The Street Railway Gazette.

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The Street Railway Gazette.

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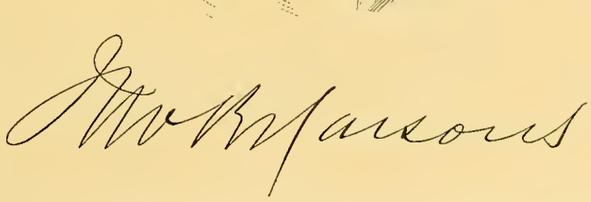
John B. Parsons, Esq.

GENERAL MANAGER WEST CHICAGO ST. RR. CO.

"Messrs. Widener, Elkins and Kemble have no use for dummies or deadheads," wired the Philadelphia correspondent of the Chicago *Tribune* Nov. 12, as an introduction to a special despatch giving a sketch of the new general manager of the new West Chicago Street Railroad company, to whom the West Side lines have been transferred by lease. Mr. Parsons arrived in Chicago Nov. 10, and as soon as the *Tribune* people heard that the president of two street railway companies in the Quaker City (The People's Passenger and the Lombard & South Streets Passenger) had been engaged to manage the street railways of the West Division of Chicago, they requested their correspondent to hunt up information. The ordinary newspaper pumping machine—the professional interviewer—could not possibly learn anything from Mr. Parsons himself, who was in Chicago, and we are informed that the Quaker City special failed to get any statement from Mrs Parsons, but was referred to her father, and from him probably he gleaned "material" for the following information and comments:

"Mr. Parsons' capture by the 'Big Three' created no little surprise in railway and financial circles in Philadelphia, New York and Boston, for he was scarcely well known. But neither Mr. Widener, nor Mr. Elkins, nor Mr. Kemble cared about relinquishing his pleasant home in Philadelphia and settling down at his age in life in the breezy lake city. They believe that they have secured in their present railway systems in Chicago a gold mine, and to successfully carry out their schemes they needed the services of a reliable, honest, capable man who would be true to their interests, and who would take hold of their roads and manage them as they would themselves. They found that John B. Parsons, the young president of the People's Railway company of Philadelphia, came nearer the mark by his methods than any other man within their knowledge. Again, Parsons had been aggressive. When they crossed swords with him last March over the five-cent fare and twelve hours per day work for their employees questions, the young president of the opposition company was so quick in his movements and so defiant and calm in the face of their threats to squeeze his company that they were compelled to admire him. Parsons was a marked man from that time forward. He was a man after the heart of the trio. When they were ready for him the syndicate led its enemy to the pinnacle of the temple, so to speak, showed him the promised land, and he was theirs.

"John B. Parsons hails from the famous eastern shore of Maryland. He was born in the southern part of Delaware, May 17, 1850. His parents removed to Salisbury, Md., when he was at six years of age, and in that state he spent the rest of his life. He was given such an education as the country academy at his home could provide. Nineteen years of age he started out to make his fortune in the world. He turned his attention to railroading, becoming an assistant to the station agent at Salisbury, on the Delaware railroad. But he grew tired of the quiet country town and longed for the bustle of the big city, and in 1870 he found his way to Philadelphia. Here he entered the service of the Chestnut & Walnut Streets company as a clerk in its office at $12 a week. Two years' work at the desk satisfied the Colkets, who owned the railroad, that there was something in Parsons, so they handed over to him the management of a branch line, which intersected the main stem at Thirty-third and Chestnut streets,



and extended out into the suburbs some five miles, ending at the village of Darby. Parsons was faithful in his position, and earned the praise of his employers. In 1881 fortune began to smile upon the young railroader. His advancement from that time forward was rapid. In that year Robert N. Carson, a relative of Mr. Parsons by marriage, and William H. Shelmerdine, capitalists and speculators, William Wharton, jr., the railroad builder, and others, purchased the Lombard and South streets line. It was a poor concern, extending through a bad section of the city. It was nicknamed the 'fish and produce line,' because the cars were so extensively used by market people. Other folks preferred to walk rather than ride upon such a line. The company was in debt, the rolling stock run down, and financial men agreed that the purchase was a wild speculation. Money was put into the road. Carson used his influence, and had his young relative Parsons placed in charge of the concern. Soon after assuming control of the almost bankrupt road Mr. Parsons announced that five cents was the proper fare for people to pay, and in spite of the protests of his associates in the Board of Street Railway Presidents, he reduced the fare upon his line. In five years the Lombard & South streets line was made a dividend paying line.

"Having demonstrated to his friends and the public that no mistake had been made in calling him to a position of responsibility, Mr. Parsons naturally attracted the attention of railroad men. In January, 1886, Messrs. Carson and Shelmerdine secured control of the People's railway line, another road in hard luck and bad shape. They then turned around and to the astonishment of business men caused the People's line to lease the powerful and dividend paying Germantown Passenger Railway company—familiarly known as the North and Eighth streets road. This latter corporation had been in the possession of the Singerly party for years, and had been purchased from William M. Singerly a few years previously for $1,700,000 cash, the purchasers, of course, assuming all bonded and floating indebtedness. The syndicate also leased the Green and Gates streets line. The Lombard and South streets road, the Reyles line, and the Fourth and Eighth street lines and their branches were consolidated under one management. John B. Parsons was called to take charge of the system. He found himself at the head of a street railway combination representing sixty-five miles of road, property valued at $12,000,000, and having in its employ some 2,000 men.

"'Parsons has bitten off more than he can chew this time,' the old time railroad men remarked, with significant shakes of their heads. But, instead of making the lamentable failure predicted, young Parsons proved a decided success. He was fully equal to the occasion, and to prove that he was a success he accomplished three things: First, he improved the property and caused it to bring in big returns to his employers; second, he provided better accommodations for the patrons of the roads in the system; third, he obtained the good will of his hundreds of employees, and he established a relationship with the workingmen which secured their earnest attention to duty and an exhibition of interest in the welfare of the corporation. Parsons is clean handed, his integrity is of the best, and he has won his new spurs strictly upon merit. Railroad men declare him to be a good disciplinarian, attentive to business, and with an eye to the detail which makes him master of his occupation.

"It was no innate love for the man that caused Messrs. Widener, Elkins and Kemble to engage the services of Mr. Parsons. They looked him

over the same as a rich man would a fast anp costly horse. After a thorough inspection they arrived at this conclusion: He comes high, but we must have him. * * *

"Mr. Parsons was at first disinclined to consider the proposition made to him, to relinquish his present position and assume the control of the Chicago road. As his nearest friend and sponsor, Mr. Carson, put it: 'The offer was such a handsome one, and the inducements so good for a young man, that I advised him to accept. We are very sorry to lose him, but I would not stand in a young man's way. If he shall be successful he will get rich. The people of Chicago will be satisfied with him.' It could not be learned definitely what the terms of the contract are, but it is stated that Mr. Parsons will receive not less than $10,000 per year salary, with a percentage based upon the profits of the corporation reaching certain sums each year. It is also said that, in addition, a block of stock will be transferred to his name, to become his individual property upon certain conditions.

"Personally, Mr. Parsons is quiet in demeanour, pleasant in manner, and has but little to say. He has never figured in the social world, having always lived unostentatiously. About one year ago he was married. His wife will accompany him to Chicago. Mr. and Mrs. Parsons had just furnished a new house at No. 2033 Spring Garden street and had settled down to enjoy social life and become introduced into the society befitting a man of his position, when the golden promises of the West were whispered into his ear. Mr. Parsons is a well-known member of the Masonic order, and an active Knight Templar."

The accompanying portrait and autograph of this rising gentleman of 37 years, cannot fail to be interesting; and several of our readers who may not be well acquainted with him may remember a young man making a speech at the fourth annual meeting of the American Street Railway association, commonly called the St. Louis Convention, on the strikes that were then (1885) only beginning to trouble street railways; that was Mr. J. B. Parsons. The Association did not see the danger looming in the distance, although Mr. Calvin A. Richards (Boston) presided, and they did not heed Mr. Parsons, who predicted, in a measure, what came to pass unfortunately soon afterwards.

Mr. Parsons is one of the most faithful members of the American Street Railway Association. He attends all its meetings, and takes part in discussions wherein he has anything to say; and when he does speak he is worth listening to. He is also more liberal than many; on reference to our Directory Supplement, it will be found that the two companies of which he was president are members of the Association; many a president would economize, in such a case as that, by limiting his connection with the Association to one membership, but Mr. Parsons, while seeking all information from its deliberations, and freely contributing his own ideas in return, encourages the young and promising institution by extending the membership (and the members' dues) as much as in his power lays.

American Street Railway Association.

SUBJECTS FOR NEXT CONVENTION PAPERS.

The secretary and treasurer of the American Street Railway Association—Mr. Wm. J. Richardson—writes, January 10th: "I am just in receipt of last letter of acceptance of appointments for committees. The committees are as follows:

"*Progress of Electric Motive Power.*—Calvin A. Richards, general manager, West End Railway Co., Boston, Mass.

"*Car Houses and Stable Buildings.*—C. Densmore Wyman, vice president, Central Park, N. and E. River RR. Co., New York City.

"*Progress of Cable Motive Power.*—Wm. D. Henry, secretary and treasurer, Missouri RR. Co., St. Louis, Mo.

"*Taxation of Street Railroads.*—Winfield Smith, president, Cream City RR. Co., Milwaukee, Wis."

A NEW invention for cabling the bridges of Chicago (or any others) shall be fully described in our next number.

The New Pullman Cable Cars.

In company with Mr. Edward J. Lawless, superintendent of the Metropolitan Street Railway, Kansas City, Mo., we had the opportunity of visiting the Pullman street car works, at Pullman, Ill., December 30th. Manager H. H. Sessions was absent, but Designer A. Rapp and W. B. Manierre (superintendent of the street car department) gave us *carte blanche* to make all inspection desired. The first cars to attract attention were some cable cars with seats arranged like those of the elevated railway cars, or the ordinary steam railroad cars, *i. e.*, with separate seats for couples (of which there are twelve—six on each side) and a single seat in each corner. Thus there is seating capacity for 28 inside. The seats are not reversible, as the cars are to run continuously; that is, they will turn around loops for return trips. The brake lever and grip handle are in the open part of the car, in front. The space for these, and the grip man to handle them, is very ample. There are four single seats on one side (the left) and three single seats on the right side—the balance there being open, for passengers to get in or out, that is, in or out of the inside part—each seat in the open part is entered or vacated direct from or to the side steps. The whole car measures 35 feet by 8 feet 3 inches; the open (front) grip portion is 8 feet long; the rear platform being 3 feet 9 inches long, giving a very wide entrance or exit way. The height of car from the rail is 11 feet 3 inches.

Twenty-five of these cars are being built for the Metropolitan Street Railway company, Kansas City, and along the sides of the cars the company's name appears in bold golden letters. On the front dashboard are the words, "Armourdale Union Depot," and "12th Street, Union Depot, Stock Yards and Armourdale" appears on the side boards along top of car, the said boards being removable, like the time and train signals at a railway station, and if cars on that route are transferred at any time those boards may be readily exchanged.

Superintendent Lawless required the brake handles on these cars to be bent in such a manner as to be most convenient for the operator, and he has evidently "gone in" for completely fitted cars. Besides the grip handle and brake lever, already mentioned, the Car Track Friction Appliance company's "reliable" sand box is fixed near thereto, on the front part of the car, convenient for the gripman's foot. Mr. Manierre evidently thought this superfluous when he asked: "Why do you want sand boxes on cable cars, Mr. Lawless?" Mr. Lawless replied: "On some of our grades we may not be able to stop promptly without a little sand; these sand boxes are splendid things; they help to avoid sliding, and I would not be without them for any consideration."

Bemis trucks and journal boxes give these cars the best "understandings." The rear truck has 16 patent springs and the front truck 8, and they will run a year without oiling, so Mr. Horace G. Bird (who happened to be there at the time) assured us. Mr. Bird is the general agent of the Bemis Car Box company, and he is delighted with the way these new cable cars are being built on the Bemis "combination" trucks *

Expense has been but a secondary consideration with these cars. Superintendent Lawless, on behalf of the Metropolitan Street Railway Co. (Kansas City), required the best of everything, and the Pullman company have put together the best materials available in the best manner possible. The cars are simply elegant, inside and out, and in every way. The open portion and ceiling inside are of natural wood, the sides being cherry. The seats, which are of oak, with rattan bottoms, were manufactured by the Hale & Kilburn Manufacturing company (Philadelphia); the seat covering is Wilton carpet, arranged so as to be easily removed (for cooling purposes) in the summer. The floor is covered with Mr. Edward Beadle's "eureka folding mat." There are three center lamps in each car, the best, that in the open part, is of the Adams & Westlake make, while those inside are of Messrs. Hicks & Smith's make, New York.

The general appearance of these new style of cars gives an impression of solidity and comfort, as well as elegance. They are tastefully decorated, and the blending of colors—dark lake-uprights, with vermillion frames and varnished natural ceilings, etc.—produce a pleasing effect, which is enhanced by the handsome brass fittings (from Hart & Co., Detroit, and Union Brass Co., Chicago) and the Pullman embossed glass. And with the highest degree of beauty are connected the most careful means of safety; the pilot fenders in front serve the purpose of the cow catchers on steam locomotives, and lifeguards along the sides make it impossible for any one to fall under the wheels.

Besides the above mentioned twenty-five new cable cars for the Metropolitan, there were several cars in course of construction for the People's Cable Railway company, Kansas City. These are the old style—grip car separate from passenger cars. Bemis trucks are to carry these cars also. The cone bearing wheels turn on perfectly horizontal axles, taking motion in curving, while four side-bearing wheels make the Bemis truck most useful in securing steady motion of car. There were fifteen grip cars and twelve closed cars for the People's company.

In another part of the works was a strongly built motor car, with the name "Ansonia, Derby and Birmingham Electrical Line Motor" painted on sides, being one of the many electric motor cars built by the Pullman company for the Van Depoele system of electric railways. This particular motor car has Bemis journal boxes, but stands on Pullman No. 7 trucks.

"What is your capacity, Mr. Manierre?" Mr. M.: "From ten to a dozen cars a week."

* The rear truck is what is called No. 15, and the grip truck No. 16, in the Bemis "combination."

Resume of Progress in 1887.

A concise retrospect of progress in every department of useful science, during the past year, being "a library of information compressed into a page,"* by Dr. Robert Grimshaw, says:

"The longest tramway in the world is that projected to connect a number of towns in Buenos Ayres. It will have a total length of 200 miles. Motive power, horses. Sleeping-cars and cattle-cars will be run upon it.

* * * * * * *

"The Reckenzaun electric storage battery and motor are reported as working well on the roughest tracks in Philadelphia without hitch and practically noiselessly. Mr. Edison is stated to be thinking up an electric street-railway system that will not require any overhead wires or underground conduits. In the electric locomotives upon the North Metropolitan Tramway company's line from Stratford, the gearing is entirely new. The dynamo is on top of a vertical shaft coupled to one of the car axles by bevel wheels. The difficulty of brush reversing has been avoided by placing two bevel-wheels on the axle, one on each side of the driving pinion.

* * * * * * *

"There has been produced a corrugated tire for carriage and cab wheels, to enable them to be driven over street railway lines without the constant twisting and skidding so familiar to all. The new tire has a wavy edge; that is, instead of the tire coinciding with the felloe it alternately coincides with it and projects beyond it, so that the wheel will easily mount the rail."

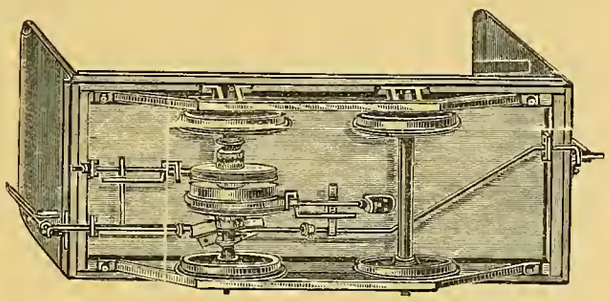
STREET car No. 4 is a car that would attract attention anywhere. It is a car that is full of individuality whether it is loaded down with passengers or whether it is empty. I have paragraphed No. 4 in the newspapers before now, alluding somewhat sarcastically to its peculiarities; but these allusions have had no effect so far as I can see. The ramshakle old car rattles right ahead as usual, displaying its peculiarities at every crossing and at every curve." That is the opening of a sweet little tale, entitled "Little Dave," in Christmas *Dixie*. We need not be inquisitive as to who built that car, or what its peculiarities are. One moral of the story is, that people become attached to particular street cars, and learn to love a car as another familiar object was loved by the one who exclaimed, "O, little brown jug, how I love thee!"

*New York *World*, January 1, 1888.

A Novel Car Starter.

The acompanying engraving represents a late invention in the class of car starters by S. Henry, of East Baintree, Mass. At the recent Mechanics exhibition in Boston, one of the first objects that attracted attention on entering was a working model of this car starter, which was operated and explained by the inventor. The power for starting the car was accumulated in the act of stopping.

Disposed around one of the axles there is a hollow drum or case 15 inches in diameter and 20 inches long, provided around its periphery near one side with an annular groove or flange, around which passes a flat iron strap or brake. To keep the drum from turning, when required, fast on the axle is a friction clutch which operates inside of flange. To turn the drum or let go as required in starting or stopping, a sleeve having an annular flange and brake runs inside of case; they are both loose on the axle and a friction clutch also operates like the one in flange fast on the axle holding the sleeve and case in place. Around the sleeve inside the case are flat coiled springs, inside ends fast to sleeve; outside ends fast to case. When the mechanism is neutral both brakes hold—one the drum, the other the sleeve. The friction clutches turn with the axle. The operation is by the present crank or upright lever outside the dasher. To stop the car, the lever is moved forward which disengages the brake from the drum and causes the friction clutch to grasp and turn it, while the sleeve is held by brake, causing the springs to wind up and stop the car. Then the lever is brought to a vertical position and the accumulated power is held neutral. To start the car the lever is brought inward to the dasher; reversing the motion takes the brake off the sleeve, causing the friction clutch to grasp and turn with the sleeve, while the drum is held by the brake, allowing springs to unwind and start the car. It is under full control of the driver, who can start it one, two or twenty feet at will, with power accumulated in one act of stopping, which power stored will start the car six times if required.



HENRY'S CAR STARTER.

The Van Depoele Company Busy.

The Van Depoele, Electric Mfg. Co., of Chicago, are working upon five 80 horse-power generators, and four 100 horse-power generators, to say nothing of orders that are awaiting shipment, orders that have been received and not put into the shop, and all their other work. A 250 horse-power generator was one of the striking sights of their shops to the visitor who was admitted to the ground floor recently. For large work the Van Depoele shops are noted, says the *Western Electrician*, and the visitor who secures the opportunity to see it in construction, can not but marvel at the magnitude of the machines turned out here, as compared with what may be seen in the shops of other electrical concerns. Our contemporary also notes a great demand for their apparatus for street cars.

Improved Connelly Motor.

The Connelly Motor Co., of New York, who were running their first motor on a private track in Brooklyn, during the past summer, long enough to thoroughly prove the economy of their system, have just completed a second motor containing a number of improvements on the first one, which they intend placing in regular service this month on the Brooklyn Annex street Railway.

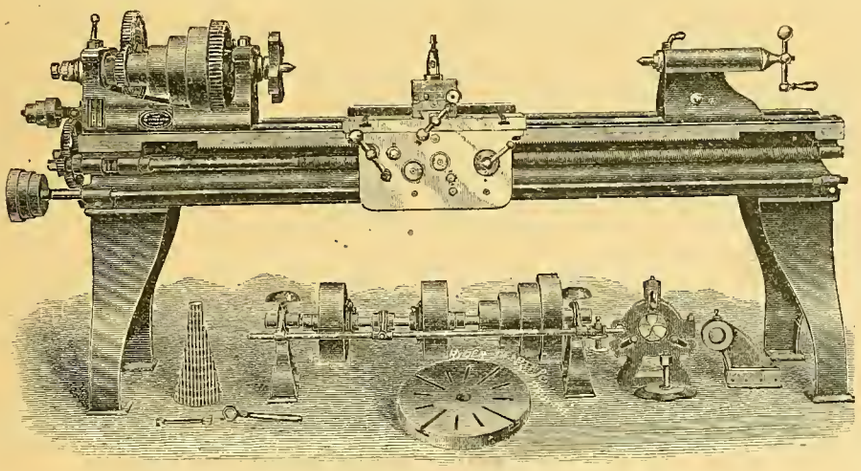
We hope to have a statement from them in time for our next issue, giving actual figures of their results.

It is claimed by the promotors of the Connelly system, that they conclusively proved during the past summer they could propel street cars an average speed of 10 miles per hour, at a cost of not exceeding $1.50 per day, covering fuel, lubrication, and a liberal allowance for wear and tear of machinery. The Connelly motor is perfectly independent; or complete within itself, being an adaptation of the gas engine with automatic attachment for generating its own gas from naphtha.

It will certainly be gratifying to street railway men to know they will soon have an opportunity to satisfy themselves regarding the claims made. If corroborated by actual service, its friends predict a very prosperous future for the "Connelly Motor."

Nicholson & Waterman's New Lathe.

The acompanying lathe cut is that of Nicholson & Waterman's* new engine lathe, recently placed upon the market, and is well adapted for the fine work necessary in making electric motor fittings, etc. It is the result of over twenty years' experience, and is designed and intended for that general shop use in which a tool once purchased is required to do heavy or fine work, as occasion requires, and to wear for generations.



NICHOLSON & WATERMAN'S NEW ENGINE LATHE.

All experience shows that where a machine is properly designed, it cannot be too well built for economical usage, and the difference in first cost soon disappears with the absence of repairs and break-downs, and in the increased cheapening of the product as well as the superiority of the work produced. These advantages are claimed for this new lathe, which is 16 inches by 8 feet. Independent rod and friction feeds are employed. The steel lead screw has large, long bearings, and an improved adjustable take up, and is provided with an open and shut nut, operated by a lever. The spindles are made of high grade hammered steel. The head stock spindle runs in composition boxes and has a $1\frac{1}{16}$ inch hole through its entire length. The front bearing is $4\frac{1}{2}$ inches long by $2\frac{1}{2}$ inches diameter; the rear bearing being $3\frac{1}{2}$ by $1\frac{3}{4}$ diameter; both of these bearings are carefully ground and scraped to insure the finest possible wearing fit. The cone has four grades, the largest being 11 inches diameter with $1\frac{1}{8}$ inches drop and $2\frac{1}{8}$ inches face. This length of bed will turn 4 feet 9 inches in length by 11 inches diameter over carriage. All sliding surfaces are fitted by scraping. The foot stock spindle is 13 inches long, 2 inches diameter, and has a bearing its full length. The carriage is gibbed front and back, and has long, wide bearings with convenient means of adjustment. It also has a binder for holding carriage while squaring up. The apron gearing is simple and accessible and is provided with power cross feed. Ample backing and bracing has been obtained by increased metal at all points of strain. Gears are furnished for cutting all pitches from 2 to 24. By means of an additional stud, a thread can be cut of 48 pitch. Every lathe is provided with the friction counter-shaft shown, the operation of which is by wrapping contact, securing firm hold and easy operation.

*Nicholson & Waterman, manufacturers, Providence, R. I.

Rapid Transit in Cities.

BY PROF. LEWIS M. HAUPT.*

In the course of a lecture delivered before the Franklin Institute, Nov. 11, 1887, Prof. Haupt said: It is not surprising, since value is conferred by the presence of man, that population should be made a criterion of measure of material prosperity. Lord Bacon wrote, "The true greatness of a state consisteth essentially in population and the *breed* of men." That this is true of communities, no less than of nations, does not require to be proven, and hence it is that the prosperity and development of a city are measured by the number of its inhabitants, and that its numerical strength is so jealously guarded But there are certain requirements of every community without which it cannot *increase*; it may exist and stagnate, as does a pond of water without inlet, outlet or internal circulation, but it lacks the vitality of the living stream or lake, and must eventually evaporate. Intercommunication is, therefore, essential to the development of a city, and the less restraint there is imposed upon a free circulation of mind and matter, the more rapid will be the accretion of knowledge and the increase of population. An acknowledged authority has stated that, "rapid transit is the most important single question, no doubt, in any given city." The fundamental queries before us then are: What are the obstacles to locomotion in cities, and how may they best be removed or diminished?

The answers are, firstly, that any object which causes a divergence from the straight path joining the terminal points is an obstruction; and, secondly, our physical inability to move ourselves beyond a certain rate of speed is likewise an impediment. Hence the difficulties in the way of rapid movements from place to place are of a dual nature; the one is external, as pertaining to the path; the other is internal and inherent in the motor. Both, however, are susceptible of great modifiation, and the practical problem resolves itself into one of the relation of "the means to the end," or, more plainly, will it pay to make certain proposed modifications in the ways of communication?

It will be seen at once, by a brief consideration of the process of development of a community, that the response to this important question is a function of the population, for, in the infancy of a city, when the settlement may have had but a few hundred inhabitants, there are very few public improvements which would be justified, and these only such as are necessary to support life, as for water, food, clothing, shelter, fuel and light, all of which may for awhile be provided by individuals for their own or their families' use. But as the community increases there comes a time when it is no longer profitable nor expedient for each family thus to provide for

*Journal of the Franklin Institute, January, 1888.

itself, and the work is delegated to others, specially appointed. Thus, in brief, the community becomes interdependent, and there results an interchange of labor and commodities which must take place over certain channels, more or less direct, and when the population expands, it becomes a matter of vital importance to increase the facilities for transit correspondingly to prevent engorgement and suffocation from overcrowding, resulting in effeminacy, immorality, degeneracy and ultimate decay.

The street-car travel is now about 125,000,000 per annum in Philadelphia. If it cost but a half-cent per mile to transport each passenger, the savings of one mile would represent an annual saving of $625,000, or a capital of $12,500,000. The economy of time to the same number of pedestrians would be 3,565 years, and for those who ride say the half of this, or 1,783 years. The work done by a man in walking one mile is taken at 33,120 foot-pounds, or about one fifteenth of a horse-power, so that the energy saved in walking would be 8,333,333 horse-power per annum.

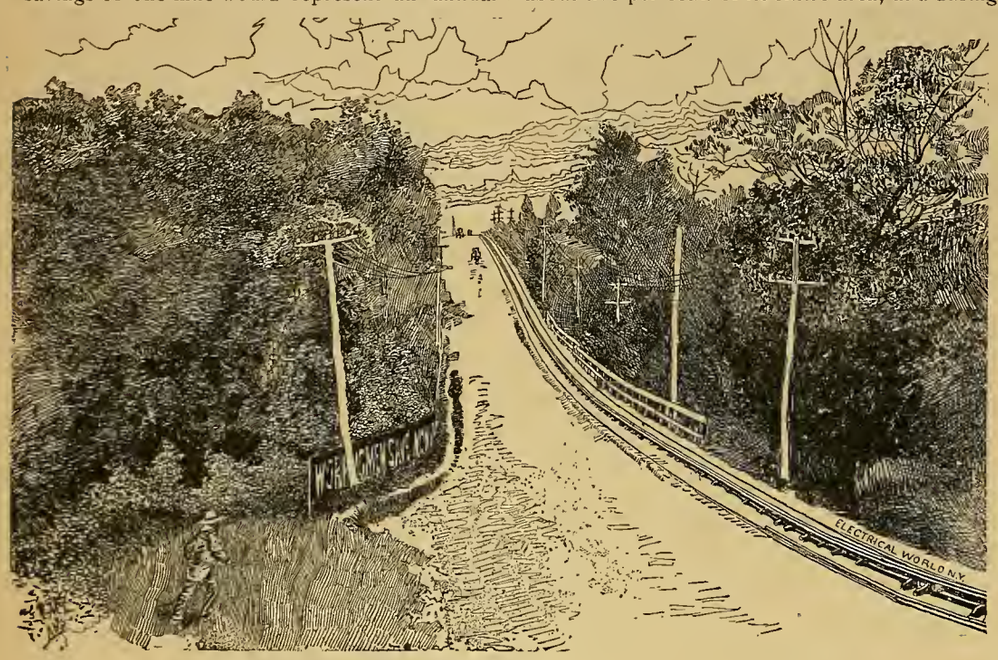


Fig. 1.—Daft Electric Railways.

The figures resulting in a saving of time by *increasing the velocity* are equally surprising when thus taken in the aggregate, as will be seen from the following extracts: By doubling the velocity it is evident that for a given length of trip one-half the time is saved, so that the round trip requiring one hour, at street-car rate, would take but a half hour at the elevated rate of travel. Thus a half hour would be saved for each passenger, and for the 125,000,000 this would amount to 62,500,000 hours, or 6,944,444 working days of nine hours. Taking 300 working days to the year, it would make 23,148 years. Startling as the result seems, it represents the amount of time actually sacrificed in this community each year by the *imperfection* of one of our ways of communication. What is this waste of time worth? Taking the average value of the working day at only $2, it gives $13,888,888. These figures explain very fully why it is that the public works of a city have so great an influence upon her material welfare.

In those cities which are readily accessible, and where the engineering works are commensurate with the requirements of the community, the increase in population has been very rapid. This is notably the case in many Western cities. In about three years Chicago will have surpassed Philadelphia in population. It may be said that such calculations are more curious than useful, but they are intensely practical, and represent facts which are none the less true because not generally observed. It is by recognizing these facts that the prosperity of a community is fostered.

The city needs to be relieved from the dangerous obstructions and delays, caused by the passage of long lines of freight and passenger trains over and upon the streets at grade. In 1881, I collected the statistics of trains and passengers in and about the city, and found there were 22,000 train crossings per diem, which would amount to twenty per minute in a train day of eighteen hours, or one train upon twenty crossings every minute. This takes no account of the length of the trains, which may cover several crossings at the same time, nor of the rapidity of their movements.

The effect of an increase of velocity upon the available building area is shown by the following statement: Before the introduction of street cars in 1858, the built-up portion of Philadelphia covered less than seven square miles, or about five per cent. of its entire area; and during the next quarter century (to 1883) it had increased to but sixteen square miles, or to twelve and one-half per cent. There remained to be developed, therefore, eighty-seven and one-half per cent. of the city's limits. The relative areas available within a limit of half an hour, as affected by the kind and velocity of travel, are theoretically—

For pedestrians moving at the rate of two miles per half hour, 8 square miles.

For horse car moving at the rate of three miles per half hour, 18 square miles.

For elevated railroad moving at the rate of six miles per half hour, 72 square miles.

For underground railroad moving at the rate of ten miles per half hour, 200 square miles.

Marvelous as was the growth of travel in New York in 1884, it has continued to increase rapidly until it has now outgrown the capacity of the existing plant; and projects are seriously contemplated which would raise the plane of traffic above the roofs of the houses by a series of long-span trusses resting upon tall iron towers, or depress it beneath the surface of the streets; or both methods may be applied as the demands increase. The increase in the elevated railroad traffic for 1887 was over 40 per cent., being 158,963,232 passengers.

A New Electric Street Car.

The Australasian Electric Tramway company have been watching the working of electric railways in America and in Europe for some time, and an electric car has been built for them at Shrewsbury, England, which was officially and publicly tested upon the Willenhall line of the Wolverhampton Tramway company, Dec. 15; and *Industries* (Dec. 23) says that during the trial, the car traveled at the rate of fifteen miles per hour on the level, and ascended a scale of 1 in 15 without difficulty. The Shrewsbury firm built the car for Messrs Elwell & Parker, Wolverhampton, who fitted it with the electrical appliances. The engineer of the Australasian Electric Tramway Co., after witnessing the successful operation of street cars fitted with Messrs. Elwell & Parker's motors, in Brussels, entrusted the construction and fitting up of their car to this firm, who have had considerable experience in electric railway work—at Portrush (Ireland), Blackpool (England), etc. In the latter systems the current has been supplied to conductors laid along side or below the track, or overhead wires. But in this case secondary batteries are employed, similar to the storage batteries at Philadelphia, described in our previous issues. The accumulators are capable of working the car for seven hours under ordinary running conditions, it is said. The motor is geared direct to the axles, and runs at the low speed of three hundred revolutions per minute. Switches are arranged at each end, so as to be directly under the driver's control. Should the car prove satisfactory, the system will probably be adopted by the Australasian company generally. We hope to give an illustrated description thereof in our next.

Fig. 2.—Daft Electric Railways.

Street Railways in the Southern States.

It is stated that the late Henry Ward Beecher once said, that he would willingly give away his right hand, if thereby he could help to make the South prosperous. The thirteen southern states show signs of great prosperity anyway. Our "Pointers" during the past year contain numerous items relating to street railway enterprise—which is always a sign of prosperity come to stay—in the great South. The Chattanooga, (Tenn.), *Tradesman*, Jan. 1st, publishes a tabulated indication of the unmistakable growth of the South, which shows, *inter alia*, that 152 street railway companies have been incorporated, or at least organized during 1887: Alabama has 24, Arkansas 9, Florida 7, Georgia 22, Kentucky 6, Louisiana 2, Mississippi 2, North Carolina 9, South Carolina 3, Tennessee 39, Texas 17, Virginia 8 and West Virginia 4.

"Of course," as the compiler of these figures observes, "a very large percentage of the street railways were not built in 1887, nor will they be built in 1888; some perhaps will never be built." What is specially claimed for the tabulated statement is "not so much in showing what has actually been built in the South as it serves to indicate the prevalent spirit toward industrial pursuits now manifest in every section of the southern states."

White's Street Railway Construction.

Mr. Reynolds J. White, 12 Pearl Street, Boston, has procured numerous patents connected with street railways. Not less than eight patents were granted him on the 3rd inst.,—track for street railways, street railway construction, construction of street railways, street railway construction, street railway construction, street railway construction, street railway construction, combined sleeper and chair for street railways. The objects of the inventions are "to produce a substantial and economical street railway road bed that can be easily and cheaply laid, and can be repaired, when necessary, by removing a very small portion of the pavement." The patents cover peculiar methods of constructing the rails and chairs to hold the same, and keys to fasten the rails to the chairs. The Western office, as will be seen from advertisement in this issue, is at 154 Lake street, Chicago; Mr. Wm. P. Boyden, agent, will be glad to show models, etc.

These inventions will be described in our next number.

The Daft Electric Railway System.

A cut showing the grades of the Baltimore and Hampden electric railway (Daft system) was published in our Vol. I, page 201 (July GAZETTE, 1886); and a cut of the "Benjamin Franklin," at the head of a Daft electric on the North avenue "L" road, appeared in Vol. II., page 175 (September GAZETTE, 1887), accompanied by a resume of the progress made by the Daft system, which is in successful operation at Baltimore, Md.; Los Angeles, Cal.; Mansfield, Ohio; Ashbury Park, N. J.; Pittsburg, Pa.; and Ithaca, N. Y. Although the utilization of electricity as a motive power commenced in Europe—Fontaine's haphazard discovery at the Vienna Exposition of 1873 may be said to be the birth of dynamo-electric power—America has taken the lead in its development. And the Daft people, and those who co-operate with them, have the greatest number of electric street railways in actual operation—with the exception of the Van Depoele electric company, who count some eleven lines operated with their apparatus at present. The Daft system stands next—in the number of electric railways already built—and it is highly spoken of.

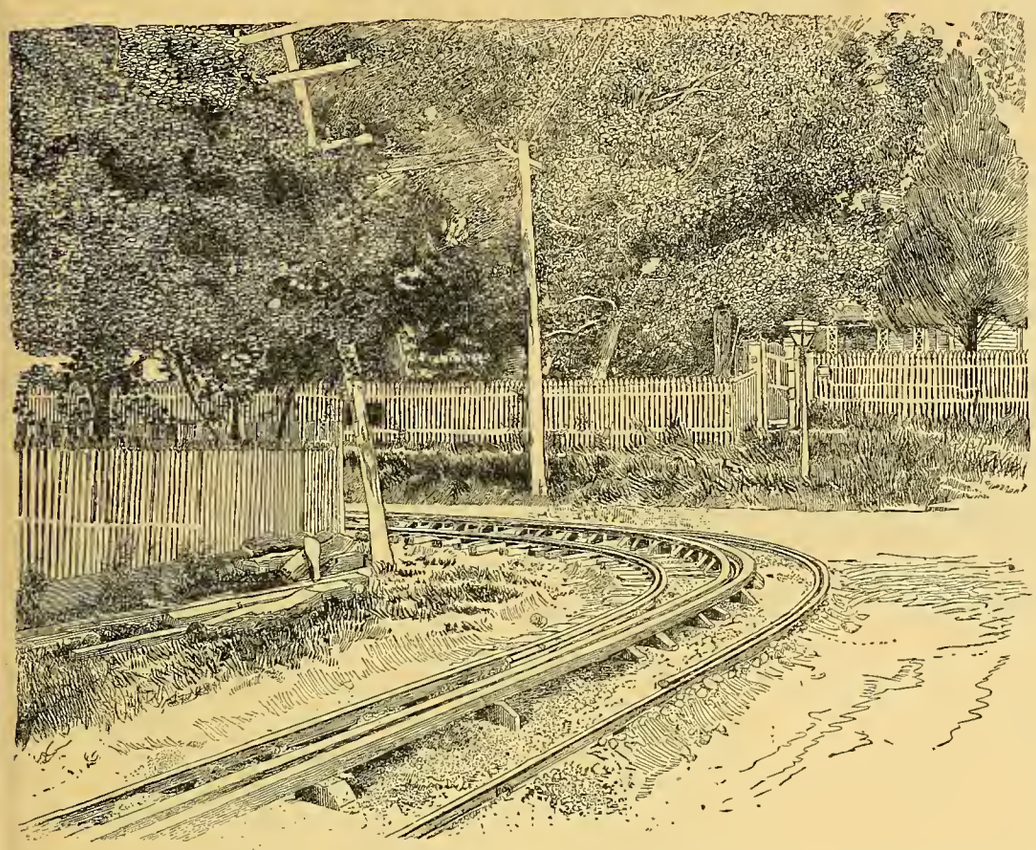


FIG. 3.—DAFT ELECTRIC RAILWAYS.

The earliest permanent application of the Daft system of electric propulsion to a recognized commercial enterprise occurred in the summer of 1885, the subject being the Hampden line of the Union Passenger Railway of Baltimore, to which references have been made in several issues of the GAZETTE. It is conceded by every observer that a more unpromising road could hardly have been found. There was not a hundred yards of level track in the whole length of two miles, the gradients ranged as high as 348 feet per mile and the radii of the curves as low as 40 feet. The condition of the rails was (without exaggeration) as bad as possible, and thirty-two mules maintained an irregular service at a speed of about 4 miles per hour. Figures 1, 2, and 3 will give an idea of the natural difficulties of the situation. The stationary plant consists of a steam engine of 75 horse-power, driving, through the medium of belting and countershaft, a Daft dynamo-generator of 50 horse-power, of which there are two, one for service and one for reserve. The current from these is led, by suitable cables, to the track and delivered to the conductive system which, in this case, is known as the "central rail," and consists of an ordinary 25 lb. steel rail resting upon umbrella-shaped insulators, fastened to the cross-ties at proper intervals. The standard of baked wood soaked in asphaltum, and the always dry interior of the iron umbrella-top, to which the rail is secured, afford satisfactory insulation in all kinds of weather.

The establishment of the power-station at one extremity of the line is theoretically objectionable, since the whole resistance of the conductor exerts its natural effect upon the current-potential, but no difficulty whatever has been experienced on this score, and it has even been made evident that a much greater distance could be included even with the present unrefined method of insulation. Contiguous rail-ends are electrically connected by copper strips riveted to the webs and the entire length of the conductor guarded from accidental touch or tread by a skirting of planks on each side, rising a little above the top of the rail. The potential employed is so low that no serious results need be apprehended from such contact, and a farther advantage has been revealed in the remarkable diminution of lateral escape ascribable to it. Pending certain drainage of the roadbed, the line was frequently in operation when the entire foot of the central rail, and consequently many of the insulators, were actually submerged in water for a distance of fifty or sixty feet. This

FIG. 4.—DAFT ELECTRIC RAILWAYS.

would be quite out of the question with any high-potential system. This road also exhibits the unusual feature of changing the method of conduction between its termini without any interruption of traffic. At the extremity of the two miles of central rail an additional half mile of track is laid and the current is led along it by an overhead wire sustained by poles and arms over its axial line. On arriving at the end of the central rail, the contact-wheel of the motor, riding upon it, is triced up and a bell-crank arm terminating in an elastic copper brush, that at other times lies upon the roof of the motor, is raised until the brush makes a sliding contact with the aerial conductor which is maintained until the motor returns again to the central rail, when the arm is lowered and the contact wheel dropped. It is needless to say that the central rail and overhead wire are in electrical connection, and pervaded by the same current.

The tractive equipment consists of four motors, two of 14 and two of 18 horse-power, and 5,600 and 6,700 lbs. weight respectively. Connection between armature shaft and driving axle is effected by steel pinions, secured to the ends of the former, engaging with large gear wheels keyed to the latter. The adhesion of the whole wheel-base which the excessive gradients and contracted curves make indispensable is obtained by connecting the two car-axles by chains and sprocket-wheels. The difficulties of the route can hardly be appreciated unless numerically stated, and, illustrative of this, may be mentioned a gradient of 388 feet per mile including a curve of 89 feet radius which was encountered at the inception of the enterprise. Equating this curve proved it to be tantamount to a straight gradient of nearly 500 feet per mile, but it was nevertheless found possible to take a train of a total weight of nine tons over it at a fair speed, and also to stop and start upon it with perfect ease. This, however, was subsequently modified. Another gradient of 275 feet per mile includes a curve of 42 feet radius, yet it is by no means uncommon for a motor with a car attached to pass it at a speed of five miles per hour.

While the obstacles to the propulsion of a single train are sufficiently impressive, it must not be overlooked that there are three trains in simultaneous service, and such a position as the following is regularly occurring: An outgoing train will be ascending a gradient of 256 feet per mile while one incoming will be upon one of 264 feet, and a third climbing an ascent of 201 feet per mile. All three maintain an average speed of five miles per hour, and together absorb 40.09 horse-power, which may be regarded as the maximum on the present working basis, though not the ultimate working capacity of the stationary plant. A fourth train is run, when the exigences of the traffic demand it, without affecting the uniformity of the service or exerting any prejudicial effect whatever upon the dynamo-generators.

FIG. 5.—DAFT ELECTRIC RAILWAYS.

That electricity is rendering efficient and satisfactory duty here admits of no question, but whether or no it is doing so in a commercial sense can only be established by critical observations covering a considerable period. Statistics of this nature are always difficult, if not impossible, to obtain; and the only published record extant, bearing on this question, is that compiled by Mr. T. C. Robbins, manager of the Union Passenger Railroad Company of Baltimore, after he had instituted a comparison between two successive years, the first using horses and the second relying on electricity, and is reproduced at the end of this article.

The next electric railway built and equipped on the Daft system, is that at Los Angeles, Cal., which is just completing a year of uninterrupted service. Fig. 4 gives a view of its double track, overhead conductors, and rolling stock. The line is five miles long and the method of conduction is solely by aerial wires with "trolleys," better seen in Figures 5 and 6. The stationary plant originally consisted of a steam-engine, nominally of 30 horse-power, and two dynamo-generators which ran four independent motors of 15 horse-power each, or four motor-cars of 12 horse-power, at a schedule speed of 12 miles per hour, with occasional spurts in the suburbs, when an exigency arose, of 20 miles per hour. In view of very considerable prospective extension of its service the prime mover of 30 horse-power has been changed for one of 200, and an independent motor of the Pittsburgh type has been ordered. These are of 35 horse-power, 6 tons weight, and with a wheel base of 8 feet, and on the Pittsburgh, Knoxville & St. Clair railway, draw, with the use of a sprocket-wheel and rack, a loaded car up a 16 per cent. gradient. The same motor has taken a loaded car up a 12½ per cent. gradient at a speed of 8 miles per hour. With the exception of the Daft motor, "Franklin," for elevated railway service, these are the largest tractors ever built in the history of electric propulsion.

FIG. 6.—DAFT ELECTRIC RAILWAYS.

The line at Pittsburgh, though not in full operation, merits some special description, as it makes use of underground and aerial conduction on the same circuit. The underground conductor occupies a conduit similar in design, though much smaller, to those in cable-traction, and this difference in size, and in the excavation which it entails, are fairly proportional to the difference in cost between them. The price of that at Pittsburgh was $15,500 per mile. The disparity is further enhanced by substitution of an imperishable copper conductor costing $1,200 per mile for a cable whose lifetime is only eighteen months, and its price per mile $2,000.

But the most telling advantage claimed on the side of electricity lies in its superior efficiency.

Of the total mechanical power involved in cable traction, the proportion applied to moving the cable alone ranges from 84 to 65 per cent.—or an average of, say, 75—leaving only 16 to 35 per cent. or an average of 25, available for propulsion. In brief, three quarters of the total effort of the prime mover is absorbed by prejudicial work and one quarter left for useful application. With electricity, 70 per cent. of the total energy of the prime-mover is available for useful work on any circuit of the ordinary length of a street-railway, and only 30 per cent. consumed in the conversion of mechanical work into current, and *vice versa*, and overcoming the resistances of conduction. The effort of the prime-mover is distributed in the ratio of seven-tenths to useful work and only three-tenths to prejudicial. It would be supererogatory to point out that this difference in efficiency at once prescribes the difference in size—and therefore cost—of the stationary plant.

Mansfield, Ohio; Asbury Park, N. J., and Ithaca, N. Y., only employ motor-cars of which examples, both closed and open, are shown in Figures 5 and 6. These are generally made of 15 horse-power capacity which enable them, on moderate gradients, to tow ordinary cars behind them. The difference in size and cost between a

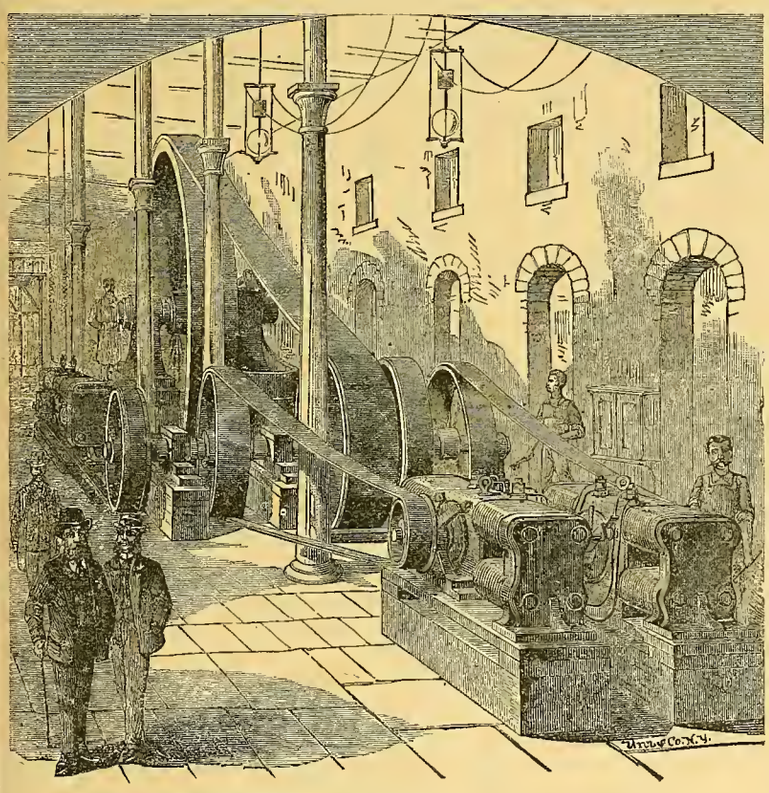


FIG. 7.—DAFT ELECTRIC RAILWAYS.

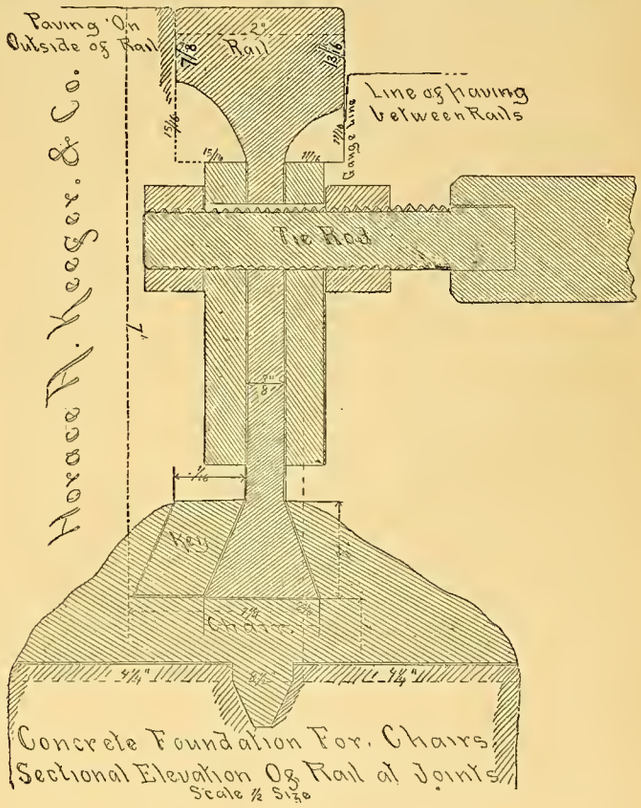
motor of 15 horse-power and one only sufficient for the needs of the car to which it is attached is a trifling price to pay for this capability of doubling the transporting power of a railway in an emergency. A road with enough motor cars for ordinary traffic and enough ordinary ones for exceptional demands is always, and easily, master of the situation.

The Daft motor-cars lay claim to peculiar merits, among which may be mentioned the following: Unobtrusiveness of the electric machinery which is entirely beneath the floor, while the starting-gear on each platform requires less room for its operation than the ordinary hand-brake. This disposition obviates, it is said, all danger to the watches of passengers from magnetization: Also preservation of the balance of the car which has been arrived at by long experience and may be disturbed by a trifle, to the utter ruin of its easy-riding qualities. In the Daft system the motor is absolutely independent of the body of the car, and is supported by a frame resting solely on the axles. This is insulated both electrically and acoustically by laminated india-rubber cushions which secure almost noiseless running, perfect freedom from jar and tremor, or electrification of the metallic portions of the vehicle. The motor thus preserves an invariable position with respect to the axles, and its motion is conveyed to them by accurately fitted steel gearing, the only trustworthy method of transmission under the conditions of the case. The sensitiveness of the springs and the suspension of the car remain just as designed by the builder, and recourse to the unreliable expedients of sprocket-chains and belts is avoided. The overcoming of this mechanical difficulty is of the highest importance. Where the distance between the centres of armature and car-axle is not fixed and invariable, there is no method of connecting except by belts or sprocket-chains. The first slip and fail where exposed to weather, and it is only a matter of time and speed which fixes the destruction of the latter. Toothed gearing alone may be depended on.

Placing the motive machinery at the end of an unstable car-floor deprives passengers of the use of one platform; destroys the balance of the car so completely as to require a different suspension by the builder—a feature which alone should settle the question with a tramway company already equipped with rolling stock, and contemplating the operation of its lines electrically; necessitates the construction of turn-tables at each end of the route to enable the driver to be in front, as the car runs—a *sine qua non* for safety; compels a resort to the objectionable sprocket-chain or belt, and exposes the watches of passengers standing or sitting in its vicinity to serious damage. The Daft system, it is pointed out, avoids all this.

Mr. Daft's greatest work is the introduction of electric power upon the Ninth avenue line of the New York elevated railways, which has been under consideration since the autumn of 1885 and for which a qualified success has already been achieved. Figure 7 exhibits the interior of the power-station at West 15th street; and a cut of the "Benjamin Franklin," with train on the elevated road, as already stated, was exhibited in a previous issue of the GAZETTE. The power-station is equipped with a steam-engine of 250 horse-power and four Daft dynamo-generators of 50 horse-power each, with a fifth smaller one for lighting purposes. The current is led by wires of suitable section to the track—a distance of some three hundred yards—and there admitted to a copper conductor attached by proper insulators to the guard-sill parallel with the outer rail. It extends from 14th to 59th street on one track and back again on the other, including the necessary turn-outs, sidings and switches. The total length is over four miles. No little delay has been experienced by the necessity of removing the central rail first laid down and substituting for it the copper rod above mentioned. The difficulty of doing this without delaying the regular traffic may be imagined.

A more important modification, however, has been the enlargement of the motor found necessary by experiment. The steam locomotives were believed to exert a maximum of 65 horse-power and a motor of 75 was built. It worked admirably with two cars in tow but with the standard train it perceptibly slackened speed on the gradients, which run as high as 105 feet per mile. Careful investigation showed that the steam locomotives really were developing 120 horse-power at times and the "Franklin" was rebuilt with a capacity of 125. The motor is at the verge of completion and will soon appear on the road to do all that the steam locomotives accomplish with, it is predicated, an even higher economy than has been demonstrated at Baltimore. The certainty claimed for this prophecy rests upon the wide difference in the extent of the two equipments about in the ratio of 1 to 60 which affords electric power its highest economic opportunity. The basic economy of electric power lies in the superior efficiency of large stationary engines of improved type and the recognized wastefulness of small engines, especially locomotives, and its best field is a complex system including many independent machines. Multiplication of power-generators is synonymous with sacrifice of fuel efficiency, and increased cost of attendance. Derivation of power from one origin with ready capability of subdivision is economy *per se*.



It requires no mathematician to perceive that, if a large engine will give a horse-power for two pounds of coal, or less, while an equivalent number of small ones require from seven to nine, or more, pounds, to do it; 30 or even 35 per cent. may be consumed by the conversions and conductive obstacles incident to the use of electric power, and still leave it substantially on the credit side of the balance-sheet.

COMPARISON ON BALTIMORE AND HAMPDEN LINE.

Year ending Sep. 1, 1885, Horses.	Sep. 1, 1886, Electricity.
Speed, per hour, 4.033 miles	8 miles
Passengers carried, 222,155	311,141
Gross earnings, $11,357.75	$15,557.05
Cost of motive power, $7,117.50	$ 4,380.00
Do. per passenger, per mile, $.0156	$ .007

Thus, with electricity, there was an increase of traffic of 37 per cent. (nearly), with 38 per cent. reduction in cost of motive power (in gross), being a reduction of 55 per cent. in cost of motive power per passenger, per mile.

The
Street Railway
Gazette.

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Spain	11ps. 95c.	Ps 1.10.
Austria, Holland	5fl. 74c.	53c.
Italy	12 lire.	1½ lira.
Venezuela	12 bolivar.	1½ bol.
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VOLUME III begins with this number. And with 1888 the GAZETTE, having outgrown its first clothing, dons a new dress. In its youth it did some things it ought not to have done, and left undone other things it ought to have done. Its success, however, has been remarkable, and the reliability of its information is indicated by the fact that the STREET RAILWAY GAZETTE has been extensively quoted, in American and English periodicals, from month to month.

In one respect it may be said that the GAZETTE leaves no room for improvement—the reliability of its advertisers. During the past two years, unreliable advertisements have been excluded from its pages; and the new year brings, among others, one new advertiser, in particular, who assures us that his company is now on a sound financial basis, and ready for legitimate business; "I refrained from applying for advertising space before," says he, "because our company was not in good condition, but now men of brain and capital are at the helm." All we have to say to our numerous advertisers is "According to your faith be it unto you"; and to the whole street railway world we wish a happy new year.

"CABLE RAILWAY PRACTICE," is the title of a series of articles, prepared expressly for the GAZETTE, by our associate editor, Mr. Edward J. Lawless, Superintendent of the Metropolitan Street Railway, Kansas City, Mo., the first of which shall appear in our February number. Mr. Lawless is acknowledged to be one of the best authorites on the construction and operation of cable railways; and these articles, which will be profusely illustrated, will no doubt supply a much felt want, and satisfy the desire of many for practical information anent cable railways.

OUR success hitherto but stimulates us to greater efforts; with additional talent and improved facilities, we are confident our friends will find the STREET RAILWAY GAZETTE still more interesting, pleasing and valuable.

AN extraordinary accident occurred in Chicago night of Jan. 14: while Mr. C. T. Yerkes was in the house of a friend, on the south side, his two valuable horses became frightened, threw the driver from the sleigh, and ran against a cable car, which killed them. Loss, $2,500.

MR. K. SAWAI, a prominent citizen of Japan, has been playing the part of Peter the Great. He is in this country studying electricity, and has filled a term as a workman in the shops of the Western Electric company.

VINCENNES (Ind.) Citizens' Street Railway company's "callendar" (which passes the mail in a boxed walnut shell, the opening of which affords a good joke,) enumerates ten occasions when people should ride—when warm, cold, rain or snow, muddy, dusty, etc.

CABLE cars were impeded in Chicago and Kansas City during the arctic weather the end of December. In Chicago the snow had so filled the slot one morning that the cars could not proceed, but the course was cleared in less than an hour. In Kansas City "the cable cars were somewhat impeded by the ice on the tracks, but the trouble did not last long, as the sleet and ice were soon melted away."

THE Chicago City Ry. Co. held its annual meeting Jan. 16, and re-elected the same directors as before. It was decided to increase the capital stock $1,000,000 (making the total capitalization $4,000,000), the new issue being to cover the Hyde Park extension, etc., and it is to bear 12 per cent. interest. 35 miles of track was laid during 1887, and nineteen miles of old track relaid; total 54 miles. Total length of track is now 122 miles; they operate 316 cars, and have 1857 horses. The cable does the work of 3,000 horses.

MR. C. B. HOLMES, president of the Chicago City Railway company (and withal president of the American Street Railway Association), is at the head of a new and important movement to rescue boys and youths without homes, or with worse surroundings than if they had no homes at all, from falling into crime. The first public meeting of the Training School and Employment Association was held at the First Presbyterian Church, Chicago, January 8. Mr. Holmes presided. Ministers of all denominations spoke. Over $2,400 was collected, with 300 acres of land.

MR. ELIAS E. RIES, the electrician and electrical engineer, of Baltimore, writes (January 9); "Have noted with interest the description of Adams' Elevated railway. * * We are still very busy in various important improvements in connection with our electric railway system, and will keep you posted in regard thereto as soon as they can be disclosed." Thanks! That is what we are here for—to be posted up regarding every movement connected with street railways, especially the coming power—and we are glad of all items of information as soon as possible.

"WHEREAS, it is desirable to know the exact status of the horse railroad franchises heretofore granted by the city of Kansas, and in order to prevent confusion in the passage of ordinances affecting the same" all ordinances of that well governed city pertaining to street railways have been collated and printed in pamphlet form. Thus the common council, and others, are enabled to see how the ground lays. May we say to other cities who have issued ordinances conflicting with existing franchises, and those liable to make such a mistake, "Go and do likewise," and save much trouble, disappointment and ill-feeling.

THE statement in the December GAZETTE, anent the success of the Daft system on the Mansfield (O.) electric railway, is corroborated by the *Electrical Engineer* (January) saying it "is doing a good business and is giving excellent satisfaction." The same contemporary says: "Two of the model electric street railways of the country are the Appleton (Wis.) and Scranton (Pa.) lines, both constructed by the Van Depoele company. They have heavy and well laid steel tracks, elegant cars, and well designed machinery. Both these lines are deservedly popular with the public, and it is almost superfluous to add, are making money rapidly."

TOPEKA (Kansas) "is now better equipped with street car lines than any other city on the globe," says a local organ, and the old fashioned horse cars have been superseded by the latest improved steam motors. Thirty miles of track for street railways, embracing three independent companies, have been laid since March 1, 1887.

ALD. BADENOCH'S bad-enough anti overloading ordinance will be passed by the Chicago City Council, likely enough, ere another issue of the GAZETTE will be printed. Only ten stand-ups to be allowed in a car—under penalties fully stated in our Pointers! Surely, that will be bad enough, and Ald. Badenoch, if he succeeds in passing his ordinance, will incur the sore displeasure of thousands who would gladly avail themselves of the opportunity to "hang on" to a car anyhow until Messrs. Yerkes and Parsons are granted a franchise, unloaded of too weighty conditions to lay down the promised and coveted cable on the West Side.

Is this true? The extraordinary statement is made, in bold type, by the *Electrical Engineer*: "A well known electrician of our acquaintance had occasion, a short time since, to consult a manufacturer of locomotives, whose railway motors have attained a national reputation for economy and general efficiency, with reference to the construction of an electric motor. The manufacturer at once exclaimed that it was useless for him to estimate on electric machinery, as he had found by experience that electrical people would not pay for the quality of workmanship that was required for proper locomotive running gear. What they wanted, he said, was a cheaper class of work, such, for example, as that used in a rather poor grade of agricultural implements."

That there may be too much anxiety for cheapness is probable, but we doubt the correctness of the above statement as a general representation of the requirement of "electrical people." And yet many electricians undoubtedly need more engineering knowledge. As Mr. Holroyd Smith, of London, recently said before the New York Electrical Society, "Too much attention can not be given to the fact that in electrical railroading the electrician occupies the second place to the engineer, and that the past failures in electric railroading have been due to the fact that electricians, pure and simple, have gone into the domain of engineering without sufficient knowledge to guide them. In other words, the electrician must not expect to succeed in working tramways unless he studies the engineering problems as well."

"THE orator of the Association" and "the oration of the evening" are two points in our report of the Philadelphia convention which a correspondent criticises; but as he will not consent to having his name published, we can not bring the fruit of his talent to the light of day, for it is against the rule to publish personal observations, however pleasant, except above the writer's proper name. One point made is that the speech characterized as "the oration of the evening" (at the banquet) was not worth reporting at all! The fact is, it was simply unreportable. And to show that our "admiration" is shared in by many, here is a paragraph written by a prominent Philadelphian on the return of the silver-tongued lawyer from a visit to Washington recently:

"The ever young and susceptible, the gifted, the poetical, our own Daniel Dougherty, has recently come back from a visit to Washington. He was made a vast deal of, as he always is at the Capital, and he has returned charmed with everybody and everything in general and Mrs. Cleveland in particular. He thinks that the President's wife is surely one of the brightest, prettiest and most sagacious women that have ever swayed the domestic concerns of the White House. Perhaps Mrs. Cleveland will think equally handsome things about Daniel. The ladies generally do. Men are moved to shout and cheer by Daniel's words, but the ladies—well, if you had seen them in a fashionable drawing-room in this city or New York, or on the piazza of the Grand Union at Saratoga, hovering around him in bevies as he tells some witty story, you would know that Daniel is their beau-ideal."

Milwaukee Street Railways.

Mr. Winfield Smith, president of the Cream City R.R. Co., and a prominent member and committeeman of the American Street Railway association, has written a concise historical report of street railways in Milwaukee, at the special request of the editor of *Yenowine's News*, which is as follows :

The street railroads of Milwaukee have grown with the population, and supply the necessities of the riding public quite as well as the average systems of other cities of equal size, and better than most. The total length is about thirty-four miles, distributed as follows : On the East Side, six and twenty-three twenty-eighths miles; on the West Side, fifteen and thirteen twenty-eighths miles ; on the South side, eleven and seventeen twenty-eighths miles, nearly all double track. Considerable areas within the city boundary are yet untouched, because the population is too sparse. The street car companies are usually willing to lay tracks and run cars wherever there is a hope of paying running expenses, trusting to the future to create a profit. Miles of road are run at a loss.

The Milwaukee City Railway company own approximately fifteen and one-half miles of road, all double tracked ; The Cream City Railroad company eleven and one-half miles, double tracked and the West Side Railway company seven miles of tracks, all doubled except a few blocks. The first named is the oldest company, and its road was originally on the East Side, beginning at Wisconsin street and extending to Prospect avenue, near the corner of Keene. It was unprofitable for several years, and was removed by Isaac Ellsworth, then proprietor, to West Water street. He gradually extended it, until he sold it some six years ago, when it covered considerable part of its present lines. It is now operating fifty-seven regular cars, and using six hundred and sixty animals, nearly all horses. Its Third street tracks reach the extreme north line of the city; on National avenue, its road touches the west line; on Muskego avenue, the south limit; and on Michigan street the eastern limit of the city. Its work is chiefly done on the West and South sides.

The Cream Railroad company began to lay track in 1874, building toward the northeastern limit of the city, which it has nearly reached. The company uses thirty-five regular cars and four hundred and twenty animals, of which nearly two-thirds are mules. Its lines, except the Forest Home road, are in a general north and south direction, and on the eastern side of the city.

The West Side Railway company constructed track in 1875. Its main line is east and west, entirely across the city, having a branch at Eleventh street running to the north nearly two miles. It runs twenty-one regular cars and uses 237 horses.

In addition to the regular cars above mentioned, each company runs extra cars or "trippers," and summer cars.

The service on these cars is generally good. It might be better, since the lines might be more conveniently and economically operated, if owned in common. Comparing them in any point of view with the roads of other cities of equal riding population, the result is highly creditable to Milwaukee roads. The opening bridges and the steam railroad crossings are a sore trial to managers and passengers, often delaying cars and thus deranging the time-table in a manner specially annoying to the waiting citizen, fuming because his car does not come. Street cars furnish indeed to the chronic growler a fertile, unfailing source of complaint, but the most reasonable passengers meet with occasional annoyances, more disagreeable that the cause is unknown. Where perfection of service depends upon so many men, so many animals, so many circumstances without the control of the manager, it is not within human ability to attain it. A broken down wagon, a fire hose, a train of cars across the track, a runaway team, a sick horse, a broken axle, an open bridge, an excessive load, a slow watch, may produce delay which the passenger cannot but magnify, and is quite likely to resent. A diversity of tastes forbids pleasing all. One is in a hurry, and chafes over a slow time ; another having plenty of time grieves that the animals are overdriven ; one wants a car to wait for him to walk a block, disgusting those in the car; one finds the car too warm, another complains of lack of heat. The cushion one wants, another finds it to breed filth and disease. Then it is natural to some to consider the fare they pay as conferring a right, as creating a sort of duty to find fault; and some fear they betray ignorance or inexperience if they fail to discover cause for censure. Too often, a low-bred or quick-tempered man or woman, giving way to petulance or anger, insults a driver who is but doing his duty, and cherishes a continuing soreness against him, and his class, and his employer.

Besides their patrons, the companies have their own troubles, often vexatious, with their employees, or with the municipal rulers. The spirit of tyranny finds a convenient, although not always a submissive, victim in a street railway company.

The cars are generally the work of the best makers, and a few are luxurious. A comparison with those of many cities corresponding to ours in population shows that Milwaukee has nothing to be ashamed of. They are not of the largest size, but they are more frequent for that reason, and therefore more satisfactory. Two of the companies use tube conveyers to carry change to the fare-box from their seats, and even from the rear platform. Two companies heat their cars in cold weather. These advantages are given to a very limited extent elsewhere, and were adopted in Milwaukee among the very first cities in the Union. A good car should last twenty years, but here, at least, they are laid aside much sooner. The public scoff at the economy by which only it is possible that they should ride so cheaply, and demand velvet cushions, while buying four-cent tickets. Horses and mules are supposed by many to work on cars as on wagon-teams, ten hours a day. They usually work three to four hours, and if not quite well, or not thoroughly accustomed, they work only an hour or so. Five teams are usually assigned to draw each car for a day, and three drivers are required for two cars. The STREET RAILWAY GAZETTE says: The average period of usefulness of the car-horse is about three years. When of no more use to the company it is sold, usually for a low price. Horses and mules suitable are the purpose cost $125 to $150. They are sold at $15 to $50.

Animals are expensive, not only on account of their short period of service, but of the feed and care they require and the buildings they occupy. Their rate of motion is about seven miles an hour on a level, but stops and the walking necessary on grades and curves reduce it to about five miles. The round trip from Bradford street to Union Depot and return requires 70 minutes, the distance being a little over six miles. The average running expenses of a car per day, without allowance for use of capital, renewal of live stock, rolling stock or rails, amount at least to eight dollars, and often exceed that rate in large cities. The expense of running a line of cars for a year often equals the first cost of the tracks.

Owners of street railroads look with interest for a better power than animals. Electricity is not yet found practicable except by the use of overhead wires, which would be much objected to. The conduit system and the independent motor system appear as yet too uncertain. As an experimenter said: I never knew when I went out with a car whether it would come back without horses to draw it.

Cables are in use in a few cities only. Those who condemn Milwaukee as backward would be surprised to learn how few successful cable roads there are. San Francisco has hills so many and so steep as to insure a business much larger than Milwaukee would furnish, and the exemption from frost there allows a construction much cheaper than has yet been adopted in this climate. The proprietors of the Rasmussen patent think that their surface system will be efficient at a cost that will warrant its adoption on many roads where the Chicago cables would not pay expenses. The manager and chief engineer, Mr. McNeil, is endowed with a perseverance, inventive talent and professional skill which deserves success.

When the Forest Home road was first opened a steam motor was put on and used for three years. It ran occasionally in the Seventh ward, and was completely successful. Although nearly noiseless it frightened some horses, especially country teams, and great objection to its use was made on Mitchell street. A story found its way into a newspaper of the "dummy" pursuing a horse and buggy up a telegraph pole. When the Cream City line was extended over Mitchell street, the motor was sold to a western road.

The Milwaukee companies would be glad to adopt a system which could be operated at a cost not so great as to abridge the present accommodations and would be also reliable and satisfactory. For after all animals do answer. They travel as fast as cars ought to move in full streets; they go when required, are controllable and efficient. They carry the people.

Rails render streets habitable which would hardly be occupied for years to come without them, because residents would be too remote from their work to walk to it. City lot speculators long since learned this and are eager for railroads. On the other hand it is not the function of a street railway to run upon vacant territory with the hope of filling it in time with people. That is the legitimate work, not of a carrier, but of a real estate proprietor. The compensation will not be found in the fare boxes, and must come, if at all, from the owners of the lots. Steam railroads doing such work are paid by grants of the lands to be benefitted, but it is not the fashion to make such gifts to horse-car companies. It is reasonable that they should progress as they are actually needed and should run cars when people enough are found to use them. The lines in this city have been extended so as to outstrip at the circumference the business which should support them, and which they find on the inner and shorter lines. By use of transfers voluntarily furnished by the companies a passenger may ride for a single fare seven miles from north to south, over several lines. The company's loss on such a ride is made up on shorter distances. But that privilege is gratituitous, whereas in many places increased rates are charged for long rides. There is a natural limit to length of a street railroad. It could not live if it carried all passengers five miles.

The travel on the street cars is much larger in summer than in winter, and in Southern cities than in Northern. Heat drives people to ride.

The city legislators have been of late slow to grant authority for extending tracks. Vehement denunciation of the slowness of the railroad companies in this respect is heard which has no excuse, the failure or refusal of the common council being the sole cause of the omission to build desired extensions. Some years ago franchises were granted with a readiness which has caused embarrassment to recent councils, and they therefore move more slowly.

No property in the city bears so heavy a burden of taxation as that of the street railway companies. First, all of their property, land, buildings, tracks, animals, cars, implements, are assessed and taxed as other property ; second, they pay license fees on their cars ; third, they keep in constant repair a strip on which their tracks lie, about fifteen feet wide. This last burden is double the other two combined, and is imposed on no other vehicles. Road teams, stone wagons, brewer's wagons, omnibuses, injure the street much more than the cars, but pay no compensation. They have not only free use of the streets, but of the steel rails, which are so easy for their heavy loads, as to be worn by them more than by the cars. Such a tax imposed upon owners of these wagons, however just in principle, to require them to contribute to such repairs, would be deemed intolerable and destructive of business interests.

Conductors are not employed, save on large open cars. They are not much needed and would be in the way in the cars generally used. The heavy expense they involve would enforce an economy either in frequency of cars or other advantage now given to the public. The patrons of the cars, with few exceptions, are wise enough to see this, and the occasional cry for conductors comes from persons who exaggerate the utility of conductors, or simply desire the creation of additional places for new employees.

No street car franchise granted by the city possessed value when given. There has rarely been competition for the right on a particular street. Time and work are necessary, and years have elapsed before a profit has been realized on roads now called good. The business is largely one of hope. New sources of expense appear and the outlays increase faster than the growth of traffic. The capital invested must needs be steadily enlarged, usually at a rate far in excess of the net revenues. The advantages of the business are found in its safety and permanence, not in large profits, but in the reasonable assurance that it will be permitted by a fair-minded public to grow in the future, as in the past, with the growth of the city and the needs of the people.

These corporations are bodies of our own fellow-citizens, bound by every tie to the prosperity of the city, anxious to promote it, worthy to share in it. WINFIELD SMITH.

The Bidwell Elevated Electric Railway.

The citizens who undertook to "create" public opinion in favor of a modified form of the New York elevated railway system on the west side of Chicago if they have not succeeded in their creation have stimulated the inventors of new and improved systems to perfect their plans and make them known. The accompanying cuts represent the Bidwell electric railway system adapted to elevated lines. Mr. Bidwell has had experimental cars exhibited on a short line near the lake front, in Chicago, for many months; and, as stated in the December GAZETTE, it has been inspected by the West Side Rapid Transit Association.

Fig. 1 shows a light graceful superstructure, not costing to exceed $100,000 per mile. The front motor car (which weighs eight tons) shows the motoneer with his hand on the lever, by a movement of which to the right he starts the train, or by a movement to the left he backs the train. The roadway is 25 feet above the street, resting on steel-plate posts set in concrete forty feet apart, on the edge of the sidewalk. The inventor's prospectus further states that the passenger cars weigh four tons each, and are fifty feet long.

Fig. 2 shows the end elevation of a car on the street surface showing the motor on the car with its belt to the axle, and the conduit between the rails under the car with the blade or wide arm dropping from the car through the slot in the conduit, having the electric wheels held up under the concave electric conductor, where they are protected from all droping of water, snow or dirt through the slot. Fig. 3 shows an end view of the motor car, showing the motor on the floor of the car and the chain-belt from the axle of the armature to the axle of the car wheels. Also the timbers under the car inside of the rail having a cap on them, under which is the half tube or protected contact electric conductor, with the two electric wheels held up under the conductors by the springs on the arm fastened to the car.

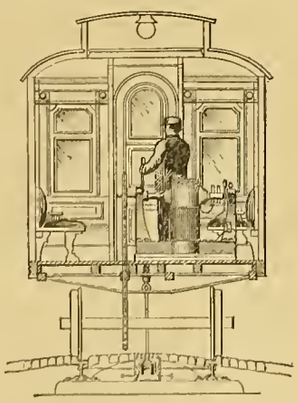

FIG. 2. — BIDWELL'S ELECTRIC RAILWAY.

Fig. 4 shows the pillars in position. *A* represents the cross tie upon which the conductor is placed; N N, the pavement; *B B*, angle braces; *C*, lower conduit case; *D D*, upper conduit case; *E E*, stay rods. The electrical conductors, *G G*, are concave and suspended under the surface plates, *D D*, but properly insulated from them by the insulating wood, *H H*. Thus suspended, the conductors are placed in a position of perfect security from interference in any manner whatever and thereby insure an undisturbed and undiminished current. The electrical contact between the conductors and the motor on the car is had by means of the arm J, supported by the adjusting spring M, which sets in a case in the bottom frame of the car. The arm projects down through the slot into the conduit, and holds in place the contact wheels, *J J*, which run in the concavity of the suspended conductors, *G G*. The spring alluded to above and the knuckle joint, L, adjust and provide for the motion of the car, thus guaranteeing perfect and constant electrical contact without sparking. Both currents, out-going and return, are provided for by the two conductors, and pass through the arm connection, which is so insulated that they are perfectly separated.

CORRESPONDENCE.

The Girder Rail.

Metallic Street Railway Supply Co.
Albany, N. Y., Dec. 16th, 1887.

I have read with much interest the report of C. A. Richards, Esq., on the girder system, and while this system is not new, it having been used in England and South America for many years, yet the report contains much food for digestion, reflection and rejection.

He has classified the girder system into three types: the first, with a deep web member which is attached direct to the ties, as in steam railways construction. Second, the web or girder, which is not so deep, "is connected to the crossties by special attachments" (viz: chairs, spikes and bolts). The third is that in which the girder is of minimum depth, and which depends upon a supporting medium, *e. g.* longitudinal chair, etc. The web or girder in this case being a means of connection of the subway, and not materially as a stiffener.

It is not my intention in this letter to give my views of the merits or demerits of the first two named systems, although they possess in a very marked degree both of these qualities, but simply to say, that the tenor of his article leans towards the second type, and I suppose the reason is, in a measure (large or small I cannot say) that there is in existence a rail known as the Richards rail, and used in few cases in the second type; why it should be known as the Richards rail I have been unable to find out.

The mere raising or lowering of the flange, or the bulbing of the bottom flat flange, is simply modifying other types of rails used in England since the days of Stephenson. Methinks it may be an error to make a bulb from a flat flange, but whether or not, I would not like to be the sponsor for the innovation. It may be found on close examination the second type has not decreased the first cost, but increased the trouble even more than the poor old timber stringer system. One thing, however, I am certain of, it will not last longer; and my reason is, the ties which support the chairs of the second type, will not last longer than the ties which support the timber stringer, therefore the same trouble and expense in renewals occur in both cases.

Then again, it has been the desire of advanced presidents and managers to get a system, void of decay, and discarding such abominations as fish plates, bolts and spikes, which has cost on steam railways the loss of millions of money and thousands of lives; and while in street railways human lives may not be sacrificed by the use of such fastening, yet hundreds of thousands of dollars are annually expended in repairs, which would otherwise be distributed in dividends if a system were adopted which does not use any timber, fish plates, spikes or bolts.

Mr. Richards advocates also that the fish plate should be 18 inches long. I think that length is just 18 inches too long, and my reason for so thinking is, the fish plate is no more than a lever, and the longer he makes it, more leverage every passing car has got to loosen the bolts and batter the rails. The fish plates will not prevent low joints or battered end of rails. In corroboration of this fact, let him look at the best of railway tracks, and he will find low joints and battered rails; and these two evils account for the large expense in repair of track, motive power, and rolling stock; also great discomfort to passengers.

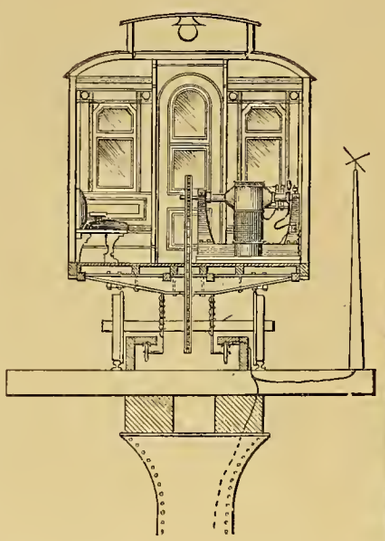

FIG. 3 — BIDWELL'S ELECTRIC RAILWAY.

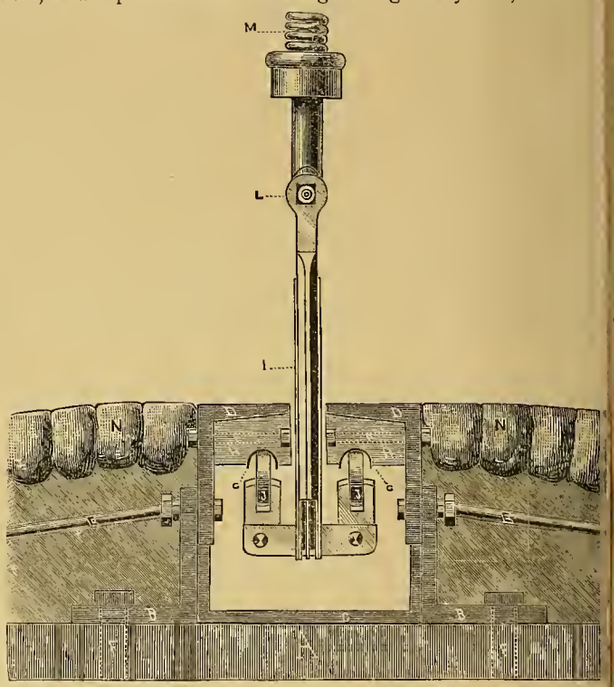

FIG. 4. — BIDWELL'S ELECTRIC RAILWAY.

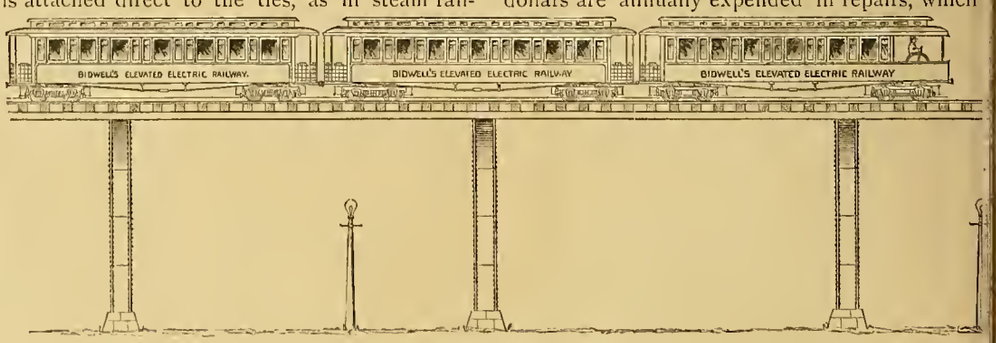

FIG. 1. — BIDWELL'S ELECTRIC RAILWAY.

Mr. Richards says, "Of the three classes, the reatest amount of success has been with the econd type." First, he says, "It is more eco-omical to use supporting devises (chairs 4 inches ase) over the tie, say every 4 to 6 feet, than to ave a bearing the whole length of the rails." To uch an assertion I can only say that he has truck the key note of all the joltings and oscil-ations now experienced in railway traveling; he urely does not mean to say that it is smoother o wheel a barrow on planks laid crosswise than n a plank laid longitudinally, and yet his asser-ion amounts to this—Why? Because of the in-quality of the vertical stiffness of the rail. The ail will deflect more between the spans than at he chair, hence the irregular wriggling motion of he cars. If Mr. Richards had given the third ype as much thought as he has the second type, e would have found that the metallic longitudi-al stringer was designed for two purposes, viz. o give the rail a uniform bearing, thus insuring mooth riding, and to prevent the paving from orking down under the rail.

Then again Mr. Richards says, "Against the hird type may be urged the fact that the rail, eing more or less flexible, its stiffness must de-end upon the subway, and its connections hereto," *e. g.*, bolts, keys, etc. A plank laid edge-ise has a certain amount of vertical stiffness, but ery little resistance against lateral pressure, so o the girder rail without a longitudinal support especially when it is lopped of its lower flange) ust depend upon the pavement for lateral sup-ort. As a committee-man appointed to investi-ate into the different systems, it seems to me that Ir. Richards has failed in his mission—in not iving in detail a description of each of these ystems, the different materials used in each, the ames of the parts, how put together, the work ecessary to put them together, the probable lockage of street travel during the construction, tc., so that railway managers could form *their wn* opinion.

In conclusion, I would state the third type has ot been extensively used, but the past two years' est of it has strengthened the approval of rail-ay officials, and capital (the only thing it acked) has come to its rescue.

Yours respectfully, THOS. H. GIBBON.

SOME day such a terrible accident will occur n the New York elevated railways as to make he whole civilized world sick at heart, was what Capt. Joe V. Meigs predicted while explaining ne merits of the Meigs elevated railway system o a Chicago audience recently. Accidents that ere each within an ace of killing crowds of assengers were recorded in the December AZETTE. In this month's "pointers" is an ccount of another very narrow escape, in reference to which the New York *World*, January 1, ays: "Again the horrible disaster that is daily hreatening the lives of the citizens who use the vercrowded elevated railroads as a means of ransportation came within the smallest fraction f time and space of occurring."

MR. WINFIELD SMITH'S treatise on the street ailways of Milwaukee, Wis., contains such logi-al and edifying observations that we have much leasure in publishing it in another part of our resent issue, and thus give it wider circulation han the local paper for which it was first written ould furnish. "I do not know why I should e requested to write about street railways," Ir. Smith somewhat sarcastically remarks in his ntroductory paragraph, "for it is well known that ne subject is simple and perfectly understood by ll except the few persons who manage them. But lthough I am not a manager of a railroad I ave been for some years near managers, and erhaps I may be expected to explain why they now so much less about their business than the eneral public."

From the article that follows, however, it is ery evident that Mr. Winfield Smith does know good deal, not only about street railways, but hat he is also a keen observer of human nature n general, and of the whims of municipal bodies n particular. The present city council of hicago, and obstructive boards of aldermen verywhere, may reflect profitably by noting hat "No street car franchise granted by the ity possessed value when given," etc.

New Books and Publications.

The Locomotive Engineer is a new monthly publication, that has made its first appearance with the new year. We give it a hearty welcome. Its scope is what its name indicates. It is not the venture of novices. The initial number bears the stamp of sound and mature judgment, literary skill, good taste, forcible diction, and all the elements of success. And no wonder; for it is in the hands of Brother Horace B. Miller, and those co-operating with him in conducting the *American Machinist*. The *Locomotive Engineer* enters the field with graceful recognition of those who are on the same ground before.

The Overhead Conductor Electric Railway Co., of Pittsburgh, Pa., have issued a pamphlet containing an account of the application of electric motors, to ordinary vehicles, a list and particulars of Joseph R. Finney, and an article by Mr. Thos. B. Kerr on the overhead conductor electric railway system, under the motto—"The days of the street-car horse are numbered."

Practical Electricity is the title of a new monthly publication, claiming to be an illustrated record of current progress in electrical science. It is published in Boston. The January number shows signs of the vigorous freshness of the new year.

Providence Cable Tramway Co. The argument by Mr. D. F. Longstreet, general manager of the Union RR. Co., Providence, R. I., before the Board of Aldermen, Dec. 2nd, and referred to in the December GAZETTE, is published in pamphlet form. And those desiring interesting information concerning the Rasmussen and other cable systems, and especially the Ries electric railway system, would do well to write for the pamphlet.

Calendars to hand are numerous. Foremost stands Mr. Frank N. Andrews' card, with monthly tablets containing illustrations consonant with the seasons. One of these will be sent free to any applicant writing to "Seasons," care of the STREET RAILWAY GAZETTE, 9 Lakeside Building, Chicago, Ill. This card is both useful and ornamental.

The Iron Clad Paint Co., Cleveland, O., have issued a similar calendar, on a smaller scale, and showing the iron clad paint to advantage.

The Carriers' New Year's Address comes from The American Graphic Co., New York.

Transactions (of the American Institute of Electrical Engineers) for December contains an index of current electrical literature, dating from October, which is to be continued from month to month. The value of such a record can not be over-estimated: it is (or will be, when more perfect) to electricians and those interested therein what *Poole's Index* is to the literary world in general. Subsequent issues will comprise leading electrical publications in foreign languages. The installment before us contains references to over 300 distinct articles, cited from 18 papers, and about 50 journals. Under "electric power" are the following, among other references:

COST OF RIES ELECTRIC RY. SYSTEM. ST. RY. GAZETTE, Oct.

ELECTRIC MOTORS *vs.* STEAM ENGINES (Corr.) C. M. Barclay, *West. Elecn.*, Oct. 15.

THE RIES COMBINATION CONDUIT (Ill.) *West. Elecn.*, Oct. 8.

ELECTRICAL PROPULSION (demonstration of Elieson system). *Lond. Elec. Rev.*, Oct. 14.

BRIGHTON ELECTRIC RY. *London Elec. Rev.*, Oct. 14.

INCREASING tractive adhesion of electric motors (Ries). ST. RY. GAZETTE, Oct.

THE COLOGNE ELECTRIC RY. *Industries; Lond. Elec. Rev.*, Oct. 21.

ELECTRIC TRACTION. (Corr.) *Lond. Elecn.*, Oct. 28.

ELECTRICITY AS A MOTIVE POWER. (S. P. THOMPSON) *Sci. Am.*, Oct. 29.

AN ELECTRIC MINE RAILROAD (Schlesinger). *Rail and Eng. Jour.*, Oct.

THE RIES UNDERGROUND CONDUIT (Ill.). ST. RY. GAZETTE, Oct.

THE Sprague Motor will shortly be subjected to very severe tests in Albany N. Y., and should it prove itself capable of readily overcoming the steep grades in that city, will stand a good chance of being adopted there on all the lines.

Business Notes.

THE Metallic Railway Supply Co., of Albany, N. Y., which has had a somewhat precarious existence for a year or two has been completely reorganized and is now the fortunate possessor of both money and brains. Mr. E. S. Fossett, Assistant Superintendent of the Albany railway, whose improvements upon the old Gibbon system have made the present one about as nearly perfect as it can be, is intimately connected with the new company and his name is sufficient guarantee that success will be the lot of the new concern.

HORACE A. KEEFER, the energetic supply man of Kansas City, informs us that he was too busy to eat his Christmas turkey. He is crowded with orders.

CONNOLLY MOTOR Co. will be heard from very forcibly in the near future—or we mistake the enterprise of those connected with it.

A STREET indicator for cars will shortly be placed upon the market, full particulars of which will appear in a subsequent issue of the GAZETTE.

THE Lewis & Fowler Manufacturing Co. has booked contracts to equip the cars of the West Side road of Boston and the West Division and the North Side roads of Chicago, with its well known registers. The same company has just shipped some of its large snow-sweepers, with all modern improvements, to the Citizens' road of St. Louis; to the Union depot line of same city; and to the Omaha Street Railway company.

THE Brownell & Wight Car Co. continues to get its full share of orders, and anticipates another big business year.

THE Iron Clad Paint Co., of Cleveland, O., finds the demand for its goods amongst car builders and street railway companies largely on the increase. "A good article always finds a ready market."

THE recent Arctic snap made street car passengers in Cleveland bless the man who invented the door fasteners used in that city. Every car in the country, where such snaps are common, should be equipped with this admirable invention.

THE LaClede Car company has just closed a most successful year, in spite of increased competition, caused by another car building company starting up under its very nose. Keep it up through '88, LaClede. Advertising pays, don't it?

WONDER if the day will ever come when the leading supply men of the country will invite the street railway officials (and the press) to a new year's banquet? Quien sabe!

THE Swem Automatic Switch is meeting with extraordinary success.

The Brooklyn Railway Supply company is very busy, being full of contracts for both "Boss" and "Walkaway" snow plows, and has recently been sending them out to fill orders from Chicago, Rome (N. Y.), Jersey City, Danbury, Conn.; New York City; Reading, Pa.; Philadelphia, Kansas City, St. Louis, Richmond, Omaha, Camden (N. J.), Trenton (N. J.), Pittsburgh, Paterson, Salem, Taunton, etc, etc.

MR. J. L. BEAMAN, of Knoxville, Tenn., is increasing facilities for the manufacture of his fare box, which appears to be in great demand.

DON'T be surprised if another Richmond gets in the car builder's field before long. Lots of room for all; East especially.

FULTON FOUNDRY, of Cleveland, O., is running to its full capacity, a ready market having been found for the improved transfer table recently placed thereon by its proprietor (S. M. Carpenter).

HORACE A. KEEFER & Co., Kansas City, Mo. —whose Providence girder rail is shown by a self-explanatory cut on page 7 of this number—have issued an instructive sheet showing different sections of street and slot rails most popular at present, any of which they are prepared to ship in a reasonable time, having the rolls to put into use at once. They offer to furnish designs and prices for castings, yokes, bolts, rails, driving machinery and equipment quickly and at the lowest market prices.

THE Thomson Houston Co., Lynn, Mass., are building street railway motors.

THE Lane & Bodley Co., Cincinnati, have supplied the steam plant for the White line electric railway (Van Depoele system), at Dayton, Ohio.

IN journeyings last week through the Empire State, I rode on a street car equipped with a newly patented gear, and it has never been my pleasure to ride so easily. Full particulars of this gear will shortly be given.

"Business is rushing," with the Car Track Friction Appliance Co. (19 Tremont Row, Boston.) Last month, General Manager Butler informs us, they filled orders for roads in Fitchburg, Mass., Waterbury, Conn,, Kansas City (three roads), Lincoln, Neb., Alton, Ill., Allegheny, Pa., the Pullman Car Co., Chicago, and the Laclede Car Co., St. Louis, aggregating over 300 of "The Reliable" sand boxes, the reliability of which is being readily acknowledged by all street railway men who try them.

POINTERS.

ARKANSAS.

Helena. President Quarles of the Citizens Street Railway company, assures us that the bond referred to in the December *Gazette* will be redeemed without fail.

Little Rock. Mr. Howard Adams is president of a street railway company who intend using steam motors in the city limits and dummies outside. They are open for propositions from any one to furnish part or the whole of material and rolling stock.

CALIFORNIA.

Sacramento. The electric motor road for which a franchise was granted several months ago is to be commenced at once and pushed steadily forward to completion. The first section of the road is expected to be in operation by May 1st. City Surveyor Bassett has made the surveys, and the materials are ready for delivery. Two electric railway companies, who have electric roads already in operation, will supply a car each for the company to experiment with. A third system, that of Electrician Hanna, which has been introduced into Stockton, is also to be tried. And Mr. Wharton's enterprise, Philadelphia, is to be rewarded with a chance here. Mr. W. J. Landers, a moneyed business man of San Francisco, is one of the largest stock holders in the new motor road. He has just returned from a four weeks' trip through the leading Eastern cities, undertaken in the interests of the Sacramento Motor Road company with a view of ascertaining if there be sufficient merit in the storage system to warrant its introduction in this city, and it is his very favorable report that has induced the company to close contracts for material and go on at once with the work. Mr. Landers is very favorably impressed with what he saw of the experiments with storage battery cars at Philadelphia. He relates an instance when two of such cars, heavily freighted, were coupled together, the first with passengers and the second with pig-iron—and the entire weight carried (exclusive of the cars themselves) was a trifle over seventeen tons, and these cars traveled all over the city. The motor on one was a six hp. and the other a five. It is therefore decided to get the best system of electric railway for Sacramento, and the chance to show which is best is left open.

San Diego. The electric motor line to old San Diego is now running successfully five miles and the use of the steam motor has been discontinued.

San Francisco. The Powell Street Cable railway was to have been in operation by the 1st inst. But up to this writing no news thereof has been received. Complaints have arisen that, through the supervisor's carelessness with regard to details, some of the curves on this and other roads are dangerous. Our correspondent writes: "The manner by which the Powell Street Cable Road company proposes to turn its cars at the end of the track on Market, Eddy and Powell streets is at present a mystery. There does not appear to be room for a turn table at these junctions."

It appears that the curves in question have been built contrary to the ordinance bearing theron, which provides that 'It is unlawful to construct or maintain a turn table on any public street within eleven feet of the curb line of any sidewalk without the consent of the property owners in front of which the said turn table is proposed to be placed. To construct or maintain any railroad tracks on the roadway of a public street within a distance of eleven feet of the curb of the sidewalk."

The Hon. Leland Stanford, President of the Market Street Cable Railway company, asks the New York Stock Exchange to list $3,000,000 first mortgage bonds and $5,000,000 stock of this company. The stock pays 4 and the bonds 6 per cent. This is the first street railway company, it is said, to have its securities listed on the New York Stock Exchange. This company has gained much by being the owners of the Valentia street line which reaches the Goddess of Liberty statue at Mt. Olympus.

The Omnibus Cable company is the title assumed by an extensive street-railway enterprise just organized and incorporated, the purpose of which, as set forth in the articles, is to construct and maintain a cable system in this city aggregating thirty miles in length, and covering all the more thickly settled parts of the city. The directors are: Walter E. Sell, George Lowenberg, Charles Sutro, R. H. Lloyd and W. S. Wood, who have each subscribed $6,000 of a $2 000,000 capital stock. The company has purchased a large piece of property on Howard street, at the northwest corner of Tenth, on which it will soon build an engine-house for the contemplated cable line.

COLORADO.

Denver. The Denver Tramway Co. have procured a new generator, 1,000 hp.

CONNECTICUT.

Ansonia. The Derby Horse Railway, to be worked by the Van Depoele electric system, is about completed, and news of its opening is expected daily.

GEORGIA.

Savannah. The Savannah Street and Rural Resort Railway Co. will construct a street railway this year. H. P. Smart, general manager.

ILLINOIS.

Cairo "We assert, without fear of successful refutation, that the Cairo St. Ry. Co., in some respects, leads any other car company extant." The special ground of this assertion, which has been sent us is that "Hereafter car No. 4 will have displayed upon its top the weather signals, made of tin painted appropriate colors." Arrangements have been made by Supt. Thos. Lewis "the recognized founder of the road," for Sergeant Bozzell, of the weather bureau, to supply weather reports regularly. The cars are supplied within with time tables, explanatory weather signals, etc., for public use.

Chicago The street cars on Milwaukee ave are unusually crowded, mornings and evenings, since the old year went out. The reason is that many who hitherto used the Chicago, Milwaukee and St. Paul suburban trains now take the street cars, because the fare has been increased on the train from five cents to seven cents (*i. e.*, 25 rides for $1.75) as far as Milwaukee ave.—about four miles from the Union depot. The Street railway company gives 22 rides for a dollar—four and a half cents a ride; and yet certain city aldermen demand 25 rides for one dollar (four cents a ride) before they will permit Mr. Yerkes and his people to cable the West Side.

The "L" road projects are making every effort to "get there." On the South Side, as we were informed January 4, the Consolidated Rapid Transit and Elevated Ry. Co., has obtained the necessary consent of property owners from near the river in the business portion of the city, taking State street from VanBuren to Thirty-ninth street—the old city limits, to South Chicago. Mr. J. D. Smith of New York, is president of the company and G. Howard Ellers, at one time consulting engineer of Chicago, general manager and chief engineer. Among the directors are J. D. Jennings, H. H. Nash, J. H. Clough and Charles Brega. The Inter-Ocean Construction Company is the wheel within a wheel which are to build the road. The plans contemplate a system very similar to that in use in New York, with modern improvements. The tracks will be supported on stringers laid across posts on either side of the road. These posts will stand eighty feet apart on the curb line and will also stand on the lot line in order to avoid too close proximity to anybody's door or window. The stringers will be sixty feet apart, and the material of the roadway will be entirely of steel and wrought iron. The cars will run directly over the center of the street—on State street for instance, they will run directly over the cable cars—and will be forty feet from the house line and twenty feet from the curb line. The cars will be similar to those used on the suburban service of the Illinois Central. There will be no bells or whistles used, and the use of oil or gas on the engines will do away with the cinder nuisance. Upon the principle that the projectors will get their money back from the patronage of the people along the line, everything will be constructed in the best possible way, both as to usefulness and appearance. The stations will be placed about four blocks apart, and will be elegant and commodious. They will stand upon the track level and be reached by stairs from the side streets. The officials expect to build and equip twenty miles of track next season, and confidently assert that the contracts for the iron work will be let before spring.

Another rapid transit scheme is projected, namely a new line to operate on the South Side. Articles of incorporation of the Chicago & South Side Rapid Transit Railroad company were recorded in the office of the secretary of state, January 5, the object being to construct a railroad from the north line of Van Buren street, between the lake shore and Clark street, in a southerly direction across thirty-ninth street, between Halsted street and the lake shore, thence in a southerly direction to Seventy-first street, thence in a southeasterly direction to the Indiana state line, with all necessary branches, switches, turntables, turn-outs, and curves along the line of the proposed railroad. The principal business office is to be maintained at Chicago and the corporation is to continue its existence for fifty years. The capital stock is to be $7,500,000. The incorporators are W. H. Clark, 2701 Calumet avenue; Charles S. Babcock, 2701 Michigan avenue; August Voughlan, 547 North Clark street; John H. Glade, 36 Grant place and Charles W. Rigdon, 307 Chicago avenue.

Mr. DeWitt C. Cregier, hitherto superintendent of the West Division street railways, will stay and co-operate with General Manager Parsons, we understand.

The West Side Rapid Transit Co. (of which Mr. J. D. Jennings is also president), meets with organized opposition, and does not make the progress it expected with the aid of the W. S. R. T. association "creating" public opinion in its favor.

Mr. Stephen Douglass has been looking how the ground lays for a new elevated railway company. He thinks there should be an "L" circle around the city, with branches from various directions to the centre.

Mr. Chas. T. Yerkes, the president of the North and West Chicago Street Railroads, is the subject of constant newspaper paragraphs, and his name has become a household word. The North Side cable will soon be in operation; and he has applied for rights to cable the West Side—the ordinance for that purpose having been before the City Council some time, and passed Dec. 9, overloaded with conditions that Mr. Yerkes declines to accept. These are to pave the street and keep it in repair from curb to curb; and to sell 25 rides for a dollar, or 12 rides for 50 cents.

The newspapers carried on their attacks on the expiring horse car system on the North Side so far that the officers of the Humane Society were tempted to avail themselves of the opportunity to try and get their names up. They actually raided the company's stables—and found horses "in hospital," as there are in connection with every horse railway system of any magnitude.

Troubles never come singly; and among the flood of attacks made upon Mr. Yerkes just now are the claims of two patentees, who have dropped upon him like mosquitoes. A copious bill has been filed in the United States Circuit Court by Henry Root against the North Chicago Street Railway company, C. T. Yerkes and Hiram Crawford, to enjoin them for the use of Root's patent for improvements in cable-railway apparatus. This patent, which was secured by Mr. Root Aug. 1, 1882, is a process for making a firm road bed for the railway. It consists of the employment of a rigid connecting-tie and support for the slat-irons. In connection with these a sub-stratum of concrete, or similar substance, is used, which 'sets' and unites with the framework into a solid mass. An effort will be made to collect royalties for infringements already claimed.

Marcus C. Isaacs, the patentee of a wire broom for attachment to street-cars, sues Charles T. Yerkes, president of the North Chicago Street Railroad company, and the company itself in the federal court for infringing his patent. The utility of the invention consists in the fact that it gets into the crevices between the street and the car rails, and keeps the tracks clear of snow and dirt. Mr Isaacs says that Mr. Yerkes has refused to buy his invention but has contracted with a firm at Sterling, Ill., for a supply of infringements.

A peculiar transaction about a lease has given occasion for filing a bill in Judge Tuley's court, from which it appears that the Le Grand Roller-Skating company leased from Mr. Yerkes some property on Clark and Elm street in January, 1886, for five years, with the privilege of making it ten. In May, of the same year, the Le Grand company mortgaged the leasehold to J. L. Amburg for $10,000. Amburg took possession of the lease and soon sold it to the North Chicago street railway for $17,000. In accordance with this the North Chicago street railway took possession. Thereupon the Le Grand company filed a bill to recover the leasehold, claiming that there had been no foreclosure, but a simple transfer of the mortgage from Amburg to the North Chicago street railway, and, therefore, they (the rink company) had the right to pay off the mortgage or buy it up.

Mr. Yerkes takes everything in good part: he maintains his good temper admirably. "Fortune favors the brave," and the famous street railway president will no doubt win in the end. He may, possibly, not get his ordinance passed to cable forty miles of the West Side streets, during the term of the present Common Council; but the bulk of the inhabitants are in his favor, and will, probably, elect new representatives on the municipal board in the spring. The present aldermen have overloaded the unaccepted cable ordinance with their eyes open. Mr. Yerkes, and his new confrere, General Manager John B. Parsons, declared all along that the terms imposed would kill the ordinance and that they will continue to operate with horses, under their present franchise, unless the people rise up and compel the council to pass a reasonable cable ordinance.

The following remarkable ordinance has been presented by Ald. Badenoch to the City Council, and referred to the Judiciary Committee:—

WHEREAS, The charter of the city of Chicago confers upon its City Council power to prohibit and punish cruelty to animals; and

WHEREAS, The overloading of street cars operated by animal power in the city of Chicago has become a crying evil, and is as well a palpable and almost hourly cruelty to the animals, which, because of such overloading, are compelled to haul greatly excessive loads, often over slippery and icy pavements and at a high rate of speed.

Therefore be it ordained, etc. SEC. 1. It is hereby declared unlawful for any person or corporation operating any line of street cars for the transportation of passengers within the city of Chicago by animal power, to allow or carry at any given time upon any so operated by said person or corporation, more than ten (10) persons in excess of the number of persons for whom seats are provided within said car.

SEC. 2. Any conductor of any street car operated as aforesaid by animal power within the city of Chicago, who shall permit a violation of Sec. 1 of this ordinance upon any car upon which he is acting as conductor, at any given time allowing or carrying more than ten persons in excess of the number of persons for whom seats are provided within said car, shall be fined for every such violation of said Sec. 1, not less than $10 nor more than $100.

SEC. 3. Any person or corporation operating any line of street cars as set forth in Sec. 1 of this ordinance, or superintendent or manager or foreman, or agent thereof, who shall directly or indirectly command, authorize, sanction or knowingly permit any violation of this ordinance, shall for every such offense be fined not less than $50 or more than $200.

SEC. 4. It shall be the duty of the police force, and every member thereof, to make complaint or arrest on sight any and every person violating this ordinance or any provision thereof.

SEC. 5. This ordinance shall be in force and effect from and after its passage.

Quincy. Work on the Quincy street railway is to be commenced in the spring. Electricity will be furnished by dynamos run by two 50 hp. engines along a quarter-inch copper wire overhead. It is intended also to light the cars by electricity.

Rockford. The Rockford Electric Power company has been incorporated. The capital stock is $30,000, and the object is the generation and transmission of power by electricity. Incorporators, John Bartlett, J. W. Bartlett and Albert L. Bartlett.

IOWA.

Des Moines. The charter of the Des Moines Broad-auge Street Railway company passed its third reading in e City Council Dec. 20th, which grants the broad-gauge mpany the right to construct, maintain, equip and oper-e for the term of twenty-five years, upon the conditions ated, with electric or other practical motor power, other an animal power, single or double track, standard or oad-gauge street railway tracks, four feet eight and one-alf inches wide, along and over the streets, alleys, via-icts and bridges of and within the city of Des Moines as signated; and such other streets and alleys as said com-ny may hereafter select with the consent and approval of e said city.

This has been done in face of the protest of Des Moines reet RR. company, locally called the Narrow Gauge mpany, who claim exclusive right under their ordinance ssed in 1869, which is to run for another eleven years he whole term being thirty years), and which ordinance is been declared valid by the Supreme Court. Said ordi-ance also specifies that

"The city of Des Moines shall not, until after the expi-tion of said term, grant to or confer upon any person or rporation any privileges which will impair or destroy e rights and privileges herein granted to the said com-ny."

Decrees have been issued by the Supreme Court, appar-ntly against the broad gauge company, but really to their dvantage, and declared by the Iowa *State Register* a Broad Gauge Victory." And the Des Moines *Daily ews* heads it "No Monopoly!" The decrees, and the gest thereof, may be found on page 20 of our DIRECTORY UPPLEMENT.

KANSAS.

Atchison. It was reported the middle of December that e Atchison street railway was sold to the Atchison Rapid ransit company. It was not so. But on January 3d it as sold to Messrs. F. D. Mills, John M. Price and others Atchison, in conjunction with a party of eastern capi-lists. The directors of the new company are: Joseph F. aul and J. C. Alderson, of Wheeling, W. Va.; F. D. Mills resident), John M. Price, W. M. Lanphear, M. T. Frame id H. H. Allen, of Atchison.

The arrangements contemplate the consolidation of the reet railways with the Rapid Transit company's line. he existing street railroads, consisting of eight miles of ack, will be put in first-class condition, and such exten-ons will be made as the rapid growth of the suburbs emands.

Pratt. The inhabitants are delighted with their mile id a half of street railway, which is now in operation.

Strong City. A rule is now in effect here to let the iver collect five cents from every passenger after 10 P.M., eside the regular fare placed in the box. The extra is for ie driver's benefit.

Topeka. The City Street Ry. Co. has elected the fol-wing board of directors: Benjamin W. Dean, president; . Wilder, treasurer; George F. Parmlee, C. S. Gleed, harles L. James, F. R. Cordley.

Supt. Shaw states that twenty new cars will be placed on e City Railway forthwith. The number of miles travel-d daily by the cars of this company is 1,518. Over 1,-00,000 passengers were carried during the year 1887.

The Rapid Transit company have put on two new steam otors and a couple of closed coaches, thereby increasing eir rolling stock to ten motors and ten coaches.

An enthusiastic meeting of the officers of the North To-eka, Silver Lake & Rossville Rapid Transit railway was eld Dec. 31, at the office of Dr. S. N. Bergen, in North opeka. They were very sanguine of the ultimate success the enterprise and will at once commence making arrange-ents for the construction of the line. The large majority ven the bonds in Silver Lake township make its almost cer-in that the several townships yet to hear from will declare favor of the road. It is understood that a larger addition-territory will soon be covered by this same company by harter, and it is believe that before the next autumn a otor line extending from North Topeka to Rossville on e west and to Perryville and Oskaloosa on the east will e in successful operation.

There is but a mile of track yet to be constructed be-veen Wichita and Valley Center. Some delay occurred id of December owing to lack of ties. Nothing is now eeded, except fine weather, to let the work proceed.

An important legal decision, against the Topeka City y. Co., and bringing a new point into prominence, is re-orted in our DIRECTORY SUPPLEMENT, page 19.

A STRANGE CONTRADICTION.

Wichita. The following "special," dated Dec. 26, ap-eared in a great number of our exchanges:

"To-day an ordinance granting an exclusive franchise the streets of this city to the Wichita City Railway com-ny for nineteen years passed the city council and receiv-d the signature of the mayor. There was also a second dinance passed consolidating with this line all other street ilways. These franchises were granted at the demand of syndicate of Vermont and Massachusetts capitalists, who ve agreed to purchase the property of the Wichita City ailway company for $700,000.

Mr. G. M. Dickson, secretary and manager, wrote:

"WICHITA, KAN., December 29, 1887.

Editor STREET RAILWAY GAZETTE—

"*Dear sir:* Yours of the 27th at hand, in reply would say e have not sold our road. Some eastern parties have en corresponding with us in relation to a sale, but noth-g has been done yet.

"We will open four miles of new line in the south-west-n part of the city on the 1st proximo; this will give us ½ miles of line, 20 miles of which has been built since ay 1st." *Ottawa Bee.* "After a long and bitter fight and opposition to the popular sentiment, the city council of ichita has granted the street railway company the exclu-ve right to occupy the streets for nineteen years. Some-ow when it comes to a struggle between street railway mpanies and municipal bodies the m. b 's are always the eaker sisters."

Winfield. The Union street railway has made great strides during the past year. The Main street line has been extended into Island Park, and a branch has been constructed around the park and across the bridge into the North Winfield addition. The Ninth avenue line was built west of the fair grounds, thereby making two distinct and complete lines running to the fair grounds. The Ninth avenue line was also extended to College street and along that street to the Southwest Kansas College. This company laid during the year about four miles of track, and put several new cars into service.

LOUISIANA.

New Orleans. At last the dispute betweeen the city and the Canal and Claiborne St. RR. Co. has come to an end. Mayor Guillotte's message to the city council, December 27, contained this statement: "The council is notified that I have approved its action of the 20th inst, to-wit: 'That the bid of the Canal and Claiborne Railroad company of $55,000 cash, this day made by sealed proposals, in obedience to motion heretofore adopted by this council, together with the specifications on which the franchise was advertised for sale, be and is hereby accepted, and the said company hereby agrees to hold the city harmless and entirely free from any impending litigation.'" This was approved, and the mayor authorized to sign the agreement.

Still the council is not yet perfectly happy. The same mayoral message contained a protest from the president of the Orleans Railroad company against the grant by the council to the Claiborne Railroad company of any right to charge for trackage over the main truck tracks of the said railroad company an amount in excess of or in conflict with the eighth article of the existing contract between the city of New Orleans and the Orleans Railroad company, executed before the city notary November 10, 1886. This matter was referred to the committee on streets and landings.

MASSACHUSSETTS.

Boston. On December 28th, orders were given by General Manager Richards of the West End railway for placing notices of the abolishment of free tickets. Over 1,500 free tickets were used over the various lines last year. In reply to a question whether annual passes would be issued to certain persons in lieu of free tickets, Mr. Richards said: "Just three! I pay my fare, every director does, and only employes wearing badges, police officers and firemen wearing uniform may ride free, and then on the front platform. The three passes will be to the three members of the state railroad commission, who are entitled to passes by law. The impression that they can write out their own passes and give them to their friends is erroneous. They can ride free, and no one else" The change took place December 31st. The annual saving will be $30,000.

Another important change that has taken place relates to 8-cent transfer tickets. There are now printed checks that are issued to passengers at certain points. The passenger desiring to change cars notifies the conductor, who punches a ticket at the date of the month and the street at which the change is to be made. Morning and afternoon tickets are of different colors. The company, it is claimed, is not bound to issue 8-cent checks, for the law can not bind it, there being no opposition lines, but the public is promised all reasonable accommodation. As rapidly as possible all the machines for registering fares will be made uniform. Other changes are to be made pointing to better facilities and accommodation.

On December 10th, at a meeting of the directors of the West End Street Railway company, a semi-annual dividend was declared of 4 per cent. on the preferred stock payable January 2nd to stock holders of record December 15th.

It is computed that there are about 5,000 street railway employees in and about the city.

New arrangements, but not many, have taken place under the consolidation administration. The routes have in some cases been changed, some of which are considered advantageous, others the reverse. The new road from South Boston, across the Broadway extension bridge and Harrison avenue to Washington and Summer streets, is regarded with favor. The new cars placed on this route are of fine pattern, with excellent equipments; and are creditable in construction and comfortable for passengers.

The conductors and drivers are fairly well satisfied with the changes made necessary by consolidation. Blockades are less frequent; trips are completed in schedule time; and ample time is secured for getting meals. Electric motors have been experimented with considerably during the past month. An old car of the Cambridge RR. Co., fitted up with electric apparatus by the Western Electric Light Co., under the supervision of the company's superintendent, Colonel C. H. Hewins, has been shown on Washington street several times at the noon hour, when most people were about. It derives its power from Julien storage batteries, the 120 cells used being placed under the seats.

The West End Street Ry. Co. has been experimenting with a Sprague motor, as stated in our previous issues. And it is hardly necessary to say again that the Sprague motor is placed beneath the center of the car, the power being transferred to the wheels by means of ten wire belts running from the motor to a pulley on the axle. The cars are propelled without even what rattling noise there is connected with the ordinary horse cars.

It is intended to put the Cambridge car in regular traffic at once, between Boston and Harvard Square, and thus there will be an opportunity to see what may be done with storage batteries.

Malden. The following-named gentlemen have been elected directors of the Malden & Melrose Railroad company for the ensuing year: Charles E. Powers, Linus M. Childs, Marcellus Coggan, John H. Studley and Henry M. Whitney. At a subsequent meeting of the directors Chas. E. Powers was re-elected president and James H. McFarland re-elected clerk.

Somerville. At a recent meeting of the stockholders of the Somerville Street Railway company, the following-named gentlemen were elected directors for the ensuing year: Samuel E. Sewell, Charles E. Powers, Reuben E. Demmon, Josiah Q. Bennett, and John H. Studley, Jr. At a subsequent meeting of the directors Samuel E. Sewell was re-elected president and John H. Studley, Jr., clerk and treasurer.

MICHIGAN.

Detroit. A spirit of dissatisfaction has existed for some time among the conductors and drivers of street cars in this city. The K of L. "took the matter up" Dec. 13, and immediately the e was an expectation that something would happen.

MINNESOTA.

St. Paul. Messrs. C. W. Hackett and J. P. Moore, directors of the St. Paul & Minneapolis Rapid Transit Co., are investigating the various systems of elevated railways; and have applied to the city council for rights of way. We hope to have their decision for our next issue, and await their choice with much interest.

MISSOURI.

Kansas City. Over $5,000,000 has been expended in cable railways in this city during the past year; thirteen miles of cable lines have been put in operation in the course of 1887. Other lines are in course of construction. "And still there is more to follow."

The Metropolitan Street Railway company alone expended considerably over $1,000,000. The Fitch street or Wyandotte line, which was completed last year, cost a round million, and the cost of the Twelfth street line, which is now partly finished, is estimated at $950,000. The same company expended $25,000 in repairing and rebuilding other lines of its system. The Metropolitan has all but finished revolutionizing the old Corrigan horse car system with which it commenced operations less than two years since. The construction of the Fifth street cable was commenced August 7, 1886, and on April 26, 1887, trains were running as far west as Ninth and Wyoming streets, a short distance from the Kansas state line. The western part of the line, which extends from Ninth and Wyoming streets to Tenth street in Wyandotte was not completed until October. The line was put in operation immediately after its completion, in fact, the Metropolitan has the reputation for running its cars the moment the cable is put in. The Wyandotte line was in operation on the same day that the cable was spliced. The Wyandotte line crosses the Kaw river near its confluence with the Missouri, and in the absence of any suitable bridge, the Metropolitan constructed a bridge across the river, which is used by the cable line exclusively Its cost was $65,000. The Fifth street, or Wyandotte line, follows almost exactly the same route as did the old Wyandotte street car line, running from Fifth and Main to Tenth street in the consolidated city. The road is four miles long, and represents an outlay of $1,000,000. The engine house is at Ninth and Wyoming streets, and two gigantic engines of 450-horse power each, are required to propel the cables. Two cables are used, meeting at Ninth and Wyoming. A year ago there were sixteen cars on the line, running at intervals of seven minutes, while now there are twenty-four trains, or forty-four cars, passing a given point every three minutes.

The Grand Avenue Cable railway has opened a repairing shop, 100x80 feet, fully equipped. Among other things are two lathes two planers four drill presses, a bolt and nut cutter, an emery rig, hydraulic punch and pattern maker's lathe

With its Westport extension (on which three new cars have just been placed) the Grand Avenue system has seven miles in operation. The line was completed shortly before the opening of the exposition, and did an enormous business while it lasted, carrying as high as 24,000 passengers in a single day. The cost of the Westport extension was $400,000, while the entire Grand avenue system represents an outlay of about $1,200,000. Thirteen more cars (of the "combination" kind) will soon be added, making the total forty.

The Troost Avenue extension of the Ninth street cable railway system was completed last year, and represents an outlay of $400,000. Ten cars are operated thereon.

The People's Cable Railway Co., which is made up of Chicago and Kansas City capitalists, are building the Tenth street cable road, 3½ miles long, at an outlay of $600,000. The work of construction commenced last August, and is to be finished in May.

Two miles of the elevated road was put in operation last year. The Inter-State Rapid Transit Co. has one mile of elevated road within the city limits; thence to Edgert n place is 5 miles; extension to Chelsea park is 2½ miles, and to Riverview 3 miles; total 11½ miles.

Rest is not yet in view. The Metropolitan Company now has an ordinance before the common council asking for a franchise for a line that will reach far out into the southwestern part of the city. This line will pass through populous sections and cannot be constructed for less than $500,000. The Metropolitan Company has been granted a franchise for a road into the northeastern part of the city, via Independence avenue and several other streets. This road will probably be built this year, and will involve a large outlay of capital. The Metropolitan folks have announced their intention to build the Eighteenth street line within the next twelve months, and in fact have already begun to make preparations to this end.

The Kansas City Cable company talks of an extension south on Washington street, so as to tap the southwestern part of the city where the street car facilities are still quite imperfect. The same company also contemplates extending both its Independence avenue and East Ninth street lines.

The Citizens' Railway company and Grand avenue line are rival applicants for a franchise for a line on Holmes street, running to the southern city limits.

A new company has been organized for the purpose of building a cable road to the East Bottoms, but, so far, has not asked the council for a franchise.

There is also a scheme on foot to convert the abandoned Fifth Street Electric line into a cable line, and extending it into the East Bottoms, but so far, the company has made nothing public concerning its plans. The franchise is controlled by a number of local capitalists, some of whom are

already interested in cable roads, and it is regarded as more than likely that a line will be built this year.

A company has also been organized for the purpose of building an elevated road which will extend from the levee to Prospect avenue. The company intends to ask the council for a franchise in the near future.

City Clerk's Office, Nelson Building.
Kansas City, Mo, Jan. 7, 1888.

Editor ST. RY. GAZETTE—*Dear Sir:* A conservative estimate of the population of the city proper is, I would say, 160,000; or, including the immediate suburbs, about 200,000. I herewith send you memoranda of horse car lines, cable lines, in course of construction and cable lines finished. The electric street railroad runs over about one mile leased track, but is not running, and probably will not be in operation again. Vesy respectfully,

H. P. LANGWORTHY,
City Clerk.

St. Louis. The Union Railway company, the Union Depot Railway company and the St. Louis Railway company appear to have united in an effort to contest the validity of the law authorizing one street car company to occupy the tracks of another company. The companies named object to the provision in the ordinance granting authority to the Southern RR. Co. to occupy their tracks and apply for an injunction. It appears that W. S. Johnson, manager of the Sixth Street line, wants to put in the Brooklyn "shallow conduit" system, and then there would be no chance of putting in the Californian system. The complainants are going to "test the case in a court of last resort."

Another collision of a cable with a Cass ave. car occurred Dec. 23rd. No one was hurt.

The adjustment of the Oliver street cable machinery is being rapidly pushed forward, and it is confidently expected that everything will be in readiness for the inauguration of the new system by January 15. The management are unable, of course, to state emphatically that all will be complete by that date, but the present indications point to very little, if any, further delay. The roadbed is all completed, and the only work remaining to be done is in the power house.

The horse car companies who have obtained rights to change to cable or other power are pressed hard to proceed; but they are anxious to see more of the electric experiments going on, and seek extension of time.

The St. Louis & Western RR. Co. have decided to submit the proposition to issue, $400,000 worth of bonds to a meeting of the stockholders February 2. Mr. Alphonse de Figueiredo has been elected Vice-President and General manager of the road.

The Lindell Ry. Co. has fully decided to go in for electricity (storage battery).

NEBRASKA.

Omaha. Judge Brewer, of the United States district court, sitting in chambers at Leavenworth, Kan., Dec. 29, gave a decision of the case of the Omaha Street Railway company vs. the Omaha Cable Railway company, refusing to grant a temporary injunction restraining the latter from building a road in the streets of Omaha, and remanding the case to the general term of the court. The case was really a question as to whether any one but the street railway company had a right to occupy the streets of Omaha with a railway. The cable railway will, therefore, continue to build its line.

NEW JERSEY.

Newark. The Rasmussen cable railway is being constructed as rapidly as possible, and will soon be in operation, Mr. McNeill, the chief engineer assures us. The grades vary from 2 ft. to 185 ft. above the datum points. The road will cost close upon a quarter million dollars, not one cent of which is to be paid the constructors "unless the road is in all respects equal to the best cable railway anywhere." The engine house and wheel-pit vaults are finished. The vault for the driving drum is 25x60x10 feet, in front of the engine house; the vault at the Market street terminus is 40x16x10 feet, and there is a similar vault at the other end of the road. The turn carriages, driving drum, etc., have been placed in the vaults which are now complete in every respect. In the vault in front of the engine house are two sets of wheels, one for the upper section of the road above Bedford street and the other for the lower section. The wheels are turned by a line shaft from the engine house to the vaults. Sewer connections are put in every 500 feet and at the Courthouse curve eight-inch catch basins will be put in at short intervals so as to keep the street dry. Each cable will touch only two wheels, one at the engine-house and the other at the return post.

The wheels are arranged with four pockets each to catch the trucks in the cable. The cable rope has been arranged on a new plan, the buttons being placed immediately on each side of the truck and nowhere else. The cable will be 23,000 feet in each. The cable is ready to be strung and will be in position very soon. There has been some delay in receiving iron from Pittsburgh on account of which the lower end of the road will not be in operation as soon as the other portion.

NEW YORK.

Brooklyn. The Jamaica and Brooklyn road, which will use the Van Depoele system, is only waiting for its cars from Pullman. This road was chartered in 1807 as a toll road and has been maintained as such to the present day. Eminent legal authority has declared that with this aspect of the case, the city of Brooklyn and the subway commission have no right to meddle with it. The Long Island Electric company, which has been organized with a capital stock of $100 000, will furnish the power to run this road, and for electric lighting purposes.

Ithaca. The Ithaca Street Ry. Co., who use the Daft electrical system, have elected Mr. Chas. D. Haines as president; F. H. Skeele, secretary; and A. G. Haines, treasurer and superintendent.

New York. The New York Cable Railway Construction company, of No. 170 Broadway, New York, has made an assignment, and has given a chattel mortgage to the Tradesmen's National Bank (New York) of $40,000. President Charles D. Inge says that while constructing a cable railway in St. Paul, Minn., they found labor two or three times higher than they expected, and they did not have money enough to meet their obligations for material, but they hoped to meet all liabilities when outstanding debts were paid. He thinks that the liabilities will not exceed $100,000. The company has an authorized capital of $200,000, and constructed cable railways under the Boyer patents. The contract price for the work at St. Paul is said to have been $250,000.

The annual reports of the street railroads of this city show that during the last fiscal year 350,000,000 persons, in round numbers, rode on the cars which traverse Manhattan island. This multitude gave up in 5-cent fares an aggregate of over $17,000,000, from which the various railway companies netted $2,908,762.

A shuttle engine dashed into a crowded train on the Third avenue elevated railway, about 4 o'clock on the afternoon of Dec. 31st, at 34th street, and "but for the merest good luck" would have dashed cars and passengers into the street some twenty-five feet below. An uptown train (with every car crowded) was standing at 34th street station when the "shuttle" train, consisting of an engine and one car, was seen rapidly approaching on its way from the Thirty-fourth street ferry on the Y track which runs out on the main line. Engineer Samuel Doughty was at the lever of the shuttle train's engine, and thinking he could make a quick stop with only one car he came up the Y at a rapid speed. When his engine was within forty feet of the main track, on which the uptown train was standing, Doughty reversed his lever and pulled out the air-brake lever. But his foolish calculations were misplaced, and the engine and car slowly but surely slipping over the snow-covered track towards the uptown train. As there are no sand-boxes on the "L" engines there was no way by which Doughty could give his engine's wheels a purchase on the wet track. Realizing his position, Doughty frantically jerked out the throttle-valve of his engine, but although the driving-wheels flew round like lightning on the revered motion, they failed to get a grip and slipped along as if the track was soaped. Seeing that a collision was inevitable, Doughty and his fireman jumped from their engine onto the platform and escaped uninjured. The engine, keeping on, crashed into the second car of the uptrain; throwing it clear off the main track onto its side on the extra track. All the side panels right at the double seats in the center of the car were smashed in, and here the only two passengers who received any serious injury were hurt.

Another danger, a sequel to the foregoing, followed. The signal announcing that the line was blocked failed to reach the downtown stations, and thirty-four crowded trains were kept waiting along the line. Ultimately a number of male passengers walked out, and proceeded to walk along the narrow board pathway that extends by the side of the track. A correspondent states that "the stream of passengers that crowded this board walk recalled the terrible accident at Fourteenth street on the same road some time ago, when a number of passengers who jumped from the car platforms onto the flimsy sidewalk were hurled to the street below, killing several of them." Fortunately no similar stampede occurred this time.

Mr. R. G. Blackwell says that the Fulton street electric road, which is to be operated by the Bentley-Knight electric system, is delayed simply through legal obstructions—all the machinery being ready to be applied at the shortest notice.

Experiments are going on upon the Madison avenue street railway, with a car containing 120 Julien cells. It ran, on one trial, from 85th street to Harlem bridge and back, a distance of 40 miles, with a drop of only two volts. Before adopting electricity altogether, the company seeks definite information as to actual amount of wear and tear, time for charging batteries, and exact cost of operation.

At a special meeting of the stockholders of the New York Elevated Railway company, January 10, a resolution authorizing the issue of $15,000,000 of bonds was carried by a vote of 63,944 shares (in favor) to 840 against. A protest was made against the Manhattan voting 63,937 shares which it holds. Notice was served by Robert G. Ingersoll on behalf of the minority that the issue of bonds would be contested and and the payment of interest enjoined. No attention was paid to the protest. The statement was given out that this sum was to be used as follows: $1,000,000 to take up the company's outstanding debentures, $8,000,000 to take up first mortgage bonds, $1,500,000 to purchase real estate and new rolling stock, and the remainder to be used toward the construction of new lines of railway.

OHIO.

Cleveland. The annual meeting of the Employees' Benefit and Relief Associat on of the East Cleveland RR. Co. was held December 29; Mr. Dan McEwen, first vice president, in the chair. There is a membership of 94 in all in good standing.

Treasurer's Report.

Received from members, i. e., employees	$488 00
Received from the donations of East Cleveland Railroad company	488 00
Received from interest on deposits	7 20
Total receipts from all sources	$983 20
Vouchers paid men for sick benefits	$247 00
Vouchers paid for newspapers, for meeting room, etc.	66 24
Vouchers paid for refunded, discharged, and men quit	63 70
Vouchers paid for East Cleveland Railroad company for discharged and men quit	63 70
Vouchers paid for desks, chairs, etc.	45 00
Vouchers paid for donation to Hulligan fund	15 00
Total vouchers paid	$500 64
Balance cash in Citizens' Savings Bank	$391 06
Balance cash in East End Savings Bank	91 50
Total cash on hand	482 56
Total vouchers paid and cash on hand	$983 20

The report was accepted and ordered filed. And officers were elected for ensuing year: President, C. W. Callaway Lake View Line; first vice president, A. L. Sykes, Euclid line; second vice president, M. Tanered, Garden line secretary, W. E. Ilaycox; treasurer, H. A. Everett. A vote of thanks was extended the retiring officers. After an informal social talk the meeting adjourned. The purpose of the organization is for better acquaintance and assistance in time of need. The dues are at the remarkably low figure of 25 cents monthly, being that low by the reason of the East Cleveland Railroad company's paying in dollar for dollar to the treasury equally with the employees. The sick benefits are $7 per week.

The East Cleveland RR. Co, has come out on top, in the attack made upon it by certain property holders on Garden street. The "legal nut" presented to the committee, Dec. 21, by the council to be cracked was whether or not the right of the East Cleveland company to occupy Garden street with their tracks was of such duration as to prevent the giving of a franchise in the street to the new Garden Street Railway company. In 1880 the East Cleveland company desired to extend the Garden street track eastward and from what is now the Quincy street branch. An ordinance was passed granting this privilege, and the same measure gave to the company at the same time an additional lease of right of way for 25 years, dating from the adoption of the new ordinance, instead of terminating January 14 inst. according to the terms of the old ordinance. As might be expected the latest ordinance, like one's last will and testment, holds the fort.

On the same date, the same committee acted upon other measures of importance. The representatives of the West Side & Woodland Avenue Railroad company, and the Brooklyn Street Railroad company, who were to have talked on the subject, did not appear during the session of the committee. The ordinance to grant the East Cleveland company permission to double track the Cedar avenue line between Hayward street and Willson avenue, was approved. The committee decided to present to the Council an ordinance compelling every street railroad company in the city to heat their cars during cold weather, the measure to go into effect on February 13, 1888. Councilman Hull's ordinance amending the ordinance which regulates the practical operation of the street car lines, was approved with a trifling alteration. The committee gave their sanction to the request of the East Cleveland company that they be no longer compelled to operate cars on Cedar avenue between Fairmount street and Blue Rock Springs during the winter. The ordinance granting the West Side and Woodland Avenue company permission to cross both ends of the Central Viaduct from the corner of Pearl and Lorain streets, and construct a new branch from the South Side end of the main bridge out Scranton avenue to the limits was briefly considered. It was decided to recommend that it be adopted, minus the amendment of the board of improvements which was intended to compel the railroad company to pave the streets from curb to curb along the entire line of the proposed branch. The West Side and Woodland Avenue company have stated that they will not build the branch they are compelled to pay for the pavement, and the claim was made that the amendment was instigated by the Brooklyn company in order to kill the ordinance. Inasmuch as the property owners on Scranton avenue desire the branch and are willing to pay their share for the pavement, the committee thought best to report adversely upon the amendment.

Cincinnati. Dan Wheaton, the master workman of "midnight assembly," has been suspended from his position as street car driver, and Supt. Harris says he will never employ him again. Ten to one if he can get a start again in the Queen City. He was "suspended," instead of being discharged, to give him an opportunity to defend himself, in the face of his accusers, before the directors of the Cincinnati Street Railway company. President Kilgore told him the directors desire to make a full investigation.

On the morning of January 7th, the Mount Auburn Cable Railway company made their first trial trip. The rain was pouring, but hundreds of faces greeted the first grip-car as it slowly made the circuit. The test was a severe one, as the day was rainy and the tracks wet, yet the brakes worked perfectly. The car was stopped several times on Sycamore Hill and started, and all who saw were satisfied the brakes would hold in the most slippery weather. In addition to the brakes used the company will equip each car with a new device operated in the slot, to be known as the safety brake.

Columbus. The electric railway here is to be constructed on the Short system, the electric apparatus to be supplied by the Brush electric company.

PENNSYLVANIA.

Allegheny. The Observatory Hill Electric Railway is said to be thoroughly well built, and is in high favor.

Scranton. The Nayaug & Crosstown Railway company of Scranton have commenced laying track last week, and will have a Van Depoele outfit running before the February GAZETTE is issued.

The Scranton Electric Railway company are extending their road, and have ordered four more cars, two from the works at Pullman, and two from Troy. Each of the cars will be equipped with a 25-hp. Van Depoele motor.

The Overhead Conductor Electric Railway company, Pittsburgh, has been organized with the following officers: President, George Westinghouse, Jr.; Vice-President and Secretary, Thomas B. Kerr; Treasurer, John Caldwell. Directors, George Westinghouse, Jr., C. H. Jackson, George H. Christy, H. H. Westinghouse and Thomas B. Kerr. The design and scope of the company can best be explained by a quotation from the catalogue just issued

"The Overhead Conductor Electric Railway company has acquired the entire right, title and interest of Joseph R. Finney and his assignees, in all his inventions relating to electric railway service, and in the patents granted therefor. These patents were granted after a most thorough investigation, and are believed to cover broadly every form of apparatus for supplying electricity to electric machinery upon moving vehicles, making use of travelers or contacts running upon overhead conductors.

"The Overhead Conductor Electric Railway company is now prepared to issue licenses to railway companies, contractors and others desiring to use its patented inventions, either upon old or new roads, at the uniform rate of $250 per car.

"Notice is hereby given, that in order to protect our licensees in the enjoyment of their rights, this company will institute legal proceedings against all makers, sellers or users of infringing apparatus."

RHODE ISLAND.

Providence. The consideration of the Cable Tramway ordinance, and Mr. Longstreet's application for franchise to operate the Ries Electric railway system, have been further postponed.

TENNESSEE.

Chattanooga. Since last winter the belt railroad has laid over fifteen miles of additional track, and "given Chattanooga better facilities for suburban traffic than are enjoyed by any city in the South."

The City Street Railway company have built nearly six miles of new track during 1887, and are still extending their lines.

An electric railway company was organized a short time since and is now endeavoring to secure a franchise to build six or eight miles of track.

VIRGINIA.

Richmond. The steep grades and many sharp curves in the Union Passenger Railway company's line, have made the work of construction very difficult. But the work is now about completed.

WEST VIRGINIA.

Charleston. Benjamin Brown has obtained with others, a franchise for a street railway, to use horse, steam or electric power. They expect to put in an electric road next spring or summer to cost about $20,000 or $25,000. They will require three to three and a half miles track. Charleston Street Railway company is the official title of the company.

WISCONSIN.

Milwaukee. The directors of the Whitefish Bay Dummy railway line have decided to use electricity for a motor as soon as their track is laid, and sent a man to New York to make investigations into the merits of different appliances.

CANADA.

Stratford, Ont. wants an electric railway.

BRAZIL.

Petropolis. A proposal for a thirty years' franchise for an electric railway has been referred to the provincial assembly by the president of the province of Rio.

Rio Janeiro. It is announced that the emperor of Brazil is going to order a circular electric tramway for his own personal use on the lines of the society of tramways at Rio Janeiro. The motor is of the Sprague system and will be fed by accumulators.

ENGLAND.

Birmingham. We have received a copy of the Birmingham *Daily Post* containing a full description of the Colemore Row and Hockley (and Handsworth) cable railway, together with pamphlets issued by the Birmingham Central Tramways Co., limited, containing specifications, etc. From a letter received from the engineer in charge, Mr. E. Pritchard, M. Inst. C. E., the line is probably in operation ere this. As stated in previous issues of the GAZETTE, Mr. Pritchard, in company with Mr. Joseph Kincard, I. C. E., of London, visited the cable railways in America; and last fall Mr. A. S. Hallidie, the inventor of the California type of cable railways (the only kind of cable street railway in successful operation hitherto), visited Birmingham and examined the cable and all pertaining to it while the road was in course of construction. Every effort has been made to secure the best cable road possible for the constituency of John Bright and Joseph Chamberlain.

The boiler house is a roomy building in which is set a series of six boilers, of Messrs. W. and J. Galloway & Sons' 1875 pattern, and about 25 ft. long by 6 ft. diameter, fitted with interchangeable tubes. It is expected that with 160-lb. pressure to the square inch, three, if not two of the boilers will furnish sufficient power to drive both the Birmingham and Handsworth cables, if the latter is carried out. The furnaces communicate with a stack 140 ft. high, and in case of any failure of water supply from the mains, a large tank has been provided upon arches adjoining the boiler-house. The *Post* describes the engines and machinery as follows:

There are two fine engines, each of 250-horse power, and having fly-wheels of about 15 ft. in diameter, and with face of 2 ft. in breadth. Between these engines is an arrangement of powerful cogwheels, which transmit the power from the engine-shaft to the pulleys around which the cable passes. In some of the American systems the cable is wound several times around a drum, but experience shows that an arrangement of two pulleys, with the cable passing once around them, is less injurious to the cable itself. It is upon the diameter and velocity of these pulleys that the speed of the traffic depends. The cable between Colmore Row and Hockley is to be driven at the rate of six miles an hour, and the driving pulleys round which it passes are 10 ft. in diameter. The line to Handsworth is to be worked at the speed of eight miles an hour, and the pulleys are 13 ft. 4 in. in diameter. In each case the groove is lined with compressed beech-wood, end upwards, upon which the friction will be less injurious to the cable than would be the case if the groove were of unprotected metal. In addition to passing round the driving pulleys the cable has also to go round a pulley carried upon a carriage running freely upon rails, but held back by a rope passing over a wheel, and then into a pit, where a weight of about five tons depends upon it. This is a tension pulley, and its necessity arises from the irregularity in the weight of the cars traveling in one direction or the other. In case the outward-bound cars are heavily loaded the portion of the cable between them and the engine house will be more tightly pulled than the return rope, which will show corresponding slackness. The tension carriage being pulled farther away by the five-ton weight takes up this varying amount of slack cable. There are thus three pulleys, nearly but not quite, in line with one another. The in coming cable will pass first clear underneath the first driving pulley, then undern ath the second and traveling round it; then it will turn under and round pulley No. 1 next clear over No. 2, round the tension pulley, and then underneath the engines out into the street. For driving purposes the cable will in this way make a kind of letter S. The engine cylinders have each a diameter of 24¼ inches, and the stroke is 48 inches. They are fitted with Jefferiss' patent automatic expansion gear. A pair of small barring engines help to start the massive wheelwork into motion, and brake power is supplied by means of pressure of a belt upon the under side of each fly-wheel, These engines have been made by Messrs. Tangye Bros., of the Cornwall works, who have also provided a traveling crane for the engine-house, and other necessaries. The cable has also been produced in Birmingham, by Messrs. John and Edwin Wright, and is capable of bearing a strain of 95 tons to the square inch. The cable, as it passes through the engine-house, will be lubricated with a mixture of tar and castor oil, which will assist in preserving the steel wire from crystallization. It is estimated that the cable, when laid, should last, with repairs, for a period of from twelve to eighteen months, and at this rate the renewal should be equivalent to about an eighth of a penny per car mile. In order to detect any broken strands, the cable in its course through the engine house will pass through an aperture slightly larger than its own circumference in some iron plates. Any projecting strands striking these plates will result in the ringing of an electric bell. The engineer will note the time of this signal, and know at what o'clock the damaged point of the cable will pass through the driving-house again, and arrange for its repair at the conclusion of the day's work. In case of any serious injury to the cable, the damaged part will be taken out and the cable respliced.

THE BESSBROOK AND NEWRY TRAMWAY.

Mr. Edward Hopkinson, M. A., Dr. Sc., read a paper before the Institution of Civil Engineers, Dec. 6, of which the following is an abstract*:—

"Although a number of electrical tramways had been constructed in the United Kingdom during the last few years, there had hitherto been no attempt at the regular haulage of minerals and goods, nor at the operation of cars larger than the ordinary tramway type. Probably in no case had the effective power of any single motor exceeded about 4 hp. The principal object of the present paper was to describe the construction and to discuss the working of the Bessbrook and Newry Electrical Tramway, which had been designed for the haulage of heavy goods as well as for passenger traffic. The length of the line was rather more than three miles with an average gradient of 1 in 86, the maximum gradient being 1 in 50. According to the conditions of the contract ten trains were to be run in each direction per day, providing for a daily traffic of 100 tons of minerals and goods, and capable of dealing with 200 tons in any single day, in addition to the passenger traffic. The electrical locomotive was to be capable of drawing a gross load of 18 tons on the up-journey, in addition to the tare of the car itself and its full complement of passengers, at an average speed of 6 miles per hour, and a load of 12 tons at an average speed of 9 miles per hour. Also, the cost of working, as ascertained by six months' trial, was not to exceed the cost of steam-traction on a similar line. The line was formally taken over by the company, as having fulfilled the conditions of the contract, in April, 1886, and has since been in regular daily operation. It was worked entirely by water-power, the generating station being adjacent to the line at a distance of about one mile from the Bessbrook terminus. There were two generating dynamos of the Edison-Hopkinson type, driven by belting from the turbine shaft, which was extended into the dynamo shed for the purpose. The turbine could develop 62 hp., and each dynamo was intended for a normal output of 250 volts, 72 amperes, though they were capable of giving a much larger output. The current was conveyed to the locomotive cars by a conductor of steel, rolled in the channel form, laid midway between the rails and carried on wooden insulators nailed to alternate sleepers. The conductor was not secured, but was simply laid upon the insulators, which fitted into the channel, and while allowing for longitudinal motion to compensate for changes of temperature, held it laterally. At one point the line crossed the county road obliquely, the crossing being 150 ft. in length. In this case the conductor on the ground level was not feasible, and an overhead conductor on Dr. John Hopkinson's system was substituted, by which the collector on the car consisted of a bar only, which passed under the supports of the overhead wire, and made a rubbing contact with its under surface. This system has been found to give very satisfactory results in practice.

"The locomotive equipment of the line consisted of two passenger cars, each provided with a motor. The body of the car was carried on two four-wheeled bogies, the motor being fixed on the front bogie, so as to be entirely independent of the body of the car. The longer of the two locomotives cars was 33 feet in length, and was divided into three compartments, the front one covering the motor, and the two others forming first and second-class compartments, together accommodating thirty-four passengers. The front bogie carrying the motor had an extended platform, projecting beyond the body of the car, and communicating by a slide door with the dynamo compartment, thus giving the driver direct access to all parts of the driving machinery, which was at the same time entirely boxed off from the passenger compartments. The weight of the locomotive, including the dynamo, was 8¼ tons.

"Apart from the electrical working of the line, an important and novel feature was the plan by which the wagons used on the line could also be used on the ordinary public roads, so avoiding the necessity of trans-shipment, and enabling goods to be loaded at the wharves and drawn to the line by horse power and again delivered where required. The plan was originally suggested by Mr. Alfred Holt, M. Inst. C. E. of Liverpool, and was embodied in the Lancashire Plateway scheme, for which a bill was lodged in the autumn of 1882 and subsequently withdrawn. The idea had been worked out in a practical form with great success by Mr. Henry Bancroft, of Newry, one of the directors of the Tramway company. The wheels of the wagons were constructed without flanges, with tyres 2¾ inches wide, which was sufficient for use on ordinary roads. Outside the tramway rails, which weighed 41.25 pounds per yard, second rails were laid, weighing 23.75 pounds per yard, with the head 7-8 inches below the head of the larger rails. The flangeless wheels ran upon these lower rails, the ordinary rails forming the inside guard. The front part of the wagon was supported on a fore-carriage, which could either be pinned or allowed freedom of motion, as in an ordinary road vehicle. There was a single central coupling arranged to engage in a jaw on the fore carriage, so as to guide it when not pinned. Shafts were attached to the fore-carriage when the wagon was to be used on ordinary roads. The wagons were of sufficient strength to carry a load of two tons, and their weight without the shaft was 23¾ hundred weight. Experience had shown that the wear and tear, both on the wheels and rails, was not excessive, and that the traction did not much exceed, if at all, that of ordinary trucks with flanged wheels. No difficulty had been found with the horse-traction on ordinary roads, and the taking on and off was conducted with great rapidity.

"Each locomotive car was fitted with an Edison-Hopkinson dynamo, which was geared by means of helical-toothed wheels, and a chain to one axle of the bogie. The special construction of driving chain, rendered necessary by the severe conditions under which it had to work, was fully described. The trains were commonly composed of one locomotive car and three or four trucks; but frequently a second passenger car was coupled, or the number of trucks increased to six. Thus a gross load of thirty tons was constantly drawn at a speed of six or seven miles per hour, on a gradient of 1 to 50. The cars could be reversed by reversing the current through the motor without change of lead, but as there was a loop at each end of the line, reversal was only required when shunting in the sidings. The terminal loop-curves were 55 feet radius only, but these were traversed by the long locomotive cars with perfect ease, to which the method of carrying the motor-dynamo on the bogie largely contributed."

The author concluded the paper with a discussion of an extended series of experiments to determine the efficiency of the whole combination under various conditions, and the distribution of the losses. The results were illustrated in a graphic form by a series of curves. Under average conditions of working the total electrical efficiency was shown to be 72.7 per cent, the losses being distributed thus:—

Loss in generator	8.6 per cent.
" leakage	5.7 "
" resistance of conductor	6.6 "
" motor	7.7 "

The friction of the bearings in both generator and motor, and the power lost in the driving gear are excluded from these results.

The cost of the electrical equipment of the line is summarized in an appendix to the treatise, and it is shown that 3.3d (7 cents) was the cost of haulage per train mile over one period of five months, when the goods traffic was light, and 4.2d. (8½ cents) when the goods traffic was heavier. The locomotive cars had registered 40 000 miles since the opening of the line; the tonnage has exceeded 25,000 tons, and the passengers 180,000.

* The *Electrical Engineer*, for January.

Patents.

The following list of recent patents relating to intermural traffic, is specially reported for THE STREET RAILWAY GAZETTE by Wm. G. Henderson, solicitor of American and foreign patents 925 F street, Washington, D. C. A copy of any of the following will be furnished by him for 25 cents:

Issued during December, 1887.

374,326. Bell for car horses—W. Scarffe, Brooklyn, N.Y.
374,256. Street railway crossing—A. J. Moxham, Johnstown Pa.
374,236. Electric railway—E. M. Bentley, New York.
374,313. Conduit for electric or cable railway—W. Nier, Kansas City, Mo.
374,199. Rail connection for electric railways—E. L. Orcutt, Somerville, Mass.
374,767. Cable gripping mechanism—A. D. Whitton, Philadelphia, Pa.
374,866. Cable track road and tightener for same—C. Carr, Boston, Mass.
374,775. Cable railway—P. M. Bruner, St. Louis, Mo.
374,864. Suspension or cable rod switch—C. Carr, Boston, Mass.
374,865. Track for suspension or cable roads—C. Carr, Boston, Mass.
375,948. Clip or hanger clasp for supporting cables, &c.—T. T. Eckert, New York.
374,940. Apparatus for cleansing car seats—D. W. Copeland, Syracuse, N. Y.
374,943. Car starter—E. Dedrick, Milwaukee, Wis.
375,290. Cable railway—J. B. Heverling, St. Louis, Mo.
375,963. Cable railway grip—J. B. Heverling, St. Louis, Mo.
375,123. Street railway—R. A. Chesebrough, New York.
375,203. Automatic catch for inclined railway—J. Schuller, Allegheny City, Pa.

E. H. JOHNSON, Prest. F. J. SPRAGUE, V. Prest. & Gen'l Mgr. A. S. BEVES, Sec'y & Treas. H. McL. HARDING, Gen'l Agt.

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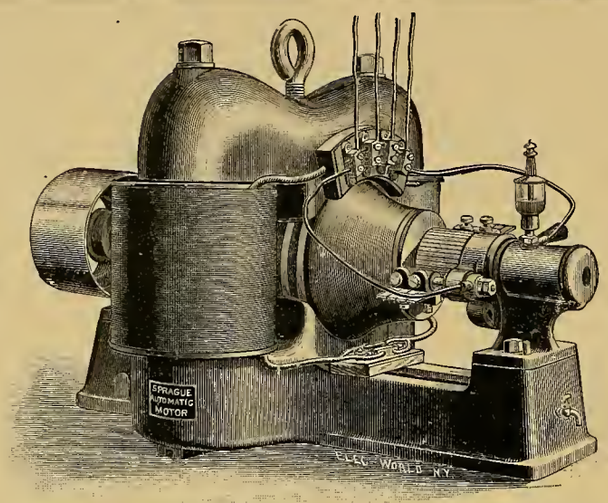

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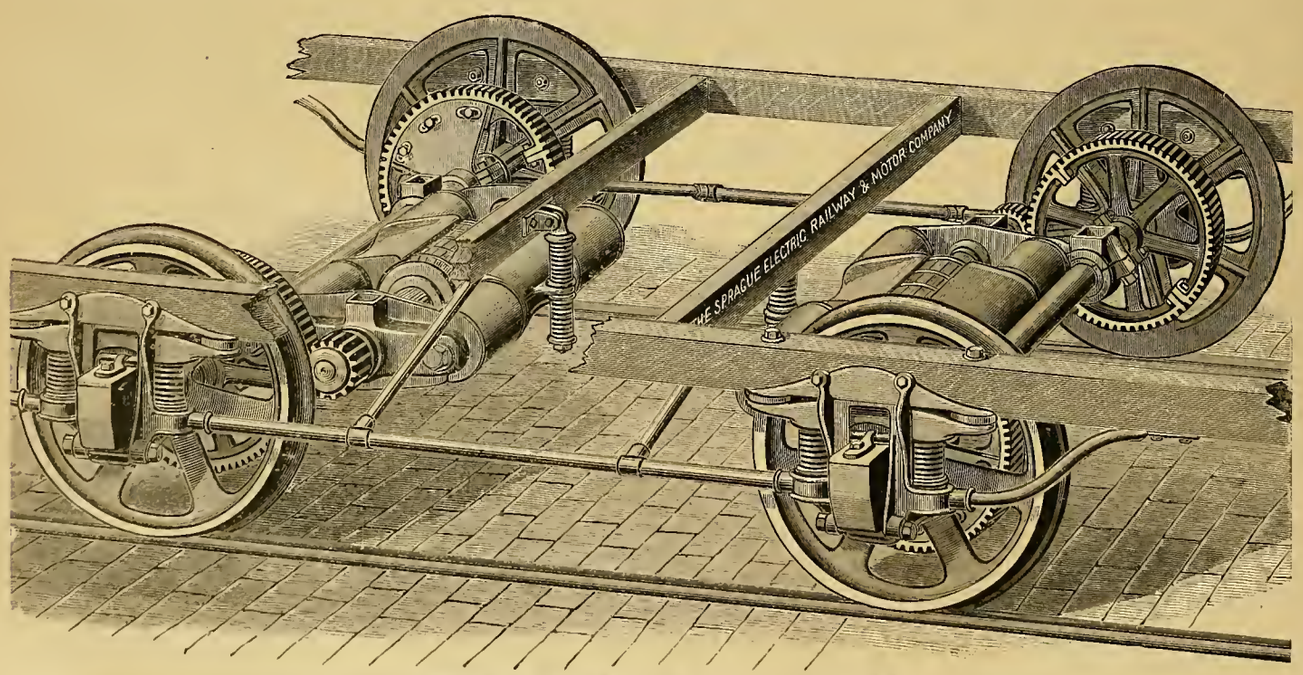
Topeka:
700 Kansas Avenue.

This is the only company in the United States devoting its entire energies to the various questions involved in the transmission of power, and it is putting into practical use more motors of and over one-half horse power than all other companies combined.

This company, having now perfected a Street Railway System in all its details, is prepared, under suitable guarantees of successful operation, to take contracts for equipping new roads with all the appliances, both electrical and mechanical, for operating street railroads, and also for equipping roads now in operation.



STREET CAR TRUCK SHOWING MOTORS.

CHARACTERISTICS OF RAILWAY MOTORS:

Lightest Weight Consistent with Highest Efficiency.
Strong Enough to do the Work under all Conditions.
Non-Liability to get out of Order. No Skilled Labor.
Commutator Wear Reduced to a Minimum.
Simplicity and Ease of Operation.
Simple, Compact in Construction

DETAILS OF SYSTEM:

Generators of Highest Efficiency and Reliability.
Systems of Conducting Current to the Cars with the Impossibility of an Accident at any Point of the Line Interfering with the operation of the Remainder of the Road.
Motors Flexibly Suspended from the Axles to insure Perfection of Running.
Greatly Increased Traction by the Application of Motors to each Axle with Independent Driving.
Greatest Return for Given Amount of Coal Burned.
Entire Freedom from Disagreeable Noises by means of Split-Gearsand Spring Suspension. Absence of all Ropes, Belts, Sprocket-Wheels and Chains.
No Useful Room in the Car taken up by the Motor. No Changes in Truck.
No Complicated Nest of Gearing. Use of Single Sets of Brushes for both Direction of Driving. Storage Battery or Overhead System.

The Street Railway Gazette.

OL. III. CHICAGO FEBRUARY, 1888. NEW YORK No. 2

uperintendent John Harris, Cincinnati.

Ever since he went to Cincinnati on horseback, ith a drove of horses, June 3, 1860, Mr. John arris has been a prominent character in the ueen City. And his recent troubles with cer- in schemers trying to supplant him from the osition of superintendent of the Cincinnati reet Railway company have brought his name forward that a little of his history may be op- ortune in this number of the STREET RAILWAY AZETTE. Mr. Harris, we are informed, was ade a leading figure in Mr. Kerper's "Eccen- icities of the members of the O. S. T. A." at ie last convention of the Ohio State Tramway ssociation ; but what was said about him iere is a profound secret ; and the humor- is author of those "unspeakable" eccen- icities (which he is pleased to refer to as a pile of nonsense") can only tell us that Superintendent Harris is a positive man, id a good one in his position, and with roper support would do much good in his ace." And under his portrait in the "pic- ire gallery" of prominent foremen, in the incinnati *Commercial Gazette*, that paper ys: "The photograph which is repro- iced here will be readily recognized as iat of John Harris, the superintentent of ie Cincinnati Street Railway company. wing to the prominence of his position s name has become almost a household ord in this community, and his features e familiar to hundreds who are not per- onally acquainted with him."

It was on St. Valentine's day (Feb. 14), 341, that the personality of John Harris ime into separate existence ; the spot was ancaster, Ohio. He was nineteen years age when he took the ride already men- oned to Cincinnati. After disposing of his rove of horses, he went at once to work in ie Fifth street stables, and afterward at the ile stables in Patterson alley, where the resent custom-house now stands. When orking on a salary of five dollars a week e married Miss Winnie Welsh. In March, 366, he went into the employ of the Cin- nnati Street Railroad company as stable oss for the Seventh street line, but shortly terward was transferred to the stable of ie Third and Fourth street line, where he mained until 1875, and then he left the onsolidated to become superintendent of the Walnut Hills line, and remained with this road ntil it went into the Consolidated in 1880, then ecoming the assistant superintendent, and upon ie retirement of Superintendent Chesley, the fol- wing year, he became its superintendent, a po- tion which he has since retained. Mr. Harris a member both of the Odd Fellows and Mason- organizations, and resides with his family on tate avenue, No. 610, at which place he was renaded, as reported in our issue for Decem- er, by two hundred men of the various street ar lines at the Spring Grove avenue stables, who then and on other occasions expressed their high estimation of Supt. John Harris.

Mr. Harris is remarkable for his wonderful powers of endurance, and in all the years of his connection with the Cincinnati street railways has never missed a day from his duties by reason of sickness. He started on nothing, and has worked his way up in the world solely by his faithful attention to the interests of his employers, a trait in him for which he deserves praise and credit. All the stock purchased for the company Mr. Harris individually negotiates for, and he employs and discharges all the working force of the various lines owned by the company. Every detail regarding the changes in tracks or the mechanical department of the company comes under his personal supervision. "He is noted for his firmness of character," says City Editor Eggleston (*Commercial Gazette*) "and when he believes any change for the good of the company is required, goes at it and accomplishes it."

John Harris

The very fact that he continnes to spell his surname without the e shows one leading trait in his character. In a New York biography it is recorded that Dr. Robert Harries of that city, is the son of one Jacob Harris, of Liverpool, and that he was persuaded to insert the e by his own mother's sister. The reason no doubt is that the Mrs. Harris constantly referred to by Mrs. Gamp, in "Martin Chuzzlewit," has no e. And as *Fraser's Magazine* says, "Mrs. Harris was a glorious creation, or, rather, conception Only, the numerous and respectable persons who bear that name must feel themselves aggrieved, for their very existence is now made a matter of doubt. By one breath of the magician, the solid flesh-and-blood of all the Harrises has been volatilized into an hypothetical phantom."

Superintendent John Harris, of the Cincinnati Street Railway company, is all there just the same.

A False Belief is Not Fraud.

Consent of abutting property owners has been diligently solicited for the construction and operation of elevated railways along several streets, in Chicago, for several months past, and some very extravagant inducements, as to extraordinary increase of property, etc., have been held out as inducements for securing signatures of assenters. And some months ago Judge Tuley granted an injunction restraining the Consolidated Rapid-Transit and Elevated railroad company from enforcing a contract by which Thomas F. O'Neill gave it permission to skirt the rear of certain lots in Hyde Park owned by him. O'Neill claimed that his permission was given on the representation that the "L" road would enhance the value of his property 100 per cent., but had discovered that instead of enhancing the road would depreciate the value of his property. He claimed fraud on the part of George Emery, the treasurer of the company, who had induced him to sign the contract.

The restraining order then issued damped the ardor of canvassers for consents, and made those employing them a little cautious. And now the promoters of the elevated roads, against which there seems to be a strong feeling in Chicago, may breathe more freely and hold out their "inducements" boldly, inasmuch as the law has decided that the expression of one's "belief," however false it may be, is no fraud. In the case in question the railroad company appealed and the Appellate court has reversed the decree entered in the lower court in favor of O'Neill. Judge Bailey says that the representation by Emery that the construction of the road would enhance O'Neill's property could not be said to be a fraud because Emery did not represent the probable appreciation of O'Neill's property as a fact, but merely as his opinion, and there could be no fraud in the expression of a belief. O'Neill trusted to Emery's judgment, and he had ample opportunity afforded

him in inquiring into the reasonablnness of the representations before reposing confidence in them.

That is as it should be; for if all the parties making extravagant and unreasonable statements, with the view of trying to obtain consents for the construction of "L" roads, were to be proceeded against for "fraud" many that now stand "above reproach" would be liable to "go under" any day. Statements have been made at the "rapid transit meetings" in Chicago, wherein the speakers have studiously uttered them as their "belief," or that they have "been informed" thereof.

Kail's Combined Fare-Box and Change Maker.

The Twin City and Des Moines River Motor Street Railway company of Boone, Iowa, is no longer in existence; the track is taken up, and the equipage and material has been purchased by the Atchison Rapid Transit Street and Road Railway company, of Atchison, Kansas. The Boone company did not earn much from their line; and the talent which failed to get enough scope while operating three cars with two steam motors, on that six miles of narrow gauge railway, has been diverted in another channel, the development of an interesting and valuable invention being the result. The *non est* company's engineer was Mr. John L. Kail, Mr. I. B. Hodges being president of the company; and these two, together with the latter's son (Mr. A. B. Hodges), now constitute the Kail Manufacturing company, whose offices are at 224 and 226 South Clinton street, Chicago, Ill., where they are busy manufacturing the Kail Combined Fare-Box and Change Maker. Up to recently Mr. Hodges, jr., was secretary and superintendent of the Boone and Boonesborough (Iowa) Street Railway company, which position he resigned in order to devote his time entirely to attend to the manufacturing of the new fare box and change maker (combined). Thus the Kail Manufacturing company comprises men of experience and ability.

The accompanying cuts show, (Fig. 1) front or inside-of-car view, and (Fig. 2.) the back or driver's side view of the box. The patent therefor was issued September 20, 1887. The patentees claim that it is the "only perfect system for collecting fares and making change on street cars.' The driver can make change without handling the money, the change being made through the box, from coins already therein. The change maker is under the driver's control, until the fares get into the locked drawer at the bottom. If a passenger wants change, say for a dollar, he pulls the knob at the top, marked "Pull," and puts his dollar in the receptacle behind the plate he has pulled back, whereupon a bell rings, in response to which the driver turns round, looks at the money in the receptacle, which he can see through the glass on his side of the box; then he (the driver) presses the buttons in a row lower down, the button marked 50 once, 25 once, 10 twice, and 5 once, and, as a result, the change (consisting of half a dollar, a quarter, two dimes, and a nickel) drops into the opening marked "Take your change," from which the passenger picks it up and then drops five cents in the place marked "Pay fare here." The money in all its stages, including the change as each piece drops from its proper tube, is seen by the driver until the fare gets to the bottom drawer. Each tube is filled with as many coins as are likely to be required, any amount up to $55. The car door is not opened for giving change, which is a consideration in cold or stormy weather. The box cannot be robbed without violence; should the driver have to leave the car the box is secure, and even if the glass should be broken, the fares cannot be extracted.

The combined box is very substantially made, well finished, all metal parts being nickel plated, and the keys cannot be removed from their various places, until the same are locked. The best Yale locks are used. The operation of the change maker is simple enough, the driver can touch the change buttons with his gloves on as well as without, and as rapidly as a lady playing the piano. It should be seen, however, to be thoroughly understood; and we understand the manufacturers will send a sample box to any responsible parties who may request one. Half a dozen, or more are in use at Sioux City, and several at Centerville, Iowa. About five dozens are in use by various companies, in Arkansas; and orders for over 300 have recently been for

FIG. 1—FRONT.

FIG. 2—BACK.

KAIL'S COMBINED FARE BOX AND CHANGE MAKER.

warded to the manufactory, by Mr. Hodges, Sr., who is now travelling in Nebraska.

"We have used twenty-four of your combined Fare Box and Money Changers for three months past, and our experience with them has been highly satisfactory," writes Mr. Frank A. Sherman, Secretary of the Des Moines Street RR. Co., Sep. 21, 1887, to the Kail Manufacturing company, and he adds that "the device for making change removes the necessity of putting up change in envelopes, and affords to the passenger a simple and easy method of getting the right amount for his fare. It is alike convenient and effective to the company, the driver and the public, and it should be generally adopted."

This is another specimen of their testimonials:

"Centerville, Iowa, January 31, 1888.

"We take pleasure in recommending the Kail Fare Box and Change Maker to any and all who contemplate changing or putting in new fare boxes, to be what they are represented, and satisfactory in all respects.

"H. A. RUSSELL,
"Secretary Centerville Street Ry. Co."

Bentley-Knight Electric Railways.

It is now some years since the first experimental road was built by the Bentley-Knight company, at Cleveland, Ohio. Since then they have encountered many obstacles, and such set-backs as would have entirely crushed any ordinary enterprise; but to-day the Bentley-Knight people have in operation at Allegheny, Pa., a road thoroughly equipped and running, which they have started under the worst conditions, and at the most unfavorable season of the year; but, for all that, the results are most satisfactory. This road was built by a company in Allegheny City, with the purpose of developing some three miles of suburban land, and to extend into and through Pittsburgh, if satisfactory. The three miles of suburban tramway is built with the overhead system of wires, and includes seven turn outs. Upon entering Allegheny City, the conduit system is employed, and the road is carried as far as the City Hall, making in all a distance of four miles, partly double and partly single track on the conduit section. The conduit is carried through five or more ordinary street railway tracks. It is this latter system which must of course be used to traverse the remainder of Allegheny and Pittsburgh, and which, in fact is the only thing admissible for city streets.

The generating station is placed about midway between the two extremities of the road and consists simply of boilers, engine and dynamos. For the overhead system copper wires, 3/8 inch in diameter, are suspended from special brackets, one above the other, upon poles placed at the side of the street. Upon these wires, trolleys or small carriages travel, which connect through flexible wire, with the motors on t car; and wherever turn outs are placed a spec switch point permits of the cars and trolle passing without interference.

The Conduit system. The strongest point of a vantage which the Bentley-Knight compa possess is the conduit composed of outer casing or frame of rolled iron, whic in laying, is made to follow the grade of the stre and is provided with catch-pits, etc., to t sewers, for taking away any dirt or wa that may get in through the slot at the top.

The side irons are arched, so that at the stre level they nearly meet, leaving only a slot of su cient width (five-eighths of an inch) admit of the free passage of the plow attach to the car, and by means of which the current picked up. In place of the copper wire used the overhead system, bars of copper one-fou by one inch are suspended on either side of t slot opening, and four inches below the top. Th are also spread apart to a distance of several ches, and are suspended from special insulators a connected by joints which adjust themsel to the expansion and contraction due to chan of temperature.

Some eight inches of space below copper conductors, admit of sufficient ro for any occasional accumulation of dirt with danger of short circuiting the current; and sweeping of the conduit, done by a paten brush attached to the car, prevents any accumu tion from long time. It is easily seen how current can be carried through straight runs; for turn-outs a special switch has been perfect and is operated by the car itself, which ma equally easy the carrying of current, so that t system can, without any difficulty, be applied any tramway now laid by simply adding conduit between the rails. The ordinary top is employed, either closed or open, as wel the regular thirty inch wheel with the ordin rim, except in one case. When unusually st grades are to be climbed, and when in slipp weather, the traction would not be sufficient drive the car, then a rack is bolted to one sid the rail, and one of the car wheels cast with g teeth. In this way, whenever slipping would cur the teeth drive the car from the rack u traction again becomes sufficient,

The electro motor is suspended from one when ordinary grades are to be encountered, when, as here, very steep places are to climbed two motors are used, one hung f either shaft. These motors are so made that, like all others, no adjusting or changing is nee to reverse the direction of motion except thro the switch board which is a point of much vantage, when we consider the amount of telligence necessary to successfully operate

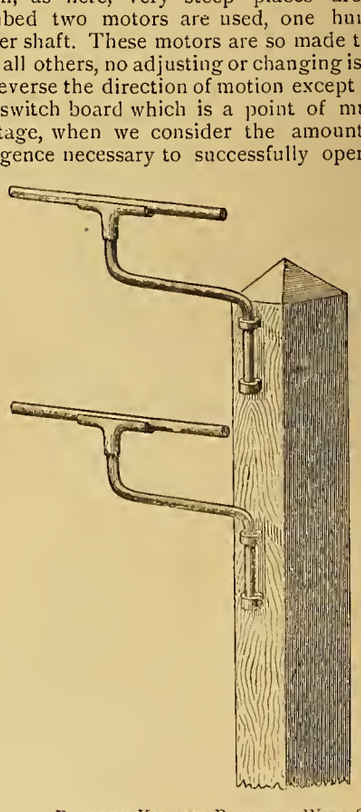


FIG. 1—BENTLEY-KNIGHT POST AND WIRE SYS

car in daily practice. The armature shaft h tached to it a pinion playing into an inter iate gear driving an intermediate shaft whi turn has a pinion driving the main gear o

le shaft of the car. Much of the economical rking of the motor depends upon the manner which these gear teeth are cut.

For controlling the speed of the motor a ecial resistance box is used by means of which ore or less current can be passed through the

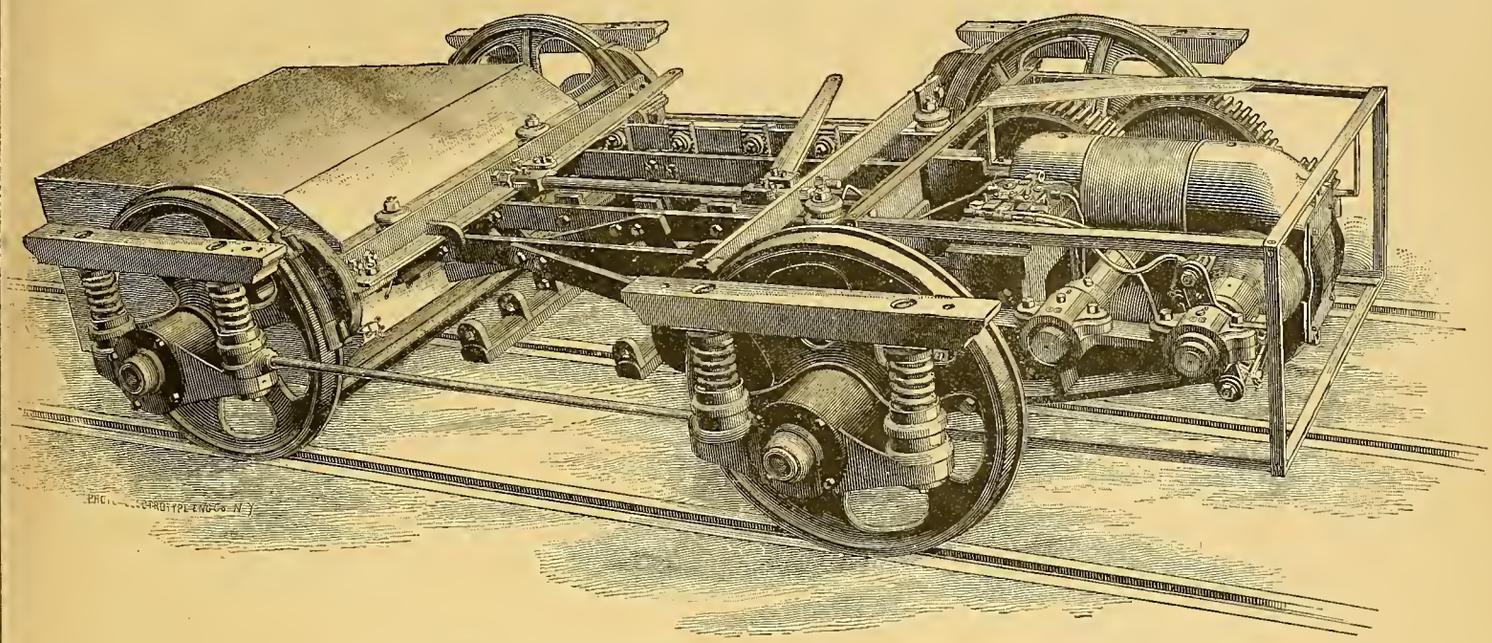


Fig. 2—Bentley-Knight's Double Motor Truck, Used at Allegheny.

otor; and the levers, by which this is operated, nnect to the brake handle, so that the driver n with one hand first take off the brakes m the wheels and then let on his power, or *e versa*. So effective is this resistance box that e speed can and is regulated from that of a ail pace to fifteen or sixteen miles an hour.

Suspended from framing, and between the o axles, are the plow guides, two in number, m which the plows, or connections between car and the conduit, are hung. These plows ten inches wide by about one-half inch thick d project into the slot some five or six inches. either side of each plow is a metal piece held place against the copper bar by a spring, and connecting through the insulation, of which all but the framing is composed with wires attached to the motor. It can easily be seen that as the cars move along, this plow continually receives and transmits the current.

Two plows are employed for passing cross openings and similar breaks in the currents and against the possibility of one getting out of order or failing from any cause. A point of decided advantage is the manner of suspension. The guides for the plows are pivoted so that in case of any unusual obstruction they will swing up and out of the slot, thus avoiding expensive breaks and delays. In addition to this motion the plows have a sidewise motion, so that the direction of the conduit can be changed to avoid sewers and man-holes, a point of great saving in the first cost of laying. From the main circuit, current is led to several incandescent lamps on each car, and thus light as well as motion is supplied.

The Bentley-Knight company are much indebted to the thorough manner in which the work throughout the building and laying of this road has been done, but to none more than to the Thomson-Houston Electric Company, of Boston, and the Messrs. Nicholson & Waterman, of Providence, Rhode Island.

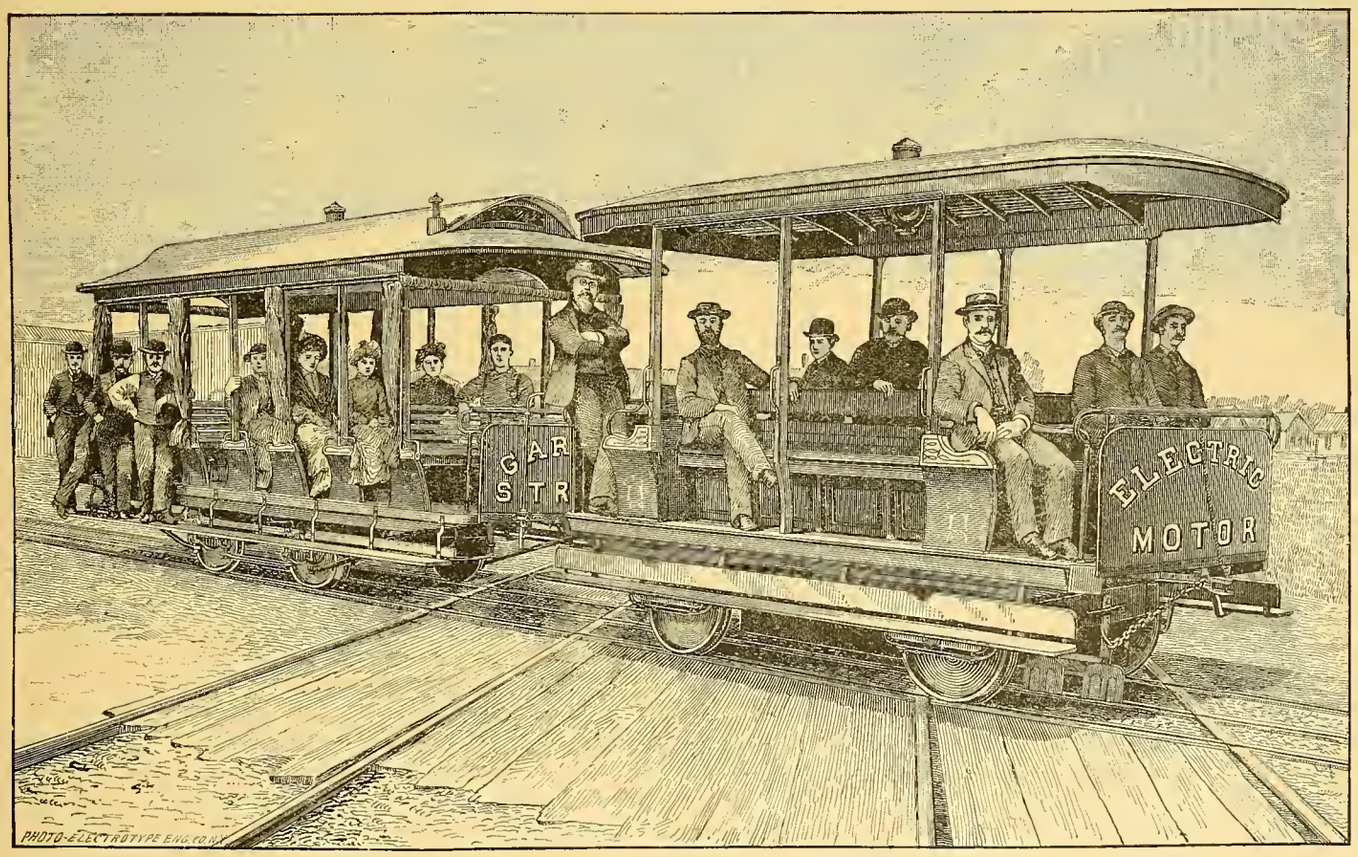


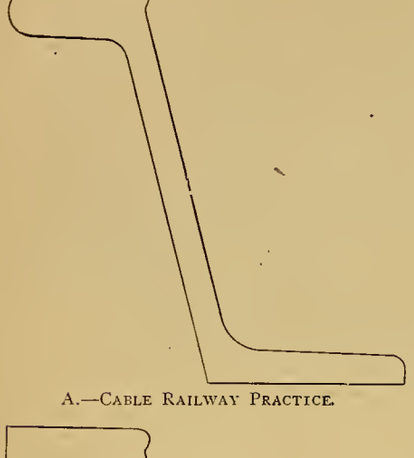
Fig. 3—Bentley-Knight's Motor Car and Tow.

The Kansas City and Bonner Springs Rapid Transit Ry. company has been organized to build a dummy line (standard gauge) from Kansas City, Mo., through Armourdale, and along the Kaw valley to Muncie and Bonner Springs, a distance of 15 miles. Capital stock $250,000. W. A. Simpson of Kansas City, Kan., is president and the following are the directors: D. E. Cornell, J. K. P. Barker, Philo M. Clark, D. R. Emmons, Winfield Freeman, W. A. Simpson, H. S. Swingley, J. F. Williamson, W. H. Bridgens, James D. Husted and Stephen S. Kirby, all of Kansas City, Kan.

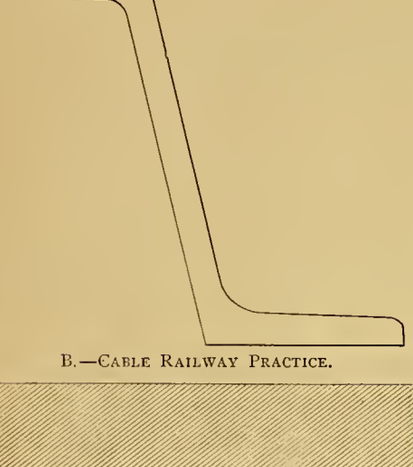
Cable Railway Practice.

By E. J. Lawless, Superintendent Metropolitan Street Railway Company, Kansas City, Mo.

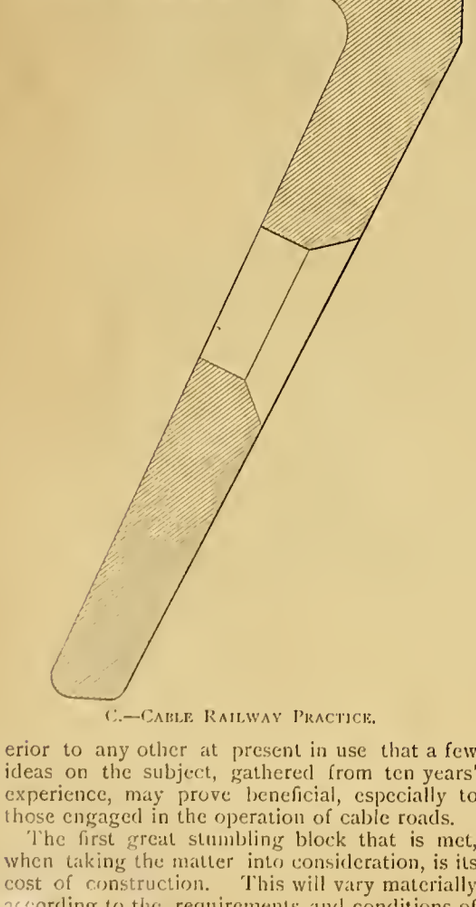
The advantages of the cable system as a method of operating street railways, in such districts where it pays to lay it, are proving so superior to any other at present in use that a few ideas on the subject, gathered from ten years' experience, may prove beneficial, especially to those engaged in the operation of cable roads.



A.—Cable Railway Practice.



B.—Cable Railway Practice.



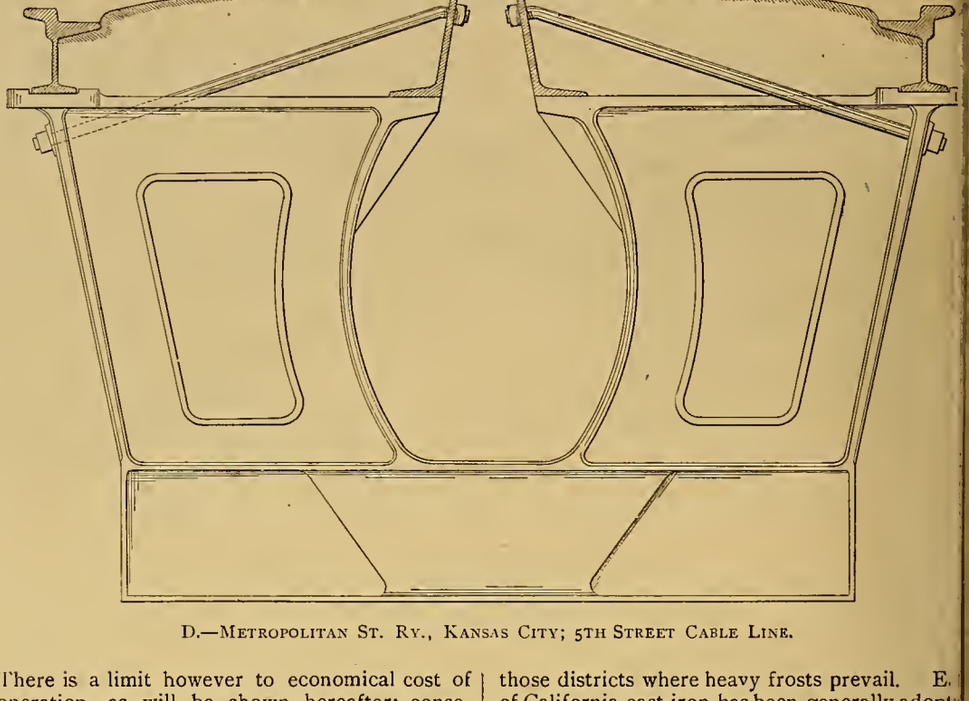
C.—Cable Railway Practice.

The first great stumbling block that is met, when taking the matter into consideration, is its cost of construction. This will vary materially according to the requirements and conditions of the roads and the number of gas and water pipes, etc., to be moved when laying the conduit. The principal cost comes on the power-house and conduit. You can get a cheap road by economising on these two items; but will it pay you to do so if your object is a permanent investment and you anticipate heavy travel? The experience of all cable lines has proved that notwithstanding the heavy cost of construction if properly managed, they are good paying investment. There is a limit however to economical cost of operation, as will be shown hereafter; consequently I have never advised any one to put down a cable line where they did not expect their receipts to reach $500 per day.

Its advantages over the horse car system are particularly noticeable where there are grades and in heavy weather. In fact, grades are desirable for cable lines as they afford much better facilities for draining and cleaning the conduit, and people will be landed with rapidity and ease to those elevated districts most desirable for residences. Everywhere cable lines run, the value of property has been materially increased and not only does it increase but it assures the property at that advance.

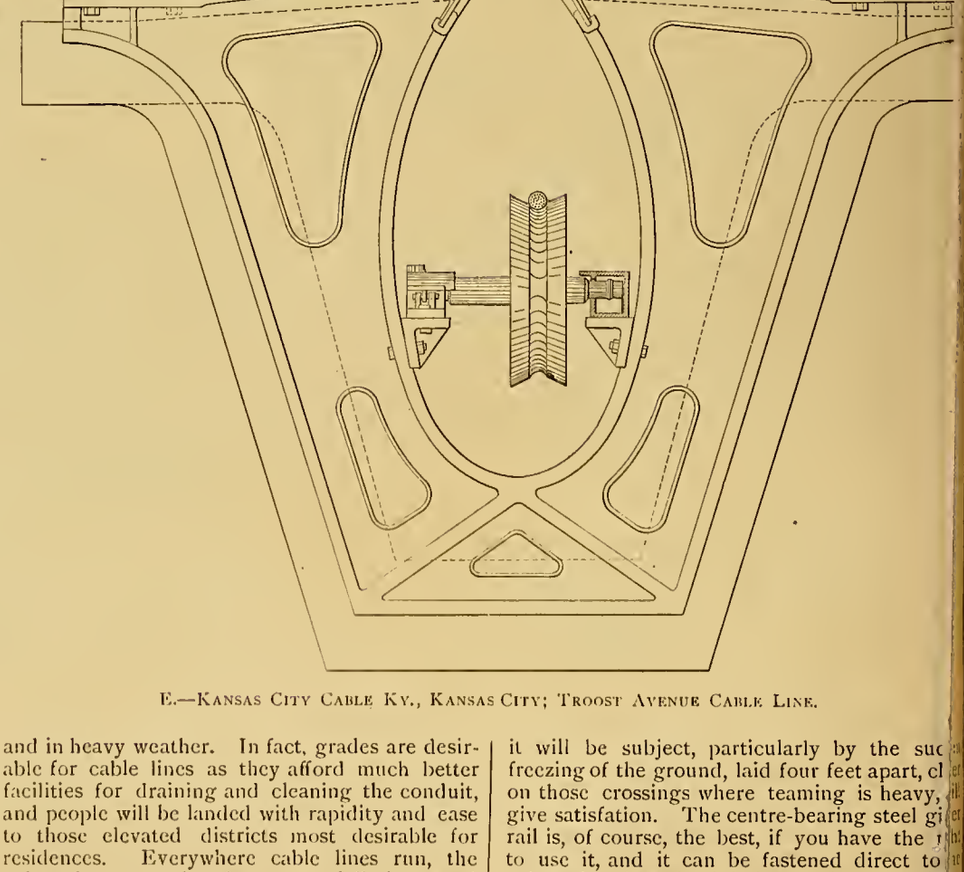
1.—The Conduit: Its Construction and Care.

In the different constructions laid down wrought iron, steel and cast iron yokes have been used. In San Francisco mostly wrought iron; but it must be borne in mind that there the thermometer rarely reaches freezing point and the yoke does not require to be as stiff as in



D.—Metropolitan St. Ry., Kansas City; 5th Street Cable Line.

those districts where heavy frosts prevail. E. of California cast iron has been generally adopted it being cheaper, stiffer, and presents a better surface for the concrete to adhere to. Where traffic and teaming are heavy, a cast iron yoke weighing about 400 lbs. with the metal distributed so as to stand a heavy inward thrust to which

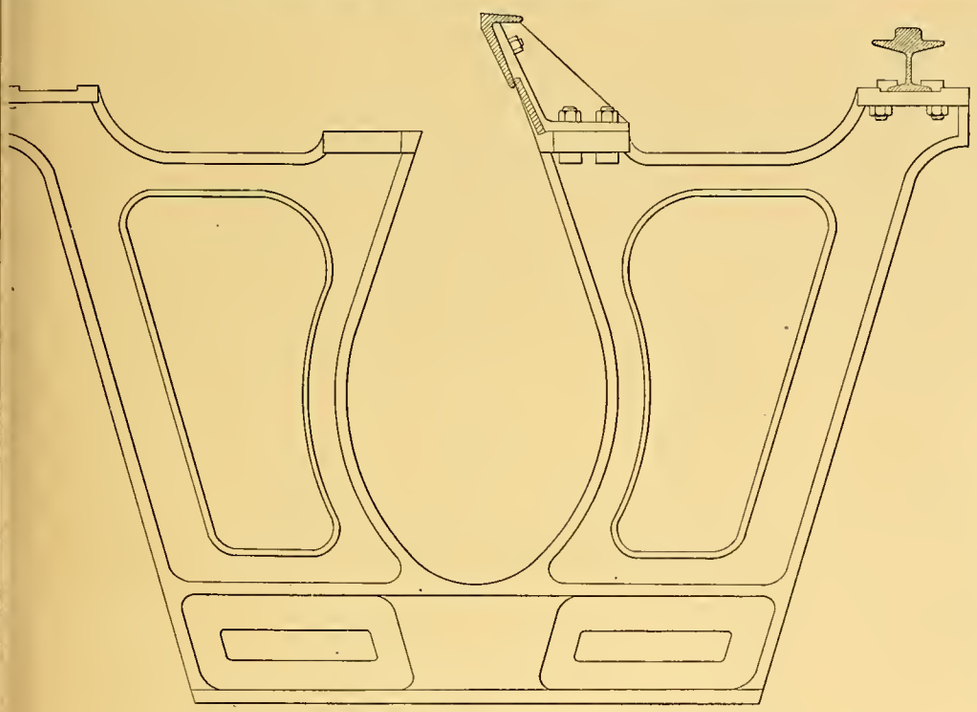


E.—Kansas City Cable Ry., Kansas City; Troost Avenue Cable Line.

it will be subject, particularly by the suction freezing of the ground, laid four feet apart, clear on those crossings where teaming is heavy, will give satisfaction. The centre-bearing steel girder rail is, of course, the best, if you have the right to use it, and it can be fastened direct to the yokes with either hook bolts or clips. Particular care should be taken to have the joints completely the yoke so as to give a continuous smooth

:e. If this is not done it is only a matter of a :le time when almost every joint in the con-uction will be felt.

The accompanying cuts show the styles of slot l in use at the present time. B is an improve-:nt on A as it is flat on top with a slight incline)m the front edge, thereby lessening the chances : horses' shoes, wheels, and dirt entering the)t opening. To such an extent were horses' oes torn off with beam A that the city council this city passed an ordinance forbidding its rther use. B and C however are not perfect, ice as many horses have been injured with that rm. The proper remedy lies in the shoe, the e and heel calks of which can be made so that ey will not catch in the slot. These slot rails e fastened to the yoke and adjusted by a rod shown in figure D. C is a good rail, but diffi-lt of adjustment, as, should the slot close, the vement must be taken up to make the adjust-ent. This is troublesome as well as expensive. iereas with the form D, by driving wedges in e slot on the side of tie rod and tightening the t with a special form of wrench made to enter e slot, you need not disturb the pavement, and e work can be done rapidly and cheaply. ould form C be adopted particular care must



F.—Metropolitan St. Ry., Kansas City; 12th Street Cable Line.

taken to put in a couple of metal shins between and the yoke to permit of adjustment when cessary; or it can be fastened to a special form chair attached to the yoke, which chair is ade adjustable as shown in figure F. This form slot rail requires what is called a "paving ate," viz. a metal plate reaching from yoke to ke and from concrete to slot rail. This plate for the purpose of filling the vacant space be-

A New Car Starter.

Few, if any, of the numerous devices that have been invented to aid horses in starting street cars, are in general use to-day. And yet, taking into

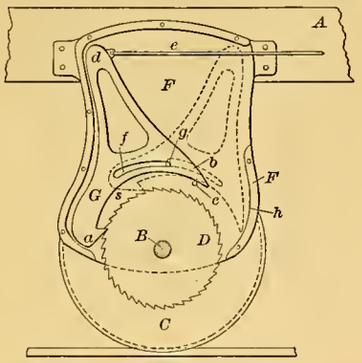


Fig. 2.—Huntoon's New Car Starter.

consideration the almost innumerable stops and starts that occur, and that always necessarily will occur in street railway travel, it does seem that there is a field for the exercise of ingenuity; that some simple mechanical device, easy of application, reliable and effective, should be introduced to reduce the exertion and strain that attend horses in starting their load. The arrangement of mechanism need not be cumbersome or complicated, and should not add materially to the car driver's duties which already require the constant use of hands and feet.

The device represented here is strictly a mechanical one, simple in construction, with few parts, and positively effective in operation, having been carefully made and applied to an ordinary street car of the best and most improved pattern. Put to frequent tests under varying circumstances, there is no reason why it should not receive the attention, and we may add, the indorsement of all street railway officials. Expense, in this case, can not be raised as an objection to the general adoption, because the mechanism is simple and inexpensive in character, and readily applied. The device consists of a toothed wheel, placed upon each axle of the car, with an operating pawl which is not attached to the axle, but is placed independently, and within a hollow frame or hanger and operating over two pins, said hangers being joined together; the wheel rests entirely in suitable bearings upon the axle, thereby not interfering with the oscillation of the car body, the ratchet is connected at each end with the same draw heads as are now in use by rods in such a manner as to draw out, so that the one in operation is always on the back axle, thereby starting the hind axle first, giving the car a start of six inches. The lead start is accomplished by the horses pulling directly on the pawl which is self-tripping, no matter how long it may be, thereby leaving the wheel free to turn either way if required, and at the same time can be engaged in a moment by merely placing the foot on a foot-tread in the platform when it drops back in place. By this means the horses do the starting and are aware of it. After it has done its work, the horses are ready to take the car as it is moving and so do not get any unnatural jerks and pulls as they do when left to start the car by their unaided exertion. It also acts as a powerful brake when going up grades, as by it the car can be stopped on any grade, and held there without the use of the friction brakes and also will be in readiness to give the horses the required help in starting so that a car can be stopped and started on a grade with as much ease as on a level road.

Reference being made to the smaller engraving Fig. 2 and following detailed description, the claims of the inventor, Dewalden L. Brown, of Franklin, Mass., will be ascertained.

1. In car-starting mechanism, the combination, with a rotary axle provided with a toothed wheel affixed thereon, of an oscillating pawl adapted to reciprocate upon two pins transversely located within a hanger, substantially as described.

2. In combination with the chambered hanger and its pins, the oscillating loosely-mounted pawl which reciprocates upon said pins, its catch *a*, and the rotary toothed wheel, all operating as herein set forth.

3. The rotary shaft B, toothed wheel D, and chambered hanger E, with its pins *c g*, in combination with the operating-rod *e* and oscillating pawl G, concaved at *s*, and with the slot *f* and catch *a*, substantially as described.

4. The combination, with the rotary toothed wheel D, hanger E, and pins *c g*, of the oscillating pawl G, with its foot *b*, adapted to contact with the hanger at *h* to tilt the pawl, for purposes stated.

The *Manufacturers' Gazette* says: Three petitions, asking for leave to establish and maintain elevated railroads in Boston, have been presented to the legislature. Meigs leads the procession with his one-rail elevated road, and two other parties desire to build roads of the ordinary type. Undoubtedly Boston will see elevated roads running not very far in the future.

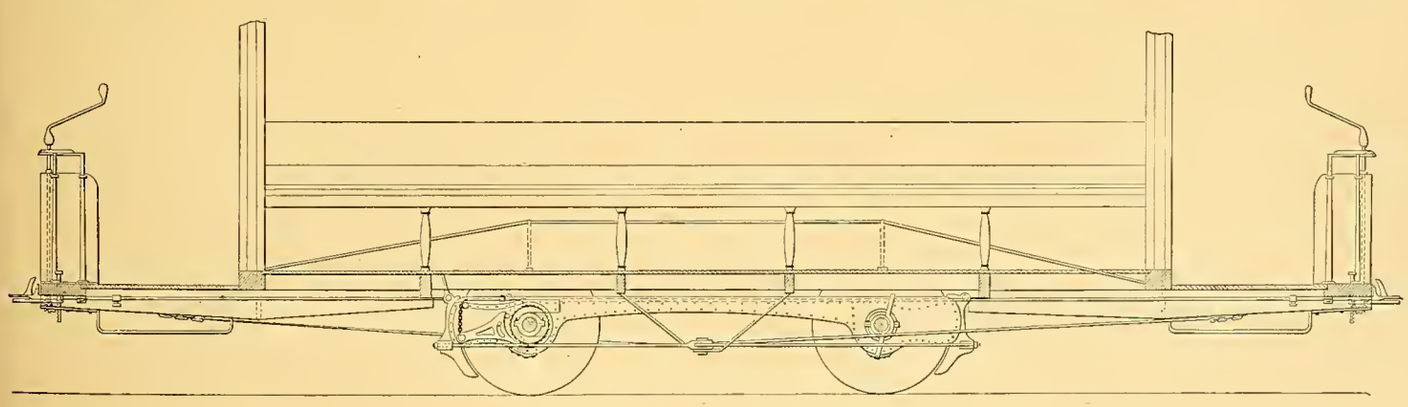


Fig. 1.—Huntoon's New Car Starter.

'een the concrete and slot rail, and to give a)od bearing for pavement to rest against; see gures E and F.

To be continued.

The Mount Auburn Cable Railway.

Cincinnati is going ahead with the cable system of intermural transportation; and in no place is the wire rope railway more suitable than among the hills of the Queen City. The Mount Auburn Cable Railway is the latest addition, and it has been constructed in the most substantial manner possible. The heart of this cable system—the power-house—is 110 feet by 106 feet; the sheave vault in front of the power-room occupies a space 73 by 36 feet. In a battery of four horizontal return tubular boilers of open hearth steel of Schoenberger & Co.'s make, of Pittsburgh, which have a tensile strength of 60,000 pounds, the steam is generated. These boilers are 66 inches in diameter, 18 feet long, and have 50 four-inch tubes each. The machinery used consists of two Corliss engines 24 by 60 inches, with the automatic cut off, and of 350-horse power, having a pressure of 85 pounds and making 65 revolutions per minute. The two immense fly-wheels are 18 feet in diameter and weigh 18 tons each. This machinery will keep the cables moving all the time, giving a speed of eight miles per hour to the south cable and ten miles per hour to the north or hill cable. The length of the south cable is 16,700 feet, and that of the north cable 26,400. The diameter of the cable is 1¼ inch, and the weight per foot 2½ lbs. The south cable makes the entire circuit in twenty-four minutes and the north cable in six minutes more. At the power-house there has been erected a platform where visitors can step in and view the workings of the machinery. There are four cable drums, of five grooves each. These drums are twelve feet in diameter. The tension carriages will bear three thousand pounds tension on each cable. There are four 12-foot leading sheaves, four 8-foot diameter directing sheaves. The sheaves vault, in front of the power-house, in which the leading and directing sheaves are placed is covered by twelve inch steel I beams, to which on the inside the leading sheaves are connected. The I beams from the top are filled with masonry and concrete, forming that part of the street under which the vault is located. The ingoing and outgoing south cable pass to the north end; the ingoing and outgoing north cable pass to the south end of the vault, and then at a right angle to the driver drums.

The length of the road from Fourth and Sycamore to Rockdale and Main avenue, Avondale, the terminus, is about four and one-quarter miles, thus making of course eight and one-half miles of single track. At Fourth and Sycamore is placed a twelve foot diameter terminus sheave on which the south cable returns to the north end of the sheave vault of the power house. The same arrangement for operating the north end of the road is located at Rockdale and Main avenue by which the cable returns to the south end of the vault.

The part of the conduit below the street paving grade is constructed of cast iron, the other part being constructed of steel and wrought iron. The tracks are laid with fifty-six pound Johnston girder rail. On the entire length of the road there are five fifty-two-foot and six 157-foot radius curves; three single-track transfer switch curves; one connecting track switch curve; two right-angle crossings of cable roads, one crossing at the Narrow-gauge steam railroad, and the construction for operating cable and cars over a canal bridge.

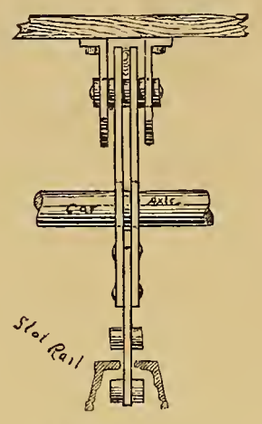


Fig. 3—Lifter.

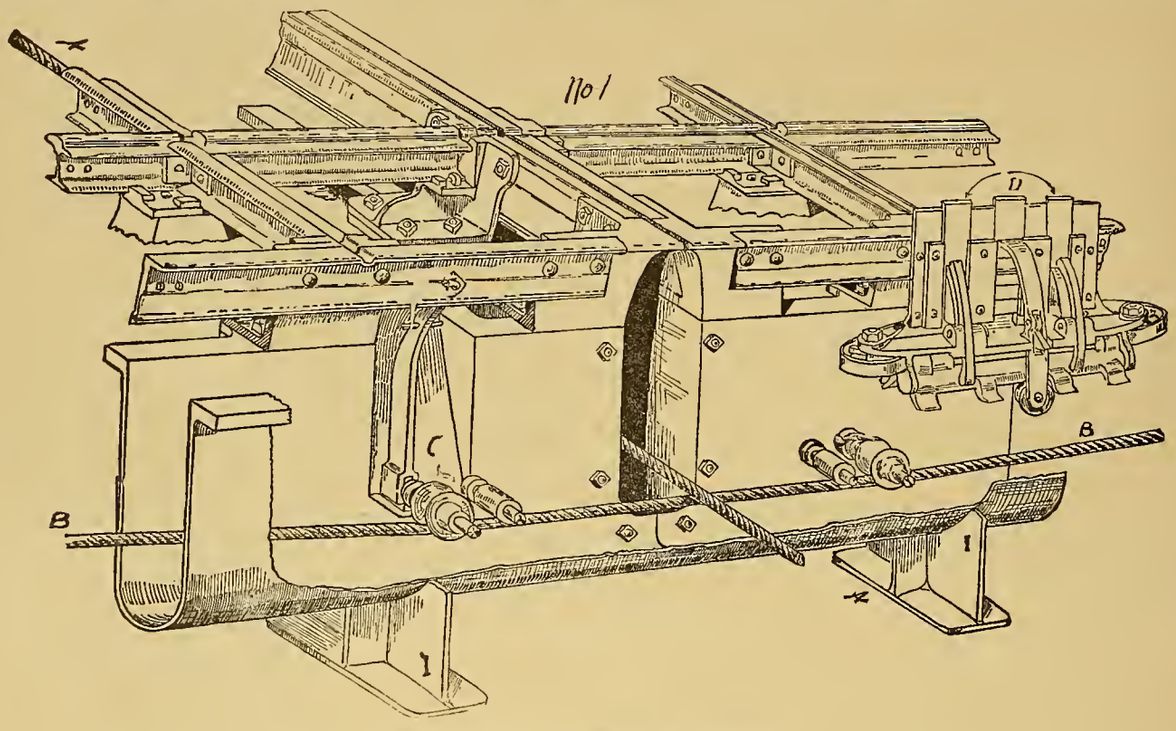


Fig. 1—Sectional View of Cable Crossing.

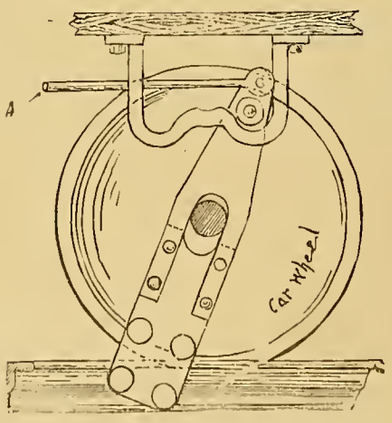


Fig. 4—The Automatic Brake.

At each of the curves there are placed four fe horizontal sheaves, with bottom and top b joint journal bearings. The sheave, with connection, is placed in a cast iron box, which connected to the yoke below and to the slot r at the surface, the top of the box being closed l a cast iron lid. The sheaves are adjustable, a can be taken out and replaced through the ope ing. The box is drained and cleaned into t conduit, which is drained direct into the sewer various points, the bottom of the conduit bei a half circle of cast iron, forming a smooth p fect drainage for surface water, or dirt.

In the conduit of both the south and north e of the road will be placed electric wires, by whi at any point along the route the conductor of a car can signal the engineer at the power stati to stop or start the motion of the cable in case is necessary to do so to avoid accidents from a cause. The power house is located at the nort west corner of Highland avenue and Saunde street, and is built of blue limestone, with wa 48, 36 and 30 inches thick. The power plant placed in the basement; the offices of the co pany are located in the southwest corner of t first floor, the other portion of the floor maki ample storage room for forty cars, which are r in and placed by a transfer truck, on the vari raised tracks. The tracks are raised suffici above the floor so that the cars can be run in a out without having to disconnect the grips.

The second floor is used for storage and rep shops. The basement and upper floors are c nected with an elevator in the centre of building. In the east front of the building stairs, which connect the basement and two up floors. The basement and vault floors are c crete. The smokestack is built of brick, and 110 feet high. On each floor of the building arranged water pipes and hose connections, use in case of fire. There are two sets of ca driving machinery, arranged in two groups, w continuous central shaft twelve inches in diame so that there can be put in an additional engi and two sets of driving machinery.

The engraving, Fig. 1, showing the inters tion with the Walnut Hills cable at Fifth a Sixth streets, is a sectional view of the cond at the point, where the conduit a cable tracks intersect and cross at a ri angle. A represents the top cable, B the cor or under cable, which is kept depressed bel the cable (A) by adjustable sheaves or pulle which are inserted from the top at the open (C) in order to prevent the cables from com in contact with each other. The two small p leys shown between the two larger ones safety pulleys, and operate only when one or b of the other pulleys may be removed from

ause. The lower part of the conduit, which is nown with a portion of the side broken away, ; made of cast iron with the opening cut away n either side, the size and shape of the conduit unning at a right angle from it, which the cable A) travels in. The parts of the conduit above he cast iron are made entirely of steel, and are o arranged and connected as to make smooth nd almost level tracks at the points where track nd slot rails intersect, and where the (4) slot ails intersect, forming the right angle slot hrough which the grip passes. The various ails are connected to steel brackets, which are gain connected to the cast iron part of the conuit. The points where the tr: ck rails intersect orming right angle tracks, the rails are supportd by a pedestal extending down to the bottom f the bearing flangs (I) of the cast iron part of he conduit. The various parts of the construcion are made with stays and tie bolts in a manner to prevent separating or spreading in any way, and after being placed in position, is filled or a sufficient space outside and up to the paving ine with concrete.

D represents the grip in the conduit near the oint of crossing, or near the point where it has dropped the cable B. The lifter (E) at the point where the cable is dropped, is thrown out sufficient to allow the cable to pass it in dropping. By this it will be observed that the grip by nomentum of the car passes over the sheaves nd the top cable A. After the grip (D) has assed sufficiently beyond the cable A and heaves, the lifter E, as shown in Fig. 2, is owered enough for the sheave F of the grip o pass under the cable B, then the lifter E is aised to the point as shown in grip D, carrying he cable with it and within the jaws G, then the aws are closed on the cable.

The rollers H on each end of the grip D at he curves bear against the sides of the conduit, vhich is formed of cast iron. By this the grip is ept central in the slot while passing around the urves without the use of a chafing plate. It vill be seen by the drawing that the grip will operate on an S shape, right or left curves, without n auxiliary cable or extra appliances as are used

grades of any degree. The brake being automatic, it will be seen, by the car moving in the direction indicated, that the brake will release its frictional locking hold, and when the car has traveled so far that the brake is in a right angle line with the body of the car, it has assumed the position shown in the cut, and travels freely through the slot until it has been changed from that position by power connected to the rod

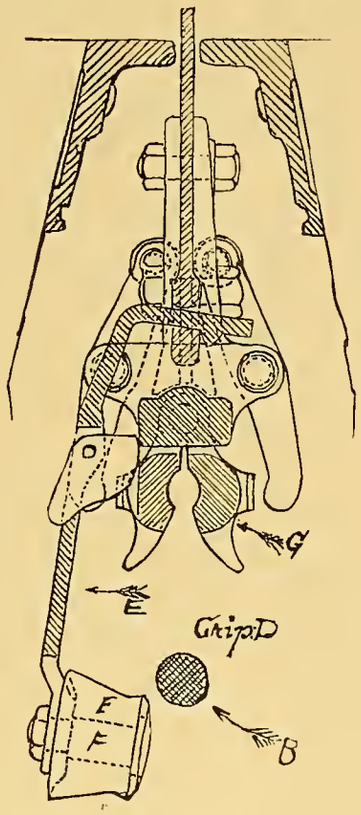


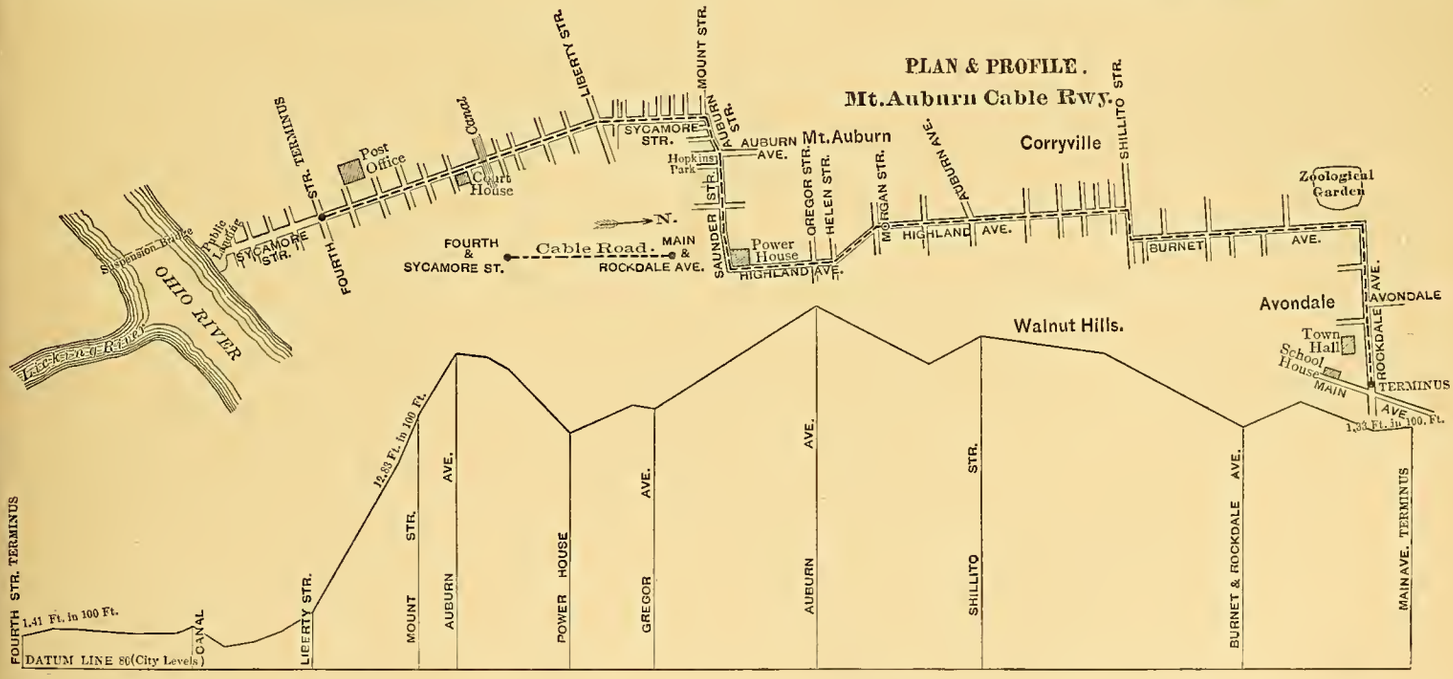
FIG. 2.—GRIP.

road and its patents are Cincinnati work and invention. The capital to build the road, amounting to $400,000, as it now stands, without counting future extensions to Avondale and the Zoological Gardens, was furnished by Cincinnati capitalists. The officers of the company are: President, Henry Martin; Secretary, Wm. F. Irwin; Treasurer, John H. Martin; Constructing Mechanical Engineer, Worcestor Haddock; Superintendent, C. W. Thomas; Directors, David Sinton, Elijah Coombe, Henry Martin, R. Wurlitzer, John H. Martin, Wm. F. Irwin, Albert Hill.

The cars to be used upon the new road are among the handsomest ever seen. They are of the J. G. Brill & Co., manufacture, of Philadelphia, elegantly upholstered and furnished with plate glass windows, patent signal lights and ventilators, and cathedral glass windows in the upper part next the roof. There are twelve cars in the power-house at present, and eleven ordered for delivery early in March. Besides these closed cars there are summer cars similar to those in use on other roads, and six grip cars.

The new cars have a seating capacity of twenty-six, and the aisles are wide and roomy, making standing room for a couple of dozen more. In the centre of these cars, next the side and between the seats, are placed medium-sized anthracite stoves, similar to those used on the Third avenue cars in New York City, which will comfortably heat the cars on the coldest of days.

MR. W. A. DUTTON, formerly superintendent of the St. Clair Street Railway, and Mr. H. A. DORNER, for several years with Bowler & Co., (both of Cleveland, O.), have formed a partnership under the firm name of Dorner & Dutton and will operate the street railways department of Bowler & Co. In addition to which, the firm will handle all kinds of street railway supplies, including Hathaway & Robison's turn tables, transfer tables, automatic switches, etc. They will also make car wheels and axles, journal boxes, track castings, and the improved Worswick patent journal box of which they are the sole manufacturers. THE STREET RAILWAY GAZETTE bids them welcome.



on other roads at curves, as the cable is taken in at the bottom of the grip and the jaws close from the sides. This makes the operation of the grip the same on any kind of a curve, crossing or switch, the grip being the same on either side of its vertical centre line, or the conduit, as shown in the engraving of the grip and lifter. These intersections and grip systems are entirely new and not used on any other cable road. The grip and brake are patents of Worcester Haddock, the mechanical engineer of the Mt. Auburn Cable Railroad.

The accompanying cuts were drawn by the company's mechanical draughtsman, Mr. A. Hill.

The automatic brake is operated on the slot rails of the cable conduit for holding the car on

marked A. This rod may be operated backwards or forwards from the centre or right angle so as to cause the brake to operate either direction the car may travel. The object of this brake is to get frictional locking on an immovable body. By this the sliding of the car is prevented, and the brake being automatic, it releases itself when the cable gives movement to the car. It will be seen by the construction of this brake that the car can be stopped on the steepest grade without the grip, cable or other mechanical appliances.

The power machinery plant was built by the Lane & Bodley company, and all the iron and other materials used in the construction of the road were purchased in Cincinnati. The whole

ELECTRICAL distribution of current, without a motor, without overhead poles, and without underground conduits, is the latest system for moving street cars with electricity; and no storage or secondary batteries will be interposed between the dynamo and the cars. Patents have already been granted, and others are now ready to issue to cover this new system. A strong company has been formed, and the inventors feel confident of success; but we are not yet permitted to publish names nor particulars, as they "have not as yet made a practical test of the system, but purpose doing so at an early date. Any public description of the apparatus, previous to such experiment, would be premature." And we must wait developments.

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Street Railway
Gazette.

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OUR Boston office has been removed to more convenient premises, 17 Chardon street.

JULIEN-BRUSH is a combination answering well for an electric car, as appears from report of New Projects, etc., under St. Louis, Mo.

SUPT. ALONZO J. PAINTER, Pasadena (Cal.) City Ry. Co. reports good progress. The population of Pasedena is only 391 in the last census; now it is computed to be 12,000!

THE NATIONAL CABLE RY. CO., have been awarded $4,500 damages from the Trustees of the New York and Brooklyn Bridge for infringement of Hallidie patents. See under New York.

THE Mount Auburn Cable Ry. Co., Cincinnati, have applied electricity to enable the gripman to signal the engine house in case of any mishap. Our description of their new cable railway in another part of this issue contains interesting information.

"FEEDING Draught Horses," is the subject of a valuable treatise on the preparation and mixing, and the daily and weekly distribution of forage, by Mr. C. Challenger, tramways manager, Bristol, England, a portion of which we will endeavor to find room for in our next number..

CONGRATULATIONS come pouring to our sanctum. They make us feel glad that we are alive. Here is a specimen from Mr. J. A. Van Hoose, president of the Birmingham Union Railway company, Alabama, written during the terrible cold third week of January: "We like the GAZETTE, and frankly say that I enjoy reading it, and want it for the company also. * * * Should you, at any time, wander this far away from God's country, drop in and we will show you another Chicago (*in esse*—?), well, say *in futuro* anyway. We are growing in a truly wonderful way, for this country, and should you be here, at any time, will do all in our power to make your stay pleasant. * * * Pardon length, but we knew you were all cold and blue, and thought I would give you a word of cheer to warm you."

PROF. L. M. HAUPT, A. M., C. E., professor of civil engineering, in a letter dated University of Pennsylvania, Jan. 31, 1888, says: "I feel sure that internal circulation in municipalities is as important as it is in animal organization." We have received letters expressing great admiration of the extracts given in our last number from Prof. Haupt's lecture on Rapid Transit in Cities, wherein the subject is presented in a new and attractive manner. And we look for further expressions of the views of such a learned engineer, now that he has taken hold of the important subject so earnestly. Having put his hand to this plough of progress, let him go ahead.

"ACCIDENTS on the Elevated" is the caption of a lively article in the February number of our new contemporary the *Locomotive Engineer* (noticed in our last issue). "Accidents on the elevated roads are getting rather too numerous for the peace of mind of many people who ride on them, and also many others who are obliged to travel beneath them," it says. "The engineers on the elevated roads should not be allowed to work over eight hours, nor go on duty unless they had just had at least six hours of rest. * * * They should be noted for sobriety, good judgment, good pay and short hours."

STORAGE batteries are to be improved by means of an invention to construct the electrodes so as to reduce the weight of lead required for a given capacity, and to make the plates absolutely rigid, so that no short circuit can occur through buckling. M. Carriere has taken out a patent therefor in France. He claims that his new batteries require no process of forming, and give a current after the first time they are charged; also that the supports are mechanically perfect, and are not attacked by the acid solution, whilst the whole of the lead is actually available for storage.

THE West End Street Railway Co., Boston, according to official report just received, have 212 miles of track in operation, with 1,717 cars and 8,459 horses. Cable traction is contemplated on certain lines. They have two electric cars running, one with Sprague and one with Weston motors. Henry M. Whitney is president, Prentiss Cummings vice-president, and D. F. Longstreet general manager. Mr. Longstreet, hitherto vice-president and general manager of the Union Horse R. R. Co., of Providence, R. I., has been connected with that road for 23 years, and he is undoubtedly one of the leading railroad managers in the country.

ACCIDENTS are becoming altogether too common, on cable railways as well as on the "L" roads. That which we report at St. Paul, Minn., was dreadful. On Feb. 8th, Kansas City, Mo., was shocked by a cable mishap. As a train on Kansas City Cable Railway was going up the incline from the Union depot, the grip broke. The men in charge applied the brakes as soon and as vigorously as possible, but they failed to work, and the train with its cargo of human freight dashed madly down the incline, where it collided with a stationary train which had just been filled with passengers. No one was killed outright, but three persons are believed to have been fatally injured.

ELECTRIC railways are increasing in number rapidly. Eleven of the Van Depoele system are in operation, and five more under contract; the Daft system has six lines in actual operation, while six more are constructing or under contract; the Sprague system has been in practical operation on only two or three lines hitherto, but in another part of this number we report the successful opening of a very extensive and important street railway using Sprague motors, and they have five more lines contracted for or constructing, one being at St. Louis, 13 miles long; the Bentley-Knight system is in operation on two lines (a description of that at Allegheny being given in our present issue), and they have another important line ready for operation in New York City. The Julien system is spreading; and, as stated in our St. Louis correspondence, the Reckenzaun motors are on the way.

FURTHER improvements may be reasonably expected, from the record of scientific progress out of which we give extracts elsewhere, in the application of electricity to propel street cars. "Mr. Edison is stated to be thinking up an electric street railway system." About time he did, unless he wants to get left on this electrical problem.

The Julien Traction Company has just been incorporated in New York. The capital is $3,000,000, and the incorporators are William Bracken and L. Willoughby, of Philadelphia, and Edward O. Coles, of East Orange, N. J. The new concern, which, we understand, is intimately identified with the present Julien Electric company, will manufacture electrical appliances, and build machinery for electrical railways. The factory is to be located in East Orange.

Electric Propulsion.

New things are always interesting, especially when they are likely to be of great public service And electricity is now successfully applied to operate a score or more street railways in the United States, a couple in Canada, and some half a dozen on the other side of the Atlantic ocean the work being done so economically and so satisfactorily as to inspire many to prophesy that "the days of the street car horses are numbered," and that "electricity is the coming power." Yet many there are who scorn this wonderful elemen or phenomenon of nature as if it were a demon and a dangerous thing to have in a city. A city council—not a hundred miles from Chicago—not ten miles off—recently refused permission to put an electric street car on any of their roads even as an experiment, or to show what could be done. It is not further back than 1873 that the adaptability of electricity to exert force at a distance from a "generator" was practically discovered—it was a *discovery*, and not an invention, a all new devices of real value generally are. That discovery in 1873 opened the way for the "invention" of electric railways, operated by "the electrical transmission of mechanical energy" along wires or other conductors. Since then "storage batteries" have been invented, whereby several experimental cars are fitted up with "electrical energy" within themselves, and require no conductors, *i. e.* no conductors of electricity: on "charge" stored in their load of battery cells being sufficient to operate them for several hours But one experimenter recently said that, when he started out with an electric car, he did not know whether he should be able to bring it back without the aid of horses. That uncertainty will no doubt be overcome as the newness of the invention disappears. The newness, however, is only in the way of applying electricity.

Electricity itself is not new, by any means. In fact, "there is nothing new under the sun" in one sense. Natural gas, for instance, now much talked of, is not a new thing—the ancients called its flame "the eternal fire;" and its newness lies in the ever varying ways it is accidentally discovered, and the new uses it is put to. No one pretends that electricity is a new element or phenomenon in the universe; and probably it has been in this earth and its atmosphere ever since the chaotic beginning when the spirit of the Creator brooded upon the face of the dark waters, and gave to this planet of ours its positive and negative poles. It was noticed, as far back as about 2,500 years ago, that amber, when rubbed, acquired the power of attracting to itself such light bodies as chaff or dust. That is mentioned by Thales of Miletus, who wrote about the year 600 B. C. From that time, down to near the end of the reign of Queen Elizabeth (of England), amber and jet were supposed to be the only two substances which could be used for that purpose. But about the year 1600, Dr. Gilbert, of Colchester, discovered by experiments that a large number of other substances, such as diamond, sapphire, rock-crystal, glass, sulphur, sealing wax, and resin, also possess the same property. Dr. Gilbert called them *electrics*, and since the time the name *electricity* has been used to denote the element by the operation of which electric phenomena are produced.

Webster describes electricity as "a power nature often styled the *electric fluid*."

(*To be continued.*)

CORRESPONDENCE.

Sprague vs. Reckenzaun Motors.

The Sprague Electric Railway and Motor Co.
Office: 16 and 18 Broad Street,
Factory: 510 to 516 West 30th Street,
New York, January 17, 1888.

Editor STREET RAILWAY GAZETTE:

Dear Sir:—We note in your issue of Decem-ber, a letter from Mr. William Wharton, jr., of Philadelphia, in which he makes the assertion hat "the efficiency of the Reckenzaun motors over the Sprague motors is very marked. This not only gives us greater speed and power, but reduces the cost of electricity in running expenses. The weight of the Reckenzaun motor, per horse-power, is only about one-third of that of the Sprague motor, and about one-sixth of that of he Van Depoele motor."

This general statement of Mr. Wharton's is, so far as we are concerned, unnecessarily and mali-ciously false. The facts are simply these: Mr. Wharton knows nothing whatsoever of the Sprague motors in general. This company built two motors for him, to fulfill certain conditions which were given to us by a number of people, none of whom seemed to know what they wanted, and are unlike any other machines out of the hundreds which have been constructed by the Sprague company. Notwithstanding this fact, what success Mr. Wharton has had, until recently, is due to these machines, and he was enabled to pose in borrowed plumage as the savior of the street railway before the late Convention of Street Railway Presidents at Philadelphia.

It is impossible to build motors of a given capacity of lighter weight than some of our types of machines. The motors which Mr. Wharton has, he knows, were built under a series of mis-representations made to us, and they have never yet been tested under the conditions which were given to us at the time of their construction. It is unfortunate for Mr. Wharton's reputation that he should see fit to misrepresent a machine which he knows is not the representative of any stand-ard type, but to which, poor as it is, he is in-debted for what indifferent success he has made.

If any one wishes to know what Mr. Wharton's and our position has been in this matter, they are at liberty to see all the correspondence.

Yours truly,
THE SPRAGUE ELECTRIC RY. & MOTOR CO.

The Cable, Electric Motors, etc.

ST. LOUIS, Feb. 1, 1888.—The cold weather has suspended progress on street railway im-provement temporarily, but plans for the coming summer are now being made. The machinery for the Olive Street cable is on hand, but it will not be put in place immediately because the road will not begin operation under the cable system before the middle of March. A report has been put in circulation recently to the effect that the cable on Olive street would be abandoned on account of the trouble the Citizens Railway is ex-periencing with its cable. The Citizens is now being operated temporarily by horse-power, the rope having stranded in several places after three months use. The principal trouble with the Citizens appears to be the many crossings with the Cable and Western which it has to make. Many of the grip men are inexperienced, and in taking the rope after a crossing they are likely to injure it. The company also experienced some trouble with the slot which closed on one or two very cold days. This has been an exceptionally hard winter, the variations in temperature run-ning to unusual extremes. After a little more experience the Citizens will doubtless be in good running shape. Another rope is now on its way from Roeblings.

The Lindell Railway managers continue to ex-periment with the electric motor. The armature for the Brush motor arrived here from Cleveland recently, and further experiments with that motor will soon be made. The Brush Electric company's plant in this city burned out recently.

John Scullin, of the Union Depot line, is ex-perimenting with a noiseless steam motor, but he has been a firm believer in electricity, since his return from Philadelphia. He has ordered four of the Wharton cars, but is waiting at Mr. Wharton's request until certain experiments shall be concluded. Mr. Scullin is an applicant before the Municipal Assembly for a franchise which will allow him to use the Eighteenth street bridge and Clark ave., to connect two points on his line more directly. The residents of the southwest section want the Eighteenth street bridge used for a road to reach their locality.

Mr. Scullin, the Moffitts, and others are trying to enjoin the Southern Railway from the use of their tracks to make a loop half a mile north of its present terminus, Market street, to reach the heart of the city.

Calvin A. Richards, Esq., Boston.

The West End Street Railway company has swallowed up all the street railways of Boston—including those of the Boston Consolidated (i. e. the former Highland and Middlesex), Metropoli-tan, Cambridge and South Boston companies—the largest being the Metropolitan system, of which company Mr. Calvin A. Richards was the president; and it was he who took the lead last July in bringing about the recent wholesale con-solidation of Boston's street railways. Mr. Rich-ards' associates on the whilom Metropolitan exe-cutive board gave him a complimentary banquet Nov. 9th, and declared that when the fortunes of the Metropolitan were at their lowest ebb, in 1875, he was induced to relinquish his "many business cares" and undertook control of the company whose increased dividends soon proved the wisdom and profitableness of Mr. Richards' policy. The energy he displayed was felt in every department from the first day he became connect-ed with the company. And when Mr. Richards passed over with the swallowed up Metropolitan (of which he had been such an admirable presi-dent for so many years) to be general manager of the new consolidation, every one felt assured of the success of the West End Street Railway Co., and his influence as general manager thereof, was felt and admired throughout every grade of the population of "cultured Boston"—until he resigned!

Other men may come and go, but Calvin A. Richards is a name so esteemed by the leaders of street railway enterprizes that his resignation cannot very well be passed over without knowing the whys and the wherefores. Mr. Richards has been appointed to take charge of the paper on the progress of electric motive power to be read at the next meeting of the American Street Railway Association, of which he is a most prominent member—being the chief orator of the association—and its presidential chair was occupied by him one year. In a word, his fame has got abroad so widely, as an authority on street railway matters, that his severance from the management of the street railways of the "Hub" is sure to produce a shock to the feelings of many of our readers. And to have that paper on electric propulsion presented by the president of the Boston Heating Company, where Mr. Rich-ards is now found, is a little incongruous—should he remain there until the Convention.

The Boston *Globe* says that Mr. Richards is taxed for real estate to the value of $750,000; and that he owns fifty houses, four large family hotels (the Metropolitan being one), and over forty shops, stores, etc. We are glad of that infor-mation, Mr. *Globe;* and hope his possessions will increase as rapidly as Jacob's, etc.

In reference to his retirement, Mr. Richards himself says: "My private business, together with official duties in another way, now engross my attention. * * * While I have nothing in my past to look back upon with regret, so far as my official life goes, I yet must confess that I part with something very dear to me when I thus abandon my street railroad career."

Death of William W. Hanscom.

Our esteemed friend Mr. Wm. Wallace Hans-com, San Francisco, died Jan. 16 of congestive chills. The Engineers' Association resolved: "That whilst we hereby bow to the will of the Almighty, we most sincerely morn his loss, for he commanded our love and respect, as an honest man, a kind friend and an able deviser."

Mr. Hanscom's last article to us was that on the Efficiency of Cable Railways in last October's GAZETTE.

American Street Railway Association.

REVISED LIST OF CONVENTION SUBJECTS, ETC.

The special committee to prepare papers to be read and discussed at the next annual meet-ing, at Washington, have been finally appointed the appointments being duly accepted, and the following are the subjects, arranged in their official order:

1.—*Conditions Necessary to the Financial Suc-cess of the Cable Power.* Wm. D. Henry, secretary and treasurer Missouri R. R. Co., St. Louis, Mo.

2.—*Location and Construction of Car House and Stables.* C. Densmore Wyman, vice-president Central Park, N. & E. River R. R. Co., New York, N. Y.

3.—*Progress of Electric Motive Power.* Calvin A. Richards, president Boston Heating Company, Boston, Mass.

4.—*Street Railway Taxation.* Winfield Smith, president Cream City R. R. Co., Milwaukee, Wis.

5.—*Street Railway Mutual Life Insurance.* C. C. Woodworth, secretary Rochester City & R. R. R. Co., Rochester, N. Y.; R. Dudley Frayser, president Memphis City Ry. Co., Memphis, Tenn.; A. C. Moss, secretary and treasurer, Sandusky Street Ry. Co., Sandusky, O.; C. Dens-more Wyman, vice president Central Park, N. & E. River R. R. Co., New York City; V. Cronyn, president London St. R. R. Co., London, Canada.

These subjects are of vital interest. The eyes of the world will be upon the Washington con-vention next October. A "chiel" will be among 'em "taking notes; and, faith, he'll prent it."

Married.

Mr. Wesley W. Sargent, superintendent of the Fitchburg Street Railway, and Miss Alice E. Pinkham, were married at Meriden, Conn., Feb-ruary 1st. They will be at home, 82 Pleasant street, Fitchburg, Mass., after the 21st inst.

Street-Car Men Still Discontented.

In our issue for October last we expressed the fond hope that the increase of wages to twenty-one cents an hour, with the assurance that "no run shall call for less than ten hours' work," granted to the car conductors and drivers of Chicago's big and growing West Side, had laid the foundation of contentment and permanent peace; at all events we ventured to say that "the matter has been settled so well, probably, that no talk of a strike can reasonably be expected among the street railway men of Chicago for a long time to come." But the "walking delegate" must have some opportunity to show the neces-sity of his "position," and, like standing armies, must show his usefulness as it were. And so, before the past January had altogether expired, a committee consisting of President Luke Coyne and Walking Delegate Goodwin, of the West Division Conductors' and Drivers' Association, called upon Mr. Cregier, superintendent of the West Chicago Street Railroad company. They did not ask for increased wages or shorter hours; they preferred no complaint against non-union men; there had been no mistake made in the matter of promotions. The complaint this time was that pay-day came too often!

"Glad to see you, gentlemen," said Supt. Cregier, as these stormy petrels "appeared in person" before him. "What can I do for you to-day?"

Luke Coyne shifted uneasily in his chair, took a few savage pulls at his cigar, and said: "We had a meeting of the union the other night, Mr. Cregier, and the question of pay-day was brought up. We had a long discussion on the subject, and the men finally decided that they did not like the new system of weekly pay-days, and in-structed us to tell you that they wanted to return to the old plan of a pay-day every two weeks. They say that ——"

"Well, I'll be ——," exclaimed Mr. Cregier.

"It's like this, you see," explained President Coyne. "The men do not like to lose so much time getting their pay. They have to come down-town, and it sometimes takes an hour or more for them to get their pay. This is all right for the day men, but it is pretty tough on the night men. Now, it certainly is just as easy, and more so, for the company to make up the pay-

roll every two weeks, and it would be much easier for the men. Anyhow, that's what they told us to tell you, and I have made it just as plain as I can."

"Don't you think they would like a slight reduction in wages for a change?" suggested Mr. Cregier. "It would not be so much trouble to carry it home, and if the men were sandbagged on the way they wouldn't lose so much. You might suggest that."

After a pause Mr. Cregier continued: "This is an entirely new problem, the solution of which must be referred to a higher authority than myself. It strikes me that your argument is a good one, but you have not carried your theory to its logical conclusion. If a pay-day once in two weeks is better than one once a week, it naturally follows that a monthly day of reckoning is better than either. It would be better to put the men on annual salaries, payable, say on every 4th of July. Suppose you submit such a proposition to your union, and in the meantime I will break the news to General Manager Parsons as gently as possible. He is a new man in Chicago, and I don't feel like taking any rash chances. Call around in a week or ten days and I'll let you know what he says."

A few days later we called to see Mr. Parsons, who is now fully harnessed in his new position. "Most remarkable thing I ever heard of," said he. "I supposed Superintendent Cregier was joking when he told me about it."

"Will the request of the men be granted?"

"We shall continue to pay once a week, as usual," was the decided answer.

"What is the objection to the desired change?"

"In the first place, I don't believe the men really desire such a change. If they do they do not know how to protect their best interests, and it is the duty of the company to do so for them. The day men need not lose a minute to draw their pay, and the few night men would be inconvenienced only to the slightest degree. Workmen earning the average wages should have frequent pay-days. It has been proved beyond any dispute that a long interval between pay-days always results in the contraction of the credit system of buying groceries, meat, and the necessities of life. The debtor always gets the worst of that plan of trading. No, sir, we shall not pay any attention to that demand, and believe that the men will have enough good sense to look at the matter in the right light."

The men are inclined to take a serious view of the situation and attach considerable importance to it. Walking Delegate Goodwin, when interviewed, was confident the demand would be granted, and said: "There are several other little things that are not satisfactory, but we don't like to have it appear that we are all the time grumbling and kicking. The new coupon system is a miserable failure so far as we are concerned. The conductors are always losing the tickets, or the clerks miscount them. In either case the conductor is the loser. The pay-day question must be settled. The men are greatly opposed to the weekly pay-day, and were almost unanimous in requesting that it be changed."

White's New and Improved Rails, etc.

"Minimum of cost with maximum of durability" is the combination most desirable by street railway companies: that has always been the aim, namely to construct the road-beds, etc., as good as possible at as little cost as possible—two ends that seldom meet. But with the dawn of 1888, Mr. R. T. White, of Boston, has brought out a number of valuable and matured inventions, which are calculated to start a new era in the construction of street railways. With these inventions, it is declared, substantial and economical street railways can be built, as briefly mentioned in the January GAZETTE. Particulars are given in this issue. And the eight patents recorded in Mr. White's advertisment cover the following important characteristics of the White girder system, viz.: (1) great transom stiffness; (2) the entire absence of bolts, nuts, fish-plates, splice-bars and holes in the rail; (3) solid bearings for all connecting joints; (4) the lower or girder parts of crossing are cast in one piece, and the upper part or rail secured to girder by keys, so that the old rail can easily be removed and replaced with a new one.

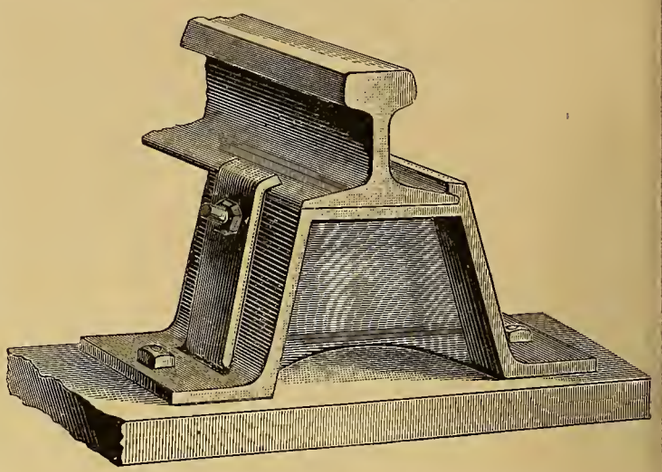


FIG. 1—WHITE'S SINGLE CHAIR FOR T RAIL.

These particulars are from advanced extracts of Mr. White's descriptive circular, which will soon be issued. The patentee draws special attention to the fact that his new rails can be laid to replace those worn out very easily and cheaply. And he is ready to send samples, on application, to any parties intending to build a road using a T rail. All purchasers are guaranteed against patent or infringement suits.

Experts who have examined White's new system of street railway construction pronounce it the best in existence, and vouch that it will very materially reduce the "repair account" of companies using it. Repairs with the systems hitherto in vogue take big slices off street car revenues—the biggest, barring "operating expenses." White's system, it is claimed "virtually annihilates the repair account as, when properly laid, it will last for a generation."

It goes a long way to prove the prospective usefulness of this new system that such "cool, calculating outsiders" as the Worcester Steel Works—"whose conservative management is seldom deceived"—have gone to great expense in putting up machinery for rolling and finishing the rails, chairs, crossings, etc. on an extensive scale. And we understand that this strong corporation has also guaranteed the validity of all patents embraced in White's system.

As will be seen in our Business Notes, the inventor's headquarters are at Boston; while an office has been opened in New York; and the western agent (Mr Wm. P. Boyden) "combines with many qualifications for his position, an unusual aptitude for making strangers comfortable," and he declares himself ready to furnish the capital necessary to equip any line constructed under this system west of the 84th parallel. He quotes $3,500 per mile F. O. B. in Worcester, for 35 lbs. T rail, including chairs, screws, bolts, and everything necessary for a straight track.

We are informed that some of the most prominent and influential street railway men in Boston have lately become interested in Mr. White's inventions, enabling him to make contracts for furnishing, laying, and thoroughly equipping any amount of road, and purchase franchises, etc. In short, "money is no object;" and while the Worcester Steel Works are ready to put out all needed material (for road-bed, etc.), the "financial authorities" have loosened their purse strings

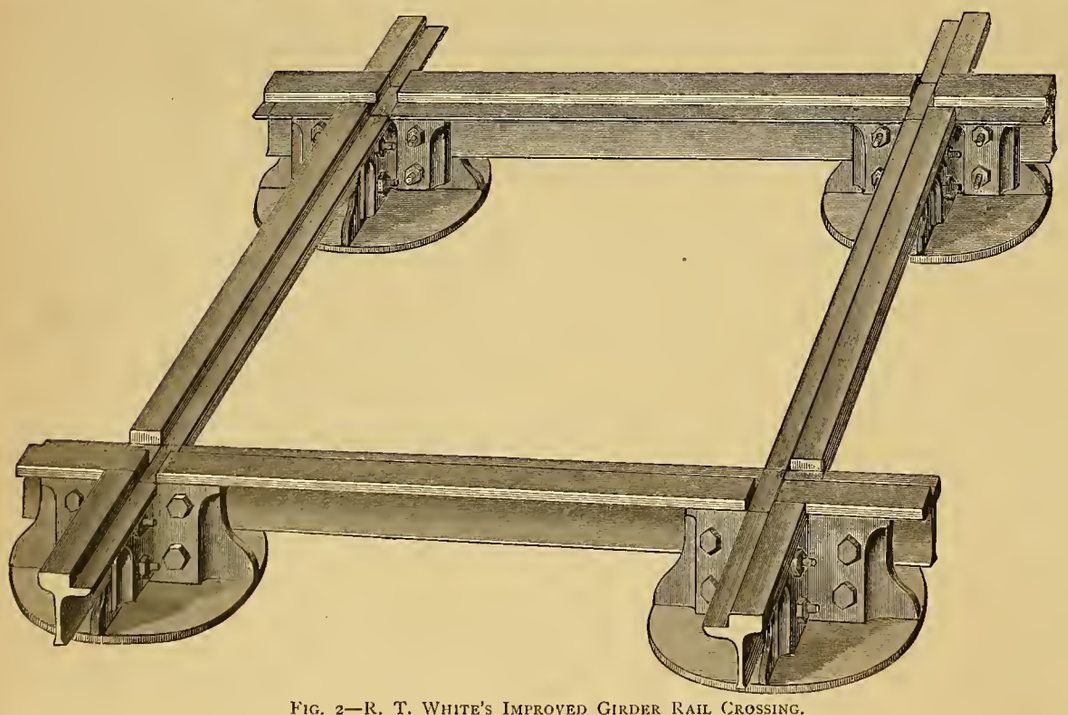


FIG. 2—R. T. WHITE'S IMPROVED GIRDER RAIL CROSSING.

The accompanying cuts show (Fig. 1) the White new and improved single chair for holding a T rail, and (Fig. 2) White's new and improved girder rail crossing. The chair is for a rail weighing 35 or 40 lbs. to the yard. These chairs are cast, as shown, with a strengthening rib under the rail; the clip is made of wrought iron with the lower end bent, same as top end, when the bolt is screwed up as shown. The clip, by being beveled at each end, draws the rail down very solid on the chair, thus making a firm and economical chair for a cheap road. The joints of rails are held in a similar way, in a chair of about double the width and a bolt and square washer at the joint, half holes being made in the ends of each rail for the bolt to go through.

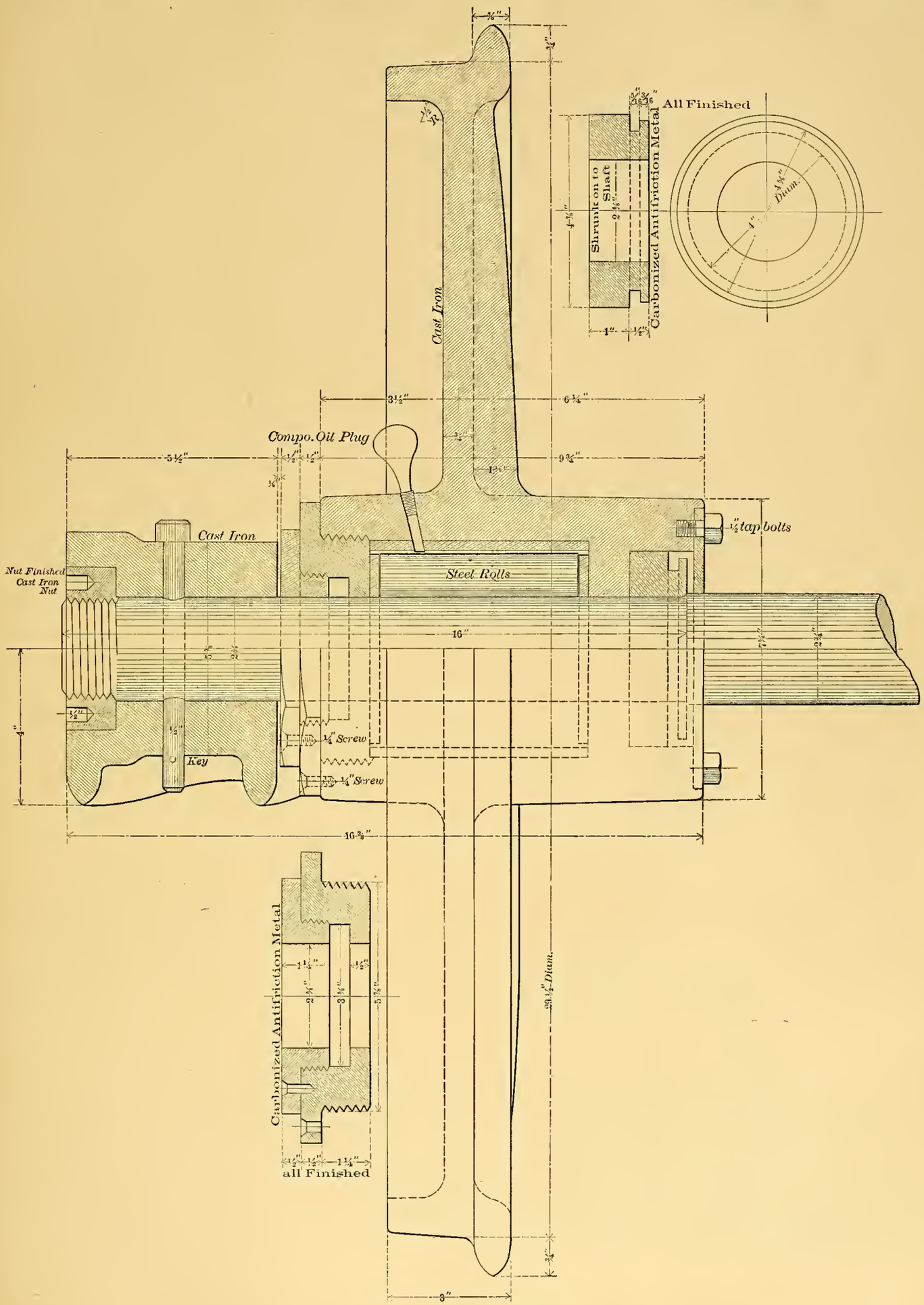
Fig. 2 (as already mentioned) represents R. T. White's girder rail crossing. It has four chairs cast together on each corner, the half of chair under outside of rail being cast solid with the base, which is of a sufficient size to insure a firm foundation, the half of chair under inside of rail being removable, and bolted to outside half by means of two bolts, the top bolt passing through hole in web at end of rail.

At centre of chairs on top is a small cast iron piece on which flange of wheels pass over, this crossing can be used with any weight of rail, rails being cut to proper length having hole bored in each end to receive upper bolt of chair, then set in chairs and chairs being bolted together, thereby forming the strongest and easiest laid crossing of any now in the market.

The Tanner Street Car Wheel.

The accompanying engraving, taken from a construction drawing, represents an improvement in street car wheels for which letters patent were granted to Samuel W. Tanner, of Brooklyn, N. Y., March 8th, 1887. The object of the improvement is one that will be generally conceded as desirable. Those interested in street railways will examine the invention critically, and will not fail to observe the excellence of the mechanism introduced, whereby the wheel is retained in a constant position, in reference to the axle upon which it revolves, and also the means whereby the friction of the wheel upon the axle is reduced to its minimum.

Reference being made to the engraving which shows a half side elevation, a vertical sectional view, and views of details, it will been seen that the wheel is loose upon the axle, consequently the axle is stationary and the wheel revolves loosely. The principal parts consist of (1) the wheel itself, with an elongated hub, which is longer than as ordinarily constructed, and may

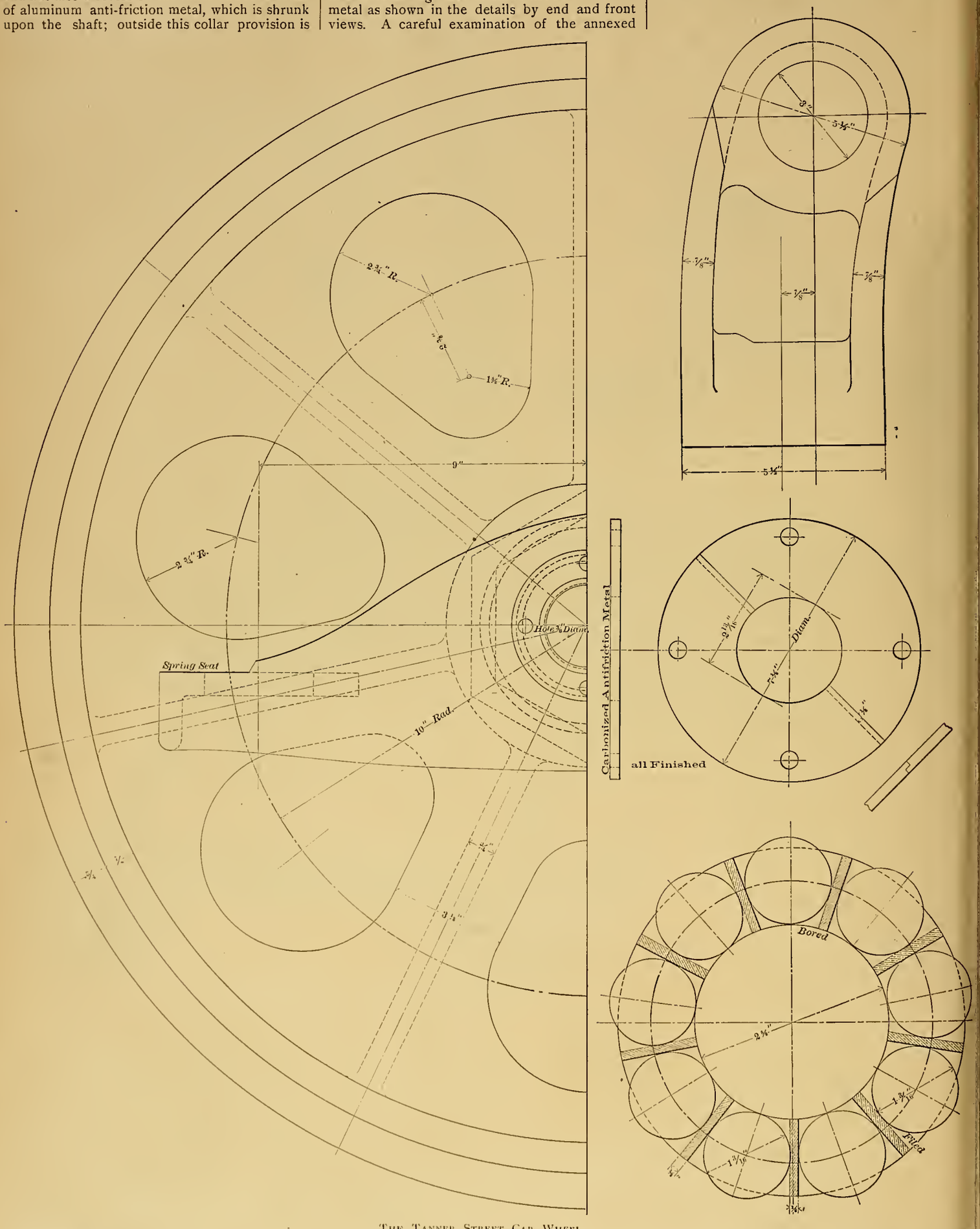


THE TANNER STREET CAR WHEEL

be lengthened still more or shortened if desired. This hub is chambered or recessed to receive a number of hardened steel friction rollers (shown in the details and placed in the vertical section), and has also a recess on the inner end for a collar of aluminum anti-friction metal, which is shrunk upon the shaft; outside this collar provision is made for packing to exclude dirt and dust; on the outer end of hub are a packing-box and gland formed by two nuts, one screwed into the other and keyed in place, made also of aluminum anti-friction metal. (2) The stationary axle that has its end fitted in a cast-iron box and threaded for a wrought iron nut, or the box itself may be threaded and serve the purpose of a nut. (3) The friction rollers of hardened steel are placed in a metallic cage also of carbonized anti-friction metal as shown in the details by end and front views. A careful examination of the annexed drawing and its explanatory details will give a clear idea of the principles involved, the disposition of the parts, and the advantages to be obtained by reduction of friction.

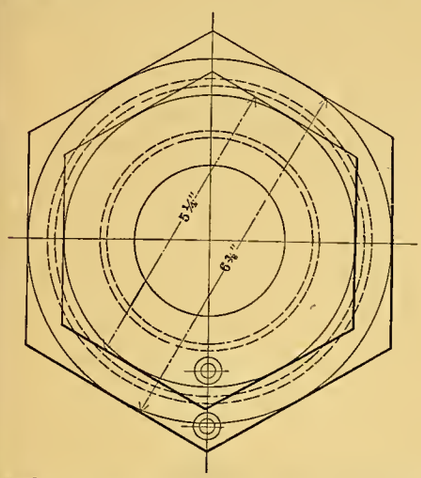
In passing over a curve there is always more or less slip and strain upon the wheel and axle, but with this arrangement, the wheels are free to move without detriment or strain. Wheels of this description have been recently, very carefully constructed, and will be placed under cars on street roads in St. Paul, Minneapolis, and other cities in Minnesota.

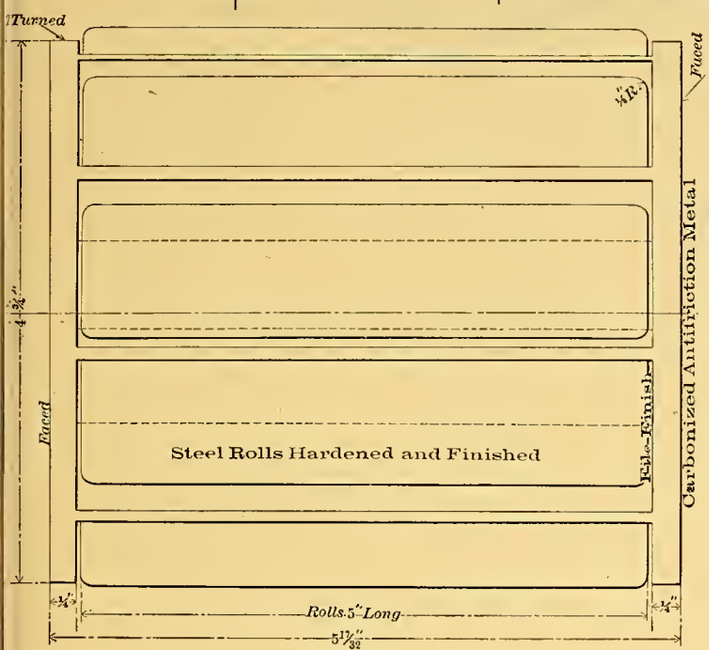
The wheels are equally applicable for steam roads, and some are being placed on the Boston

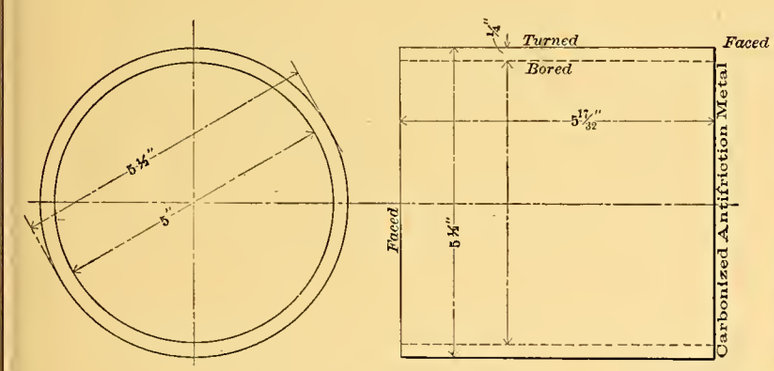


THE TANNER STREET CAR WHEEL.

and Fitchburg Railroad. Their construction was entrusted to the Whittier Machine Company, of Boston, and received the highest commendation from railroad commissioners of Massachusetts engineers, and thoroughly practical railroad men.







THE TANNER STREET CAR WHEEL.

SPECTACLED horses, or mules, is the next curiosity that may be seen, sooner or later, hauling street cars, if we may believe a story from the Manchester (Eng.) *Sporting Chronicle*, which is going the rounds, giving an account of a short-sighted horse being taken to an oculist, who certified that the horse had a No. 7 eye, and required concave glasses. Spectacles were prepared and buckled on. "The horse seemed a little bit surprised," says the author of this bit of news, "when I first put them on him, but his amazement soon gave way to demonstrations of the keenest pleasure. He now stands all the morning looking over the half-door of his stable with his spectacles on, gazing around him with an air of sedate enjoyment. * * * When I take him out for a drive," continues the veracious narrator, "he capers about as friskily as a kitten; his manner is altogether changed.

Guild's Patent Automatic Boiler Cleaner.

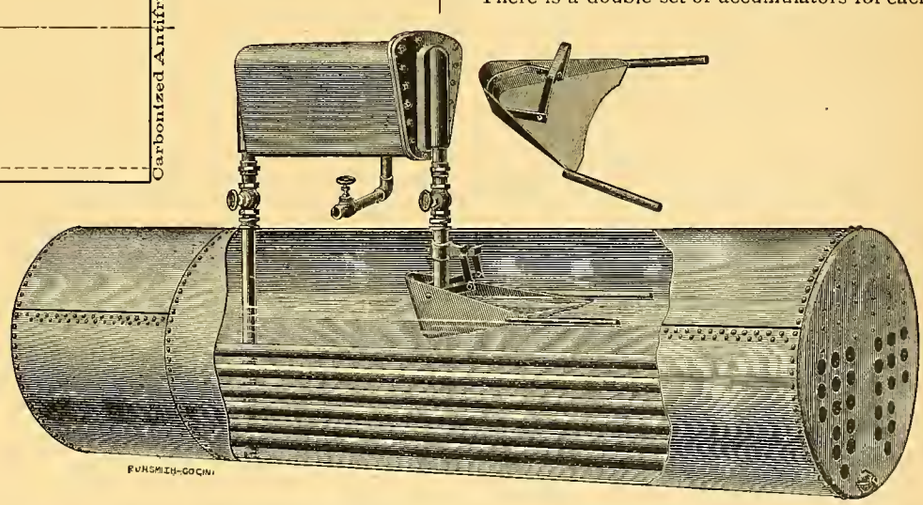
This is a new invention, being a device for removing the scale-making material, found in most of the waters used in steam boilers, and which it is proposed to remove or take out before it is deposited upon the sheets or flues, in the form of hard scale—which will certainly be the case, if permitted to remain until the heat and galvanic reaction has caused it to adhere and solidify.

This cleaner relies upon a well known law for its action. All matter in water, whether in solution or suspension, rises to the top as ebulition commences, when it appears as froth or scum; this device has a skimmer which rests upon the surface of the water, and serves to collect or catch the scum, when it is drawn up into the drum, resting on the top of the boiler. Here it is permitted to settle, the sediment remaining in the bottom, and the clean water returning to the boiler; the sediment is removed by the attendant opening the valve in the blow-off pipe.

The skimmer adjusts itself to the height of the water easily, being constructed so as to rise and fall with the water; and it has features that are found in some other cleaners, that have been candidates for the favors of steam users, but this is an improvement upon them, especially in the hanging of the skimmer so as to adjust itself to the stage of water in the boiler.

The value of a device that will prevent incrustation in steam boilers cannot be disputed, they reduce the cost of power, prolong the life, add to the safety, reduce the labor and cost of operating, and conduce generally to the satisfaction and comfort of all concerned, to say nothing of entire relief from anxiety and apprehension.

This device is destined to become a favorite with steam users, as it is not expensive, easily attached, and, with reasonable care, will do all that is claimed for it. It is the invention of Mr. Guild, and is made by the Knoxville Car Wheel company, Knoxville, Tenn.



GUILD'S PATENT AUTOMATIC BOILER CLEANER.

Julien Storage-Battery System.

The Julien street-car system is soon to be in operation on the New York and Harlem (Fourth Ave.) Railroad, which comprises 18½ miles of track. A correspondent gives a glowing account of the Julien system at Brussels, Belgium, where he met Mr. Edmond Julien himself, and who "is evidently as much pleased as a child with a new toy at the success of his system," and perhaps he has reason to be, since this success has recently brought him from King Leopold the much-coveted decoration of the Order of Leopold, which is equivalent to the Legion d'Honneur in France.

Although the population of Brussels is 400,000, the mileage of street railways and the numbers of cars are much smaller than would be the case in a city of equal size in America. One reason for this difference is to be found in the nature of the ground on which the city is located, by which the operation of cars is rendered difficult and expensive. With electricity it is anticipated that a much more efficient and economical service can be established, and it is not unlikely that the immediate consequence will be a rapid growth and extension of the system. There are, at present, over a hundred cars in active service. Of these, ten have already been transformed by M. Julien into electrically propelled cars. These cars have been in operation since April, 1887, and they are found capable of giving as good service as sixteen cars propelled by horses. They have enabled the company to dispose of 150 horses. The running expenses are said to be much lower than with horses, as appears from the following extract from the Vienna *Neue Freie Presse*, in which is given a report of the meeting of the International Tramway Congress recently held in Vienna: "M. Michelet, General Manager of the Brussels tramways, gave an account of the results obtained by the use of M. Julien's system of electrical traction. He said, among other things, that since the month of April the accumulators and electrical apparatus had required no repairs whatever and no special care; that up to the present the only expense consisted of the general working expenses, and even counting on the renewal of batteries, etc., and expenses existing and to come, the working expenses of five tram-cars driven by horses cost as much as eight electrical tram-cars, whence an economy of three cars in eight, or a trifle over 37 per cent."

There is a double set of accumulators for each car, so that one can be charging while the other is on the car. The car starts in the morning with a fully charged set of batteries, and has a supply of energy sufficient to run fifty kilometres (thirty-one and a quarter miles) safely, and with

some margin. After this distance has been traveled by the car, it is sent into the accumulator room, the side panels being first opened. The car is driven to the "unloading station" in the accumulator room, and the discharged cells are taken out. The platform is on a level with the floor of the car, and therefore it is only necessary to slide the trays out, which is easily done. The track is on a slight incline at this point, and on releasing the brake, the car rolls down to the "loading station," where it comes against projecting arms that stop it exactly at the right point, where there are trays of charged cells just in line; and these are easily loaded by being simply pushed into the car under the seats. The car moves out, the panels are closed, and the car is again prepared for another run of fifty kilometres. It requires on an average about ten-horse per set of cells for producing the charging ing current. This makes forty horse-power-hours per set of batteries, or, since each car requires two charges per day to make its normal run of 100 kilometres, (62½ miles), we may take eighty horse-power-hours as the amount of energy required. The boiler and engine used require 1½ kilogrammes (3 3-10 lbs.) of coal per horse-power-hour, and consequently we have 120 kilogrammes, (262½ lbs.) as the quantity of coal required per car per day to produce its necessary supply of motive power in the form of electrically stored energy.

M. Julien said in relation to the spread of his system: "I have just received an order from The Hague for twelve cars, which are now being constructed under the supervision of their own engineer, M. Flammache. I have concluded a contract with two lines in Vienna where my system is about to be introduced. A telegram received a few days ago from Lisbon informs me that the first car sent there is now in successful operation. Others will follow soon. There are four cars running in Hamburg. I have cars in construction for Milan, Italy; Rio de Janeiro, Brazil; and Melbourne, Australia.

Patents.

The following list of recent patents relating to inter-mural traffic, is specially reported for The Street Railway Gazette, by Wm. G. Henderson, solicitor of American and foreign patents, 925 F street, Washington, D. C. A copy of any of the following will be furnished by him for 25 cents :

Issues of January 10, 17 and 24, 1888.

375,997. Grip for cable railway cars—B. L. Harris, Detroit, Mich.

375,876. Conduit for electric conductors and power cables—I. L. Johnson, Washington, D. C.

375,850, 375,852, 875,853, 375,854 and 375,855. Street railway construction—R. T. White, Boston, Mass.

375,856. Combined sleeper and chair for street railways—R. T. White, Boston.

375,851. Construction of street railways—R. T. White, Boston, Mass.

375,849. Track for street railways—R. T. White, Boston, Mass.

376,356. Car starter—H. P. Wayman, Trenton, N. J.

376,363. Track brake for cars—J. S. Bokenkotter, Norwood, Ohio.

376,153. Cable railway crossing—E. S. Holden, San Francisco, Cal.

376,627. Cable grip—F. H. D. Bergmann, St. Louis, Mo.

376,587. Grip for tram cars—D. T. Denton, Tower Mines, Minn.

876,479. Street railway switch frog—J. Hope, Jr., Providence, R. I.

376,567. Electric railway system—D. G. Weems, Baltimore, Md.

376,668. Railway track scraper—H. M. Littell, St. Paul, Minn.

376,429. Tube motor street railway—W. G. Creighton, Norwood Park, Ill.

376,885. Cable grip—E. P. Heppard, Jr., Woodbury, N. J.

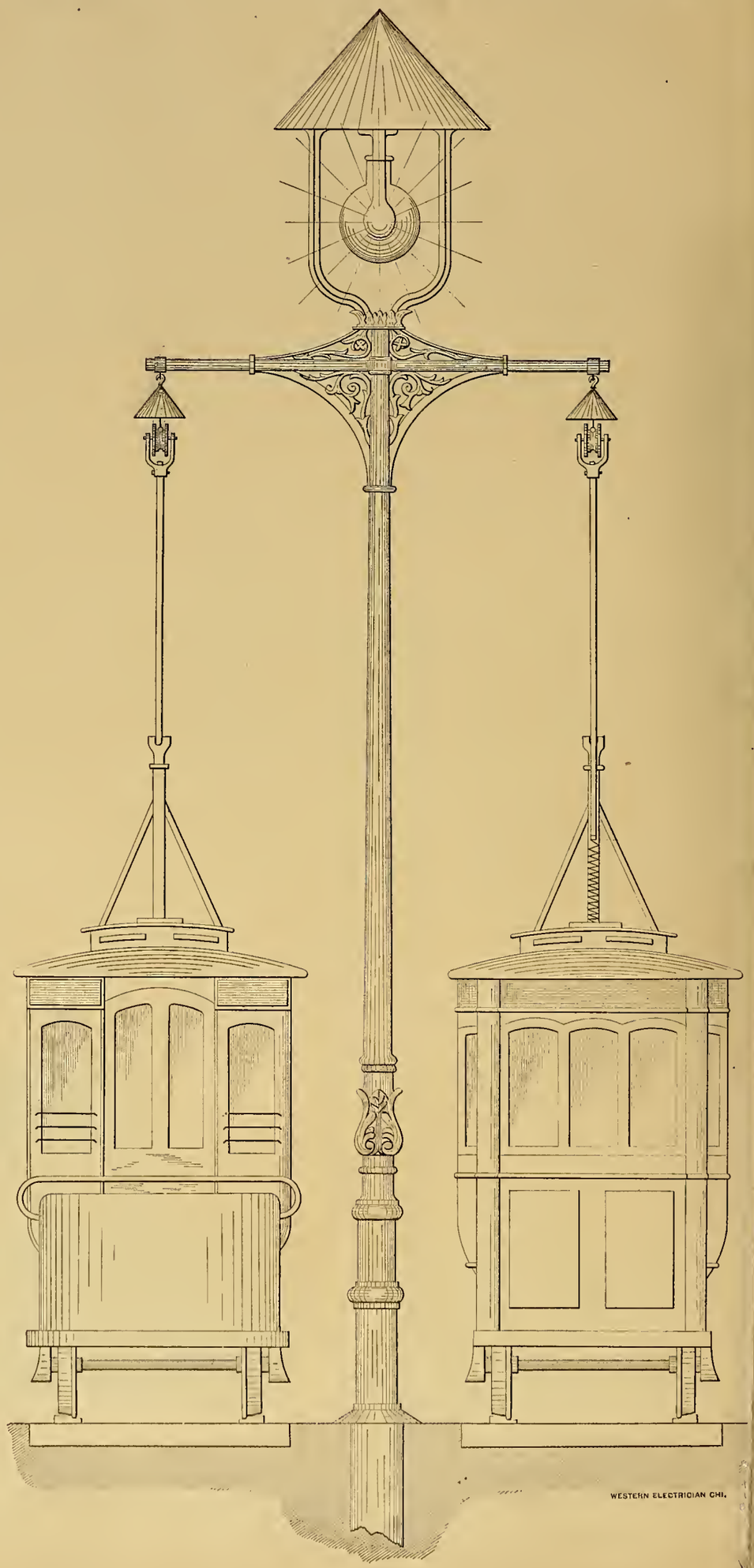
376,875. Car starter—J. Gilmore and W. R. Clark, London, England.

376,829. Elevated railway—W. P. Wood, Clayton, Ga.

376,951. Railway structure—F. K. Hain, New York, N. Y.

Electric Railways Electrically Lighted.

The Van Depoele Electric Manufacturing company have devised a pillar and lamp, shown in the accompanying cut, for utilizing the car-propelling electric current to light up the street. Incandescent lamps may be mounted on the poles; and from their location in the middle of the street would illuminate it much better, and be more readily accessible, than when placed on the street sides. This would much improve the appearance of great thoroughfares, and may help to get electric railways adopted in large cities.



W PROJECTS, PASSING EVENTS, &c.

Brevity enables us to give all States a fair showing.

ALABAMA.

Birmingham. The Clifton and Red Mountain eet Railway company, will construct their new id in the near future.

Decatur. The Fairview Dummy Railway com- ay has been incorporated by Messrs. P. H. nn and L. W. Wyatt; capital $30,000.

CALIFORNIA.

Alameda. The Alameda, Oakland and Pied- nt R. R. Co., are building an extension of a ple of miles, to Oakland by a different route m the present one. The area of the city of ameda is about four miles. The length of lroad within city limits is 2¾ miles, extending ¼ mile beyond the city boundaries.

Lodi. A street railway is to be built here. Mr. as. W. McMaster is the promoter.

San Diego. The electric railway, in successful eration, has a grade of 8½ per cent. "The e is four miles long and a decided success," are in formed. The road will be rapidly ex- ded out through the towns of Peralta and La esa to El Cajon valley.

The San Diego Cable Railway Rights Co., s been incorporated, their papers being filed the office of the Superior Court, Department , San Francisco, Jan. 9; capital stock $100,000. irectors: F. L. Castle, S. Steiner, J. M. Thomp- n, M. B. Keller and R. H. Young

San Francisco. Mr. Robert F. Morrow, presi- nt of the Sutter Street Cable Railway com- ny, who stood charged with jury bribing, was quitted at Santa Rosa February 4, the jury king only half an hour to agree. This was the cond trial, the first having taken place in San rancisco, when eleven jurors stood for convic- n, and then Mr. Morrow obtained a change of nue to Santa Rosa. The charge arose out of e claim of a woman whose husband was killed falling through the trap door opposite the mpany's engine house. A young man named rank Northey has been convicted of attempt- g to bribe the jury to non-suit the widow, and now in state's prison. President Morrow and perintendent McCord were charged with in- igating the crime, but could not be convicted.

Stockton. A correspondent, writing Jan. 20, ys: Messrs. Hanna, Swayne & Co., have seventy- ve men at work grading the streets preparatory to ying the rails for the electric motor line. The ne will be about ten miles in length, running rough the principal streets, and to all the rail- ay depots and boat landing. A company is eing formed, with $500,000 capital. Consider- ble has been already taken. The stock will onsist of 5,000 shares of $100 each. The road ill have no wires overhead nor underneath, but ne power of each car will be stored in the bat- eries under the seats. The construction of the ars will be the same as that of the Market-street able cars, but they will be a trifle smaller, being wenty-two feet long, while the Market street ars are twenty-six feet long. Several cars for ne line are already in course of construction. The contractors expect to have the road comple- ed and in running order by September 1st of his year.

COLORADO.

Denver. The Denver City and Colfax ave. ailway companies have been consolidated.

CONNECTICUT.

Meriden. The stables, with 80 horses and 14 ars of the Meriden Horse R. R. Co., were burnt anuary 10.

DISTRICT OF COLUMBIA.

Washington. Three organization are before ongress for incorporation. The Washington & uitland St. R. R. Co., Weller & Refette, pro- notors; Capital Rapid Transit St. R. R. Co., G. B. Loring and G. L. Ordway, incorporators, and he Washington Suburban R. R. Co.

FLORIDA.

Jacksonville. The Jacksonville and Gulf Ry. Co. has been incorporated by A. S. Rowley, Samuel Barton and Bryan Taliaferro.

The Jacksonville Street Railway is being ex- ended.

GEORGIA.

Covington. A street railway company is being organized by Mr. J. W. Anderson.

ILLINOIS.

Chicago. The Chicago City Railway Co. held their annual meeting January 16, as briefly reported in our last issue. Rev. Dr. W. H. Ryder presided. Mr. H. H. Windsor, secretary, read his report, and that of Superindent Holmes followed. The total number of miles run by cable cars during 1887 was 7,702,950, while horse cars covered 3,216,760 miles. The increase in the number of passengers carried over 1886 was 5,894,916. The cost of handling snow last year was $53,436. During the year the company built 130 cars; an equivalent of 1,905 cars have been passed through the shop, and 2,045 new wheels have been used. Ten miles of cable roads have been built in Hyde Park. At the corner of State and Sixty-first streets a building, 164x340 feet, has been erected. A building 125x600 feet has been built at Sixty-ninth street and Emerald avenue. The time made by the cable cars from Sixty-third to Madison street is better than made by the elevated cars in New York. During the last fifteen years the company's plant has increased from 23 miles of track to 122, from 75 cars to 316, from 600 horses to 1,851, and the cable system is now doing the work of 3,000 horses, with capacity for doing that of 10,000 more. The increase in number of passengers carried over previous year (nearly six millions) occurred on the cable cars. The cost of operating cable cars was 10.57 cents per car per mile, while the horse cars cost 23.16 cents each per mile to operate. The retiring directors were re-elected. This company is satisfied with their officers—and with their dividends.

A "miracle," happened to three firemen with Capt. Ehret and a horse, January 16, as they were proceeding at a rapid rate in a hose cart across State street, and were thrown out between two cable cars one going north, the other south. The men were thrown out, and the horse was in the narrow space between two cars, and had had sense enough to stand still until Capt. Ehret came to him. The men escaped with slight bruises, the horse had a slice of his flesh torn off. It was a great wonder nothing worse happened.

The Lake Street Elevated Railway company of Chicago, was licensed by the Secretary of State, Feb. 7; capital stock, $1,000,000; incorporators, H. P. Thompson, T. P. Hicks, P. O'Donnell, and others. They calculate they can get consent of a majority of the property owners along Lake street, which runs from Lake Michigan straight to the western limits of the city. If they do get consent, what of the council? And, furthermore, what of Mr. Yerkes and General Manager Parsons, whose street cars run along Lake street?

The committee dealing with street railway ordinances has approved of Mr. Yerkes' proposal to construct a new tunnel or two under the river, instead of paving the streets from curb to curb.

Alderman Badenoch's ordinance to limit number of passengers on horse cars, has been defeated. The public were rapidly assuming a howling attitude, and the municipal legislature had sense enough to give it up.

The cable on the north side has been threaded. Mr. Yerkes says it will be in operation before the next GAZETTE is out. The proceedings of the Le Grand Rink company will make no difference, we are told.

The South side cable (Wabash Ave. division), was broken January 23, and horses were resorted to temporarily.

The superiority of the Adams Elevated Railway system, illustrated description of which appeared in the December GAZETTE, has been approved by Mr. Yerkes, as the best kind of "L" road he has yet seen, although he says he has no intention of adopting it—not just yet anyway. The tunnel schemes attract his attention underground.

An attempt was made to rob the Halsted street receiving office of the West Chicago Street R.R. Co., recently. Between one and two o'clock in the morning a number of thieves attempted to enter the office, but a shot from the inside frightened them.

A street railway is projected on Jackson street, the only leading thoroughfare, with Monroe street, across the main portion of the city, hitherto without car tracks. Consents of property owners are being obtained as rapidly as possible, and without much difficulty on the west side of the river; but John B. Drake, and Frank Parmelee are formidable opponents on the east side. The proposal is to construct a line about seven miles long, including branches. The promoters remain in camera, and the moving spirit thereof has yet to be manifested.

INDIANA.

Anderson. Mr. C. D. Chapman is organizing a street railway company here.

KANSAS.

Abilene. The Abilene St. Ry. Co. have now five cars running over four miles of track. Three more miles will be laid in the spring. The company have just opened negotiations with the Ransom Street Car steamer company, builders of noiseless rapid transit steam motors, with the object in view of running the same on the lines in this city. The superintendent of the company is now in the east on this business.

Atchison. President J. H. Beeson, Atchison St. Ry. Co., says they now operate eight miles of track, and that such extensions will be made as the growth of the suburbs demand.

Clay Centre. Car No. 3 of the City Ry. Co. was "somewhat demoralized" recently, writes a local scribe. He says: The car was going west being drawn by the two big calico horses, and when near the R. I track, a special came up from the east frightening the team, which jumped the track and started "cross cut" for the stables. The front platform and steps and one spring were badly smashed, and different parts of the car more or less injured.

Fort Scott. The cars of the Bourbon County St. Ry. are literally frozen out—or, rather in. A correspondent says: Valuable rewards are being offered for the train of street cars that were seen going south some days since. It is supposed that news of the northern blizzard and the Society for the Prevention of Cruelty to Animals caused them to hunt a warmer climate. Joking aside, the street car company has had a tough time of it for two weeks, and the ice on the track has at last compelled the temporary suspension of business on parts of the line, until a thaw, or some work lets them out again.

Kansas City. The secretary of state has issued a charter to the Kansas City, Argentine & Suburban Railway company of this city, with a capital stock of $100,000. The directors are George Sheidley, N. McAlpine, A. W. Boeke, A. W. Little and C. C. Adams. The company building a railway from the state line, near Kansas City, Mo., westward through Argentine and Wyandotte and Johnson counties. The purpose of the road will be to furnish the facilities for rapid transit to parties desiring to live at a distance from the city. A general movement in the direction of suburban homes has begun to manifest itself, and this company proposes to furnish a new direction to this impulse. The road will be about forty miles in length.

Pratt. The Pratt street railway has been in successful operation several weeks. The citizens and traveling public are delighted therewith, as intimated in our last issue. And those who have seen no other declare that "the cars and equipments are all new and the finest and handsomest made."

Strong City. The shareholders of the consolidated St. RR. Co. held their annual meeting January 17, and re-elected E. A. Hildebrand president, and W. P. Martin secretary. Mr. W. H. Holsinger is the superintendent. "The company is doing a fair business, and is contemplating putting on two more cars in the spring."

Topeka. "Warm and quick." A local writer says: Since the first of last April, when the work was commenced, the Rapid Transit company has built fourteen miles of track extending east, west and south of the city, and running in all directions through it. The equipment consists of ten cars and six motors, kept constantly moving, and the people thoroughly appreciate the warm cars and quick time. A large brick engine house 85x120 feet, has been erected at the corner of Huntoon and Jackson streets, as well as offices, outbuildings, etc. It is expected that at least ten miles more will be built this year.

MORE LEGAL PROCEEDINGS.

Judge Guthrie's "double perpetual *injunction*," reported in the December GAZETTE, did not have an enduring effect. Joab Mulvane *et al.*

have been convicted of "unlawful assembly;" they tore up the track of the rapid transit company, and laid down that of the City Railway Co. in its place. Judge Guthrie in delivering his instructions to the jury, January 21, said: "If the defendants on trial, with others assembled or met together for the purpose of unlawfully injuring the property described the indictment, and then and there, by force, took up the rails, ties or property of the railway, without the owner's consent, then they are clearly guilty as charged. If the defendents on trial and those with whom they acted, believed that they were entitled to use this particular street for another purpose, this will be no excuse or defense here. The law affords to every one a peaceful remedy and will not permit force or violence to be used to redress real or imaginary injuries. Nor is it material whether the rails or ties were taken up without injury to such rails or ties; it is sufficient if such rails or ties were taken up by the defendants and their associates."

It is probable that the case will be taken to the supreme court.

Mr. G. F. Parmelee is the secretary of the Topeka City Ry. Co.

Wellington. The Citizens St. Ry. Co. of Wellington contemplate extensions.

Wheeling. Mr. Loftus is putting in a plant for an electric railway in Wheeling, and if it succeeds the same kind of plant is to be put in other cities who are waiting results.

Wichita. The Wichita City Ry. Co. "are figuring on a new system of electric motor which is giving good service in other cities.

"Amicably settled." The Wichita City Railway company and the Riverside and Suburban Railway company have arranged their lines on South Water street amicably; the one laying their track two feet west of the centre line of the street, and the other (suburban) laying their line two feet east of the centre.

Louisiana.

New Orleans. Not quite clear yet. Mayor Guillotte received the following, January 23rd:

The Canal and Claiborne Street Railroad company would respectfully protest against the passage of the ordinance introduced on Jan. 17, 1888, specifying that nothing in ordinance No. 2698 C. S., be construed against the grant in article 8 of ordinance 1992, C. S., etc. This would be an affirmance of said article 8 and may materially change the actual responsibility of the city of New Orleans to the Orleans Railroad company. When in our contract we accepted to assume all responsibility of any suit by the Orleans Railroad company against the city in reference to the tracks on Canal street, we assumed only the responsibility of any suit based on the ordinances, contracts and facts then existing. This company cannot be held responsible for any rights which may accrue from any acts or ordinances of the city done and passed by the city since the date of the passage of ordinance 2698, and it will so contend. Very respectfully, Chas. K. Hall, Canal and Claiborne Street Railroad company.

Maine.

Waterville. The Waterville & Fairfield Horse Railroad company has been incorporated, to construct a three mile track. Seven or eight cars and two dozen horses will be required.

Massachusetts.

Since the resignation of Mr. C. A. Richards, more changes have taken place, and they seem to be giving public satisfaction, principally for the reason that additional accommodation has been furnished. Cars now run every ten minutes from South Boston to Harvard Square, a distance of about six miles. The fare is five cents. The cars are among the best in the city. Cars have also been placed on a route from South Boston to Brattle street, and on another route from the same place to Scollay Square. There are parties in the city who are strongly advocating one or more elevated railways, and the Meigs' elevated railway system is again receiving some attention. With the new city government it is probable that rapid transit questions and city railroads will receive more favorable notice and attention than during last year, although thousands of dollars were spent in visiting, inspecting and banqueting.

Boston's street railways carried last year 100,479,338 passengers, being an increase of 6,486,443, a little more than half the increase on all the street railways of the state.

"Spokes from the Hub" is the caption of the Boston correspondence to the New Orleans *Picayune*, Feb. 1st. The writer said he had snuggled himself into the coldest corner of a Roxbury street cary, Jan. 30, when the vehicle was boarded by a very big and jolly-looking man, who carried in his hand an enormous turkey. Of the only two vacant seats he occupied one and placed the bird next him in the other. The latter, in a sitting posture, with its legs extended and its body—encircled at the neck with a string—done up in a paper bag, had quite a comic effect. When the conductor came through, the jolly-looking man paid two fares. "For my friend here," he said, pointing with his thumb at the turkey. The knight of the bell-punch pocketed the ten cents gravely and made no remark.

Michigan.

Detroit. A twenty-mile electric railway system is to be constructed from Detroit, Mich., to a fashionable resort. There will be three motors, and $20,000 worth of half-inch copper wire conductors will be used. There will be three closed cars for winter and three open ones for summer.

Minnesota.

Minneapolis. The Waterloo (Iowa) street car and omnibus works, with plant worth $100,000, are to be removed to this city.

St. Paul. The "Reliable" sand box was not there, when a train of cable cars got beyond control and slided down St. Anthony's Hill, Jan. 27, after the cable had been jerked from the grip, at a terrific rate until it passed Shelby avenue, and reached an obtuse angle turning to Third street at the bottom of the hill, when the passenger car went off the rails in a half summersault fashion, and seriously injured several persons, two or three fatally. The coroner's jury found that the brakes were inadequate, and that they ought to have had a little sand. The grip car did not leave the rails, and the persons on it were only scared.

Missouri.

Kansas City. Messrs. Dwight, Raymond, Orr, Bradley, etc., of Chicago, recently visited Kansas City, to inspect the Tenth street cable line in which they are interested. The directors of the Citizens' Street Railway company held a meeting January 16, at the Coates house. The Chicago members of the board were there in force. The meeting partook of informal nature and was devoted principally to a discussion of the progress of the construction of the road. The road will probably be in running operation in about three months.

Mr. D. M. Edgerton, president of the Interstate Rapid Transit Co., has resigned, owing to failing health. Mr. McNair, the new president, is a thorough railroad and business man and has an extensive acquaintance in the west. He commenced life in Kansas City when but ten years of age as a messenger boy in the Kansas Pacific offices and when he left the road in 1872 at the age of twenty-two years, he was the local treasurer. He went to St. Louis and engaged in the banking and brokerage business until about a year ago when he accepted the superintendency of the L road. He has the entire confidence of the directors and will undoubtedly become a very popular manager.

A knotty legal point.

In dismissing the suit of Clift Wise, the engineer of the Kansas City Cable Ry. Co., on demurrer of the Grand Ave. Ry. Co., Judge Thayer, (United States Circuit court) said: "A patentee, it has been determined, is not obliged to settle the validity of his patent at law before obtaining equitable relief by an injunction or otherwise, although it is in the discretion of the chancellor to require a suit at law to be brought and tried, before awarding an injunction, if he doubts the validity of the patent. The second objection of the demurrer is well founded, viz.: That the complainant does not specify in what the alleged infringement consists. It merely avers that the plaintiff is the inventor of a new and useful device, described in the letters patent of the United States as 357,162, and therein named an 'Improvement in Cable Railways,' and that said letters were duly granted on February 1, 1887.

"After reading the bill the court has no information respecting the invention. After an inspection of the letters patent an expert machinist might be able to determine or even gue from the description of the complainant's inve tion, whether any such invention as described in use by the defendant. The complaint do not even show to what part of the machine usually employed by a street railroad the inve tion here in question appertains. The bill clearly defective, and the demurrer will be su tained."

Macon City. The dummy railroad, to be bu by the Macon City & Suburban Railway Lig & Power company, will be commenced as so as the frost is gone.

St. Louis. Feb. 5 was a red-letter day in t year's diary of the Lindell Ry. Co. Shortly aft nine o'clock in the evening, a yellow car, wi its interior brilliantly illuminated with two Sw incandescent electric lights, was conducted Mr. E. J. Bagnell, local manager of the Bru Electric Association, along Washington aven The car is not numbered, but on either side a pears the inscription, Julien-Brush. It w built by the Brownell & Wight company, a has been in readiness for business ever since periments on the line were temporarily suspend last fall, pending a decision as to just what co bination of motor and battery would best se the purpose. The armature and gearing for new combination arrived about a week previous from Cleveland, where they were prepared at establishment of Dorner & Dutton, and this be all that was required to test once more the syst to which the Lindell Railway company pinned its faith from the time the local cont versy over rapid transit methods first began this city, all was in readiness. It will be reme bered that the initial experiments last fall, w made with both the Julien motor and Julien b tery, but proved unsatisfactory at the out Then

THE JULIEN BATTERY AND BRUSH MOTOR

were tried in connection, and though the con nation produced some very good results, ye was found that unless the internal resistance the ponderous machinery could be increased, motor would not stand the strain as long a was desired it should. Mr. Bagnell has, du the past few months, given as much attentio the perfection of the Julien-Brush combinat as he has been able to spare from his other w He is quite well satisfied with the result of labors, and now believes there will be no fur trouble. The battery and motor used are same, and have been lying at the stables of company since last fall, but the armature been so perfected, that the internal resista has been increased 100 per cent. Aside f this there has been no innovation, and the trical car stands just as it did last October. Julien battery consists of 118 cells, each we ing thirty-two pounds, or a gross weight of 3 pounds, while the Brush motor weighs 1 pounds more, making a total weight of 5 pounds. Everything is stored compactly ou sight under the flooring at the forward en the car. When the car had climbed half wa a 3 per cent grade, the ammeter indicated b amperes. For the whole route the car was pelled with an average of 27 amperes.

In a circular letter, the end of last year, P dent Geo. S. Case, Baden & St. Louis RR. said: "I enclose you your fourth dividend year, the most prosperous season we have for a long time. Much has been done in the of repairs and equipment, and the track better order than it has been for many year look for a still better season next year"- 1888. Go on and prosper is all the har wish them.

The usefulness of an electric alarm in co tion with cables was demonstrated here Ja 27, on the cable road of the St. Louis Cable Western RR. Co. A watchman observed peculiar noise as the cable rounded the cu Christy ave. He promptly turned in an and the cable was stopped within a distan 600 feet. Men immediately set to work an out a strand, which extended from Locust to Washington avenue. The stoppage wa entirely to the liberality of the company ir ing cars all night for those who attende Firemen's hall. The cable inspector had n the manager that he would have to cut ou

t which showed weakness, but as the line did t cease running repairs were postponed with e the above result.

The delays that have occurred on the Citizens' ilway since the cable was substituted for horse wer have given rise to many complaints from ssengers of the road. The management acowledge that the delays have caused their rons much inconvenience and are doing all y can to stop them. They have put in force n. 30, a regulation that will doubtless be reved with favor by the patrons. Conductors ve been instructed to refund to passengers all es paid if by reason of any accident to the le the car does not reach Compton avenue ing west or Tenth street going east. President lsh, who is now in the East, says that he will able to remedy most defects in the spring. e line is being worked by horses until the arri of a new cable from Trenton, N. J.

Mr. Scullin will probably give the Pearson noisess team motor a trial on his Union depot lines, 's an exchange. "Nine miles an hour can be ained by it. It has lately been tried at Salem, ass., and was a partial success. It is cheaper n electricity, and is on the storage plan."

A damage suit for $5,000 was entered Jan. 25, he Circuit Court, by John Connor against nry Nowack. The plaintiff is in the employ the Cable & Western Railroad company as airer on the slot, and he was engaged in his rk on Wash street when the defendant, it is eged, without any warning, galloped down on him with a horse, throwing him to the und and causing internal injuries.

Resolutions from the Trades & Labor Union re presented to the council Jan. 25, asking the y to enter suit against the Cable & Western l Jefferson Avenue Street Car companies for ling to run "owl cars." Referred to the comtee on railroads.

NEBRASKA.

Norfolk. A mile of street railway track has en laid here.

NEW HAMPSHIRE.

Dover. The Dover Horse Railroad company t Jan. 16, and revolutionized the directory of road by electing Mrs. Dr. Mary E. H. G. w (president), Hon. Winfield S. Bradley, Frank Williams, Henry Law, Cyrus Littlefield, Harri Haley, and Henry D. Freeman as directors. vernor Sawyer is vice-president, and Dr. nry Dow (president's husband), treasurer.

NEW YORK.

Brooklyn. The VanDepoele road from Brookto Jamaica so far as the electrical equipment oncerned is working very satisfactorily, says ontemporary. The track is low, however, and ns wash the sand on to the rails, making it ossible to run except after cleaning the track. e rails will be raised in the spring.

New York. Mayor Hewitt has his head full of underground plan of city railways. He deres that the elevated roads will have to be led down—the city to satisfy vested interests adequate compensation.

A bill has been introduced in the New York islature to incorporate the New York and sey bridge company with a capital stock of ,000,000 to build a bridge to connect New rk and Jersey City.

CABLE RAILWAY RIGHTS.

The trustees of the New York and Brooklyn dge have been mulcted in heavy damages. e following decree has been pronounced inst them, and in favor of the National Cable ilway company, by Circuit Court of the United tes for the Southern District of New York:

"And now, to-wit, this 23d day of January, A. 1888, this cause having been brought to final ring upon the pleadings and proofs, it is nd and hereby ordered, adjudged and decreed t the re-issue letters patent granted to Andrew Hallidie, Number 7,607, dated April 17th, 7, and set forth in the bill of complaint filed, good and valid, and that the title thereto is y vested in the complainants.

"And it is further ordered, adjudged and de ed that the defendants have disturbed, violated l infringed the exclusive right of the cominants under the said letters patent as in the l bill set forth.

"And it is further ordered, adjudged and de ed that the complainants do recover of the defendants the sum of forty-five hundred dollars ($4,500) as damages for the infringement on said letters patent.

"And it is further ordered, adjudged and decreed that a perpetual injunction issue under the seal of this court enjoining and restraining the said defendants from making or using said patented improvement during the term of said letters patent. E. HENRY LACOMBE.

"E. O. M.—A copy.

SEAL. TIMOTHY GRIFFITH, *Clerk.*

"Original filed Jan. 23, 1888."

NORTH CAROLINA.

Asheville. The Asheville Street Railway and Supply company will proceed with the work of constructing their road as soon as the weather opens.

OHIO.

Akron. The Akron Electric Railway company are seeking a franchise to build and operate a road with 5¾ miles of track. They are hesitating between three of the most promising electric systems.

Cincinnati. The following communication from the Cincinnati, Norwood and Pleasant Ridge Passenger Railway company is interesting reading and speaks for itself:

CINCINNATI, January 14, 1888.

R. M. WICKERSHAM, ESQ., President Norwood Improvement Assocation—*Dear Sir:* The undersigned company has purchased from the Cincinnati and Sharpsburg turnpike the exclusive right of way for the purpose of building a railway over said turnpike from the corporation line of the city of Cincinnati to Norwood. We are informed that the citizens of Norwood have offered to Mr. George B. Kerper for his company $22,000 cash, provided he build a street railroad over said turnpike. Our company is anxious to build said railroad, and if you desire competition we will gladly meet your committee.

We would suggest that your committee ask for propositions to build a road of a certain fixed description and have such propositions made in form prescribed by your committee and accompanied with a responsible bond for its faithful compliance. Respectfully yours,

THE CIN., NOR. & P. R. P. Ry. Co.

Harmon, Colston, Goldsmith and Hoadly.

We are informed that a stubborn fight is to be made for this road. Eastern capital is said to be back of the enterprise which intends to connect this road with the Mount Auburn Cable Railway company at some point along its route, passing from Norwood through the heart of West Walnut Hills, and thence through Mount Auburn to the city.

PENNSYLVANIA.

Easton. The Easton Electric railway has been built by the Electric Safety company of New York, using the Daft system, and an experiment made January 13, was of special interest on account of the steep grade, the rise for a distance of 1,200 feet being about nine feet in every 100. The experiment proved entirely satisfactory.

TENNESSEE.

Johnson City. The J. City Belt Ry. company has been organized to build a belt railroad around Johnson City, and to Carters Depot. The officers are: President, F. A. Stratton; secretary, C. L. Stratton; treasurer, J. E. Crandall.

VIRGINIA.

Abingdon. The Abingdon Street Railway company has been organized.

Business Notes.

The Hazard Manufacturing company, manufacturers of wire rope, Wilkes Barre, Pa., held their annual meeting January 23rd, and elected Charles Parish, president; Reuben Downing, vice-president; W. L. Conyngham, Col. C. M. Conyngham, S. L. Brown, T. F. Ryman and H. H. Ashley, directors; Walter Gaston, treasurer; Harry Hillard, secretary.

The Sprague Electric Railway and Motor company's new catalogues are received, by favor of Mr. Chas. P. Woodworth. Those designated "A," "C," "5," "S" and "V," as well as one on "Electric Power for Milling Work," afford much valuable information concerning electric motors—for stationary work and for transmission of power. A full account of an electric railway operated by the Sprague system is given in this number of the GAZETTE.

THE illustrated technical description of new car wheel published in the present number of the STREET RAILWAY GAZETTE will be perused with interest. Further information may be obtained on addressing S. W. Tanner, 282 McDonough street, Brooklyn, N. Y.

THE RELIANCE OIL & GREASE Co., of Cleveland, O., are making a superior brand of lubricating oil, made especially for cable and electric plants, also an excellent quality of grease for car journals, etc. Samples, neatly packed, of the different brands will be mailed free upon application.

THE CAR TRACK FRICTION APPLIANCE COMPANY, W. T. Butler, general manager, has removed from 19 Tremont row to 17 Chardon street, Boston, where ample and convenient arrangements have been made for the manufacture of the company's Reliable Sand Boxes. With the present manufactory and mechanical facilities, the increasing business will be conducted with greater promptitude and on a larger scale. The new factory will have machinery especially adapted for the construction of sand boxes and other street railway appliances, and be lighted with the Edison incandescent light.

THE "RELIABLE" SAND BOX stays wherever it goes. Mr. E. J. Lawless, superintendent Metropolitan Street Railway company, Kansas City, says: "On some of our grades we may not be able to stop promptly without a little sand; these sand boxes are splendid things; they help to avoid sliding, and I would not be without them for any consideration." Mr. Sargent gives the following valuable testimony:—

FITCHBURGH, MASS, Jan. 10, 1888.

W. T. Butler, Esq.—Dear Sir: I have two cars equipped with your "Reliable Sand Box." Both cars are also equipped with Littel's Track Scraper. I find that they work readily and surely, and consider that they have paid for themselves many times over since they were applied. I think, judging from practical experience in the operation of horse cars, that this invention is of great value to street railway companies, not only in the prevention of accidents but as a means of completely controlling a car winter or summer, enabling it to stop on any rail on any reasonable grade at any spot desired. Very respectfully, W. W. SARGENT, Supt. Fitchbury Street Ry. Co.

THE PEOPLE'S CABLE RAILWAY COMPANY, Kansas City, Mo., have a limited number of first class mortgage bonds of the denomination of $500, bearing 6 per cent. interest, for sale.

CATALOGUE "D" has been issued by the Wm. Wharton, jr., Co., from the Walnut street office, Philadelphia. It is a neatly bound book, in size about 9 in x 5½ in., containing their rail section, and about ten new plates principally illustrating in perspective the fastenings for tramway rails.

R. T. WHITE'S acme girder street railway roadbed is one of a batch of valuable inventions for which patents were issued last month, particulars of which are stated in our advertising pages. Mr. White is also an inventor of numerous other valuable devices. An illustrated description of his "L" road appeared in our Vol. 1, page 295 (October GAZETTE, 1886), since which time his inventive faculty appears to been very active, and the matured inventions which he now advertises cannot fail to attract the attention of street railway companies. Mr. White's office is at 12 Pearl street, Boston (room 1); with Mr. Wm. P. Boyden, as western agent, at 154 Lake street, Chicago, Ill.; and the New York office is at 39 Broadway (room 3).

WHITE'S calendar tablets for 1888, illustrated to correspond with the seasons, are attractive; and no doubt a set will be forwarded to any street railway company writing for one to Mr. White at 12 Pearl street, Boston, Mass.

THE three large street car works in North St. Louis are quite busy, having carried over a good many contracts from last year and taken a seasonable quantity of orders since the 1st of January. A feature of last year's business was California requirements, which were considerable in the latter part of the twelvemonth. Within a few months one establishment shipped upwards of fifty cars to California, and the two other factories probably as many.

The Street Railway Gazette.

OL. III. CHICAGO MARCH, 1888. NEW YORK No. 3.

Mrs. Mary E. H. G. Dow.

ESIDENT OF THE DOVER (N. H.) HORSE RAILROAD.

The election of Mrs. Dr. Dow to the presiency of the Dover Horse Railroad, January 16, used considerable commotion in street railway rcles; and the event was the subject of special spatches wired to all the newspapers of the nd. The picture of the first lady president of street railway (which Mrs. Dow is) accompanied e report, in the New York *World*, Boston *Globe*, over *Times*, and numerous other papers. The llowing is a specimen of the telegrams sent om Dover, January 17th:

"Mrs. Mary Edna Hill Gray Dow, the clever oman who five years ago subscribed a few dolrs to the stock of the Dover street car line id last night was chosen by vote of all the ockholders to preside over the concern, is oing about the business of management with great deal of vim. She is a thorough busiss woman, and from the time her first capil was invested in the road has known all ere was to know about the workings of it. o she knows just where the business stands, d is all ready to take it in charge. She has sumed the custody of the books and papers the company and says the road must boom om now henceforward. It has a monopoly traffic in the town, and this fact Mrs. Dow oposes to turn into money by extending the icks as occasion will warrant.

"She considers that her selection to be presint was perfectly natural, inasmuch as she lds the majority of the company's stock. e bought it in to defeat the plans of a Bosn syndicate, which wanted to get control of e road. When the road was first built Mrs. ow purchased real estate all along its line d made large sums thereby. Speculators re are much interested now to know where e will make her next land purchases, and ll watch for 'tips.' They think she will sely purchase a tract of property and then n the railroad out past it to insure its popuion and the consequent rise in the value her possessions.

"Mrs. Dow's fortune now aggregates more an $100,000, most of which she has amassed skillful financiering here in Dover. Though is expected that this sum will be largely gmented within the next few years, the citiis of Dover feel confident that their railroad l be conducted in their interests as she has omised. She is a woman of great energy and esight and enjoys the utmost respect and adration of the townspeople, whose tongues are sy with her marvelous success.

"Mrs. Dow to-night issued her first general ler. She ordered the price of a trip fare to be luced from 6 to 5 cents. This gives the greatsatisfaction to the patrons of the road, who ve all along objected to the 6-cent rate and en petitioned against it. The astonishment h which Mrs. Dow's accession to the presidency was received has given place to gratitude since her initiative step."

The Dover *Daily Times*, January 18, says: "As a rule the mail of Mrs. Mary E. H. G. Dow has been about the size of the average private citizen's in town. But the mail to-day addressed to her as President Dow of the Horse Railroad has been simply enormous. It included several congratulatory dispatches on her election and many letters from railroad builders, car builders and manufacturers of railroad supplies. Three or four are from horse dealers who want to sell first-class horses. Then there are a dozen or twenty people who want the position of superintendent. Many communications are from hay, grain and straw dealers. President Dow will require the service of an extra official—a private secretary."

Mary E. H. G. Dow

This is not the first time for Mrs. Dow to attract extensive notice and stand prominently before the public. She is the same admirable lady that was known as "Penelope Ann," twenty-two years ago, and the part she played in "The Country Cousin" in the New England Kitchen in the Sanitary Fair, at St. Louis, during the whole continance of that popular Fair, is well remembered by the people who attended it. The Hon. "Long" John Wentworth, for one, remembers her well. He is an old friend of the Dow family. She was a great favorite of "Old Sol. Smith," founder of several theatres West and South, who saw much of her at the Sanitary Fair in St. Louis, and he predicted a brilliant succees for her if she would study for the stage. She desired to do so, but as her parents objected she did not. General Grant's daughter, Nellie, and she played prominent parts at this fair, and many pictures of each young Miss were sold for the benefit of the fair.

In politics, Mrs. Dow and her husband (Dr. Dow) are "straight-out" Democrats. "In principle," says the Boston correspondent of the California Associated Press, "she is an emphatic woman's rights woman, and last November was the first woman in the city to demand recognition at the polls." Therein she was successful, being the first woman to vote in Dover; and her "nerve," as one puts it, in taking control of the horse railroad, has inspired some of her friends to dream of "greater things than these." All the local papers are naturally-jubilant over the great honor thus fallen upon Dover, and heartily wish "success to President Mary." The *Illustrated London News* and several other English papers have recorded and commented upon the event, as well as the leading newspapers in France, Italy and Germany. The *Dover Daily Republican* says: "She has received no end of letters of congratulation, and papers have been sent to her from all over the country with marked comments, editorial and otherwise. She has received letters from members of the St. Louis bar, from several presidents of horse railroads and other railroads throughout the country, offering any advice which their long experience enables them to give. A very kind letter was received from the editor of the STREET RAILWAY GAZETTE, in Chicago. Southern widows have come to the front, and have offered to sell old-fashioned jewels, or to write stories to be purchased by Mrs. Dow and by her sold to the northern newspapers. Many of them send samples of their stories. In addition to all this there were several letters from lunatics, also poetry from same; New York and Philadelphia purchasing agencies, offering to purchase anything for her, from a seal skin sack down. Several theatrical managers in New York and Boston have made flattering offers, one of them offering her a box at the theatre if she would appear in full evening dress."

"A woman suffragist" hopes to live to see the day when a woman will occupy the White House. She says: "It is not an impossibility. See for instance that Dover has to-day a woman president of its horse railroad. Mrs. Dow's election to this presidency is a victory for us. I should like to see the following ticket in the field at the next presidential election:

"For President—Mary E. H. G. Dow.

"For Vice-President—Belva Lockwood.

"For Electors—Marilla M. Ricker of Alton, Chris. Wells, of Great Falls, Abbie E. Chase, of Manchester, Frank A. Christie of Dover.

"Now let us suppose that the Dow presidential ticket swept New York, Indiana, Ohio, Illinois, Pennsylvania, the New England states and enough to give her at least 201 electorial votes, she would be elected. Then we'd have rattling times in Dover. Henry Law would succeed U. S. Minister Phelps at London; Frank A. Christie would get the portfolio of secretary of the navy; Harrison Haley would be sent to Russia; Owen Printy, who is acknowledged to be an adept in diplomacy, would make an excellent American embassador to the Irish republic; Henry Landecker could fill the berth of secretary of the American legation in Germany very finely; Wm. F. O'Neil would surely be made postmaster general. It would be hard to decide who would get the Dover post office, probably Jonas D. Townsend, Jr. There are plenty of other places that could be filled by Dover people. By all means let us boom Dow and Lockwood."

Doubtless our readers will be pleased to know something of Mrs. Dow's history, as well as seeing her portrait and autograph. We have traced the lady's "pedegree" as far back as the famous Lord Burleigh, of England, who was one of her honored ancestors, way back. She is descended on her father's side, from the Sheafs who are buried in King's Chapel, Boston; and on her mother's side she is a descendant of the Emersons who owned the land on which Haverhill, Mass., now stands.

Mrs. Dow is the daughter of Nathaniel Rogers Hill (name for Commodore Rogers, a relative), being next to the youngest of seven children. Her mother was Esther Ela, of Dover, who was the daughter of Esther Emerson, of Haverhill, Mass. She was born in Dover forty years ago. It was in Dover that she received the rudiments of her education. At an early age her parents removed to Boston, and it was there she got the larger part of her schooling. When seventeen she graduated with high honors from the Charlestown high school. For some years she was a successful assistant principal of the Rochester high school and later proceeded to St. Louis, Mo., where, for three years she was instructor in French and German in a well known female academy there. When twenty-five years old she was wooed and won by a wealthy resident of Dover, George F. Gray, part owner and editor of the Dover *Press*, a democratic weekly paper published there. They spent two years in Europe. Three children were born to them, and after a few years of happy life Mr. Gray died.

Before her marriage the lady was correspondent for several newspapers, among them the Boston *Journal and Traveler*, New Hampshire *Statesman*, Dover *Enquirer*, and some southern papers. She took 1st premium at the New Hampshire state fair twice for best jellies and canned fruits; 1st premium for best brown and white bread and butter; 1st premium for imported French Houdan and Buff Cochin fowls. She had best darning at the state fair, having a stocking on exhibition that was more darns than anything else, there not being any of the original part of the foot visible, but all a shapely and smoothly darned mass; also for greatest number of different patterns of tatting, crocheted edging and knitted lace, many of which patterns she originated herself; also 1st prize for best varieties of cake and frostings, and best Charlotte Russe made of whipped cream; also French and English cooked meats. She has been very successful in raising celery, grapes, and several kinds of small fruits, such as gooseberries, strawberries, raspberries, blackberries, currants, pears, apricots, Russian mulberries, etc. She has the finest asparagus bed in Dover, every root of which she set out herself after the trenches were properly prepared. She raises the finest, largest and best flavored mushrooms ever seen in the "Granite State." She learned this art in France. She has made and successfully sold butter from 15 cows at one time. In addition to all this she is a good shot with gun, rifle, or pistol, enjoys hunting, fishing and swimming; has taken prizes for swimming and floating longest on water, as blubber floats, which is an easy matter for her, since her weight now is about 200 lbs. Before her marriage her weight was 80 lbs.

The young widow next became the wife of one of Dover's esteemed and venerated physicians, Dr. Henry Dow, who is now past his 85th year. Dr. Dow's brother was law partner of Gov. Andrew, of Massachusetts. It was his ancestors who gave Boston Common to that city. He is a nephew of Dr. Harris, the noted Unitarian divine, who used to preach at the old Dorchester meeting house. When Mrs. Dow married her present husband she was worth $40,000. Her husband was reputed to be worth $50,000. Their honeymoon was spent in England. Her fortune is now estimated over $100,000, as already stated.

The day after her election to the presidency, Mrs. Dow was busy inspecting the condition of the horses, cars, harnesses, stables, tracks, and the whole of the property. "She seemed to be thoroughly posted as to the minutest details of the management," says the correspondent of the Boston *Globe*. It is not generally known that, among her other experiences, Mrs. Dow lived on a farm a few years, and managed it; her father being in poor health. She thoroughly understands horses, and has raised and successfully broken colts. She understands much about treating sick and disabled horses; and she can tell a good horse as well as any professional horseman. She was interviewed, the day after the battle, by the *Globe* correspondent, who describes her as a prepossessing woman, slightly inclined to corpulency; and to him she said:

"Six months since I never had any idea of controlling the road. I owned but a very small portion of the stock. Some time later I found that a syndicate from Boston was anxious to buy out the concern at about one third of the original price of the stock. The capital stock of the road was $20,000 — 400 shares at $50 each. This syndicate offered me $17 a share for what I owned, and for what I had paid $50.

"I pondered over the matter and came to the conclusion that if a syndicate from another State could come here and get the stock at such a price and make it pay, that I had better try to see if I were not as capable to undertake it myself. First I defeated the intentions of the syndicate at a special meeting of the stockholders, which was to be engineered so that the syndicate could get control. This done I then proceeded to buy up all shares I could procure. Some of it I got at a very low figure. Last Saturday I found myself in possession of a majority of the stock. What was more natural than that I should control the management?

"I placed a ticket in the field, consisting of Winfield S. Bradley (brother-in-law of Gov. Sawyer), Cyrus Littlefield, Henry Law, Henry D. Freeman, Harrison Haley, Frank B. Williams, and myself, for directors. It swept the field. Then we, the new board of directors, met. I was chosen president. Of course I took the chair and presided. Then my fellow-members elected my husband, Dr. Dow, as treasurer. The company's counsel are John Kivel, attorney for the State, and Robert Pike, city solicitor, the two most brilliant members of the Strafford county bar.

"Now that I have a controlling interest, I propose to make the Dover horse railroad not only a first-class paying institution, but one of the most accommodating and best-equipped concerns of the kind in the country. Dover is growing rapidly, and when I concluded to control the road I bore this in mind. In the near future the other directors and myself will extend operations. If the public good requires, we will build tracks on Oak street, Broadway, Washington, Silver and Locust streets. I am very sure that the Dover public will find that the success of my ticket last night means better facilities and better accommodations for all."

A lady friend sends us interesting testimony concerning Mrs. Dow's marketing and cooking abilities. Her mother was a famous cuisinière. Not only is the maxim "Like mother, like daughter" exemplified in this case, but Mrs. Dow has acquired the fullest information and the best training obtainable. She has been one of the pupils of Prof. Hawes, of Boston, whose lectures on "Practical Marketing" are of great value. She understands cutting up any kind of a fowl or animal, from an ox down, and can get up a fine dinner, furnished with all the delicacies of the season, at one-tenth the cost of what an inexperienced marketer would pay. Her finely flavored French, English and German dishes have won for her the admiration of all who have been privileged to partake thereof; and the ve small cost of her most tempting side dishes simply wonderful. In one of her recent lectur on cookery, Mrs. Dow said: "My maxim is save and utilize everything; and I believe th many American families waste enough, throug ignorance sometimes, to place them in muc better circumstances than they are. In ve many instances, 'The Lord provides, and t Devil sends cooks.'"

It should be noted that Mrs. Dow's pred cessor, the Hon. Governor Sawyer, is vice pre dent, and presided at the meeting when M Dow was elected. And he says: "Mrs. D is an able financier, and will no doubt gra the position and discharge the duties incumbe upon her to the satisfaction of every patron the road."

Mrs. Dow stands very high in the estimati of her neighbors and wide circle of friends. H reputation is the best all round. And her ch acter is, like that of Cæsar's wife, above s picion. She acts on the principle that to t victor belongs the spoils. And it would be w for many a larger street railway system if it w under the supervision of such a thorough posted president as Mrs. M. E. H. G. Dow.

The American Street R'way Associatio

"Nous arrivons au No. 10 de l'ordre du jou said President Michelet, as the end of the ager of the second days séance of the Vienna Tra way Convention last September was approach "et j'accorde la parole à M. Nonnenberg, er priant de nous faire la communication pron relative à la 'American Street Railway Asso ation.'" And the General Secretary of Union Internationale Permanente de Tramw proceeded to tell the members and delegate the European assembly how "une grand ass ation" was founded in America in 1882, "c prenant de nombreuses Sociétés de Tramw des États-Unis d'Amérique et du Canada," w the above title.

The object of that Association, said Monsi Nonnenberg, is the same as yours, and I beli that it will be interesting for the members of Union to hear a brief summary of the worl the excellent American Association, and to derstand what questions they study. He w on to give a comprehensive sketch; but be doing so, the secretary of the European U expressed the warmest gratitude for the cour of the secretary of the American Associat who sent over all the reports of the Ameri street railway conventions, it seems: "J'a terai, avant de commencer ce petit exposé, je dois tous les renseignements que je possé l'obligeance de Monsieur W. J. Richardson, Brooklyn, secrétaire de cette association, qui gracieusement envoyé les compte-rendus c plets de toutes les assemblées générales."

Mr. Secretary Nonnenberg seems to studied the annual reports of the American A ciation thoroughly. He has also made good of the additional information gathered from STREET RAILWAY GAZETTE and our Direc Supplement, and his "petit exposé" contain full summary of cis-Atlantic street railway i mation, including lines operated by *tra mécanique*, *traction par cable*, and *traction trique*. He points out that for three consec years (1884, 1885, 1886) the American As ation has not failed to have the subject of tric traction on their order of the day, or age and yet, to this day (Sep. 3, 1887), almost al information furnished is only concerning di experiments by Edison, Bentley-Knight, etc., says he.

Our European friend, as reported in February GAZETTE, has done much himself ards adopting electricity, and has the J system in operation at Brussels; and he evid "looked down" upon the progress of ele traction in this country. Of course, by searc for Edison's electric railways he could n otherwise; but Edison is not the only electr in America, and if Mr. Nonnenberg had present at the Philadelphia Convention the lowing month he would have seen and heard electric railways are "booming" in America course he has since then seen the report th in the STREET RAILWAY GAZETTE, and he others on the other side of the Atlantic

ticed with surprise that electric propulsion is ing ahead here rapidly (without the Wizard of enlo Park).

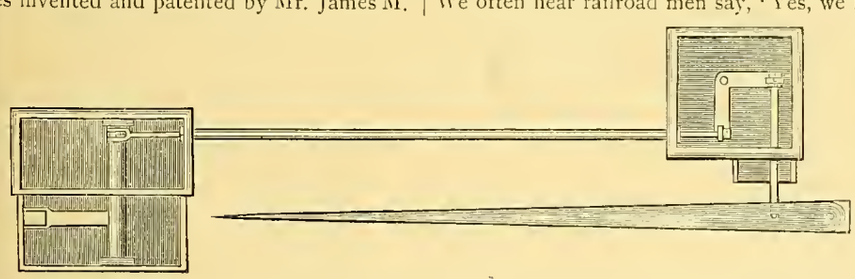
The progress of electric motive power is still the list of subjects (being the fifth time) for next convention, at Washington. And would not to be a charming move to invite the attend- e of the president and secretary of the Union ernationale Permanent de Tramways? On whole they greatly admire the American

eet Railway Association, and such an invita- would greatly please them and the Union. eir attendance, moreover, would add to the cial attractions of the "seventh annual." In ponse to this suggestion, Mr. Lawless (Kansas y) says, "it would certainly be a good move." d there are several engineers and officials of glish tramways also who would appreciate a ilar invitation.

Swem's Automatic Switch.

Mr. James M. Swem, president of the Swem tomatic Switch Co., Denver, Colo., paid us a t recently, and explained the merits of his uable invention. It is self-acting, whether used a horse road, cable or electric railway. Every- who has seen it praises it; and no sales are otiated until the switch has been tried and purchaser sees its action for himself. The ompanying cut will enable an experienced eye understand its construction and operation. top part is a surface view, and the bottom is a side view showing position of switch er pavement. The plunger can be placed distance in front of the switch, so that the er can see the switch opening before he comes . The inventor claims it is the most simple, apest, and withal the most effective switch devised. It is sold subject to sixty days , and each switch is guaranteed proof against er, snow, frost, or dirt in its underground king. No sewage connections are necessary. ll those who saw Mr. Swem's switch at the adelphia Convention have adopted it, and the most gratifying results.

he Denver *Evening Times* says: The drivers onger use "switch hooks," but the cars take desired track as naturally as ducks take to er. "They are the best things of the kind I saw," said Col. Randolph, general manager he Denver City Ry., "simply automatic ches invented and patented by Mr. James M.



n, one of our old citizens. They are dura- and the most effective in existence, and they very much less than the old switches. You 'continued the colonel to a *Times* man as he d looking at the automatic operation of a double switch, "you see that neither a hook the plate—which is used in some cities, and which the horse is required to step to place frog in position—are used here. By Swem's nt all that is required is for the horse to be en in the direction the driver wishes to go, the flange of the car wheel sets the switch." r Swem is on his way to Cleveland, O., and as agents in several cities ready to supply new switch.

Champion Patent Spring Doubletree.

Messrs. McCormick, Courtad & Co., Sandusky, O., are the sole manufacturers of the spring doubletree illustrated by the accompanying cut, which we have much pleasure in introducing to horse car railway companies. It is not an entirely new article, as the manufacturers state, for it has been thoroughly tested on trucks, wagons, and 'buses with gratifying results; and, as they say, "the street car companies may rely upon their efficiency. The qualities of the elliptic spring, with which this tree is constructed, is noted for its combined qualities of softness, fine action and great durability. The action of this spring so attached allows the team to quickly and easily throw themselves into a braced position and gradually overcome the inertia without feeling jar or strain.

"Now this feature is in very-marked contrast to the team, without the aid of a fine action spring, scrambling and straining to get a foothold, and start the car. It will be readily seen that by the action of this spring which allows the horses to gradually overcome the inertia that the car is started without that sudden jerk." We need only add to this the exhortation, "Try all things, hold fast that which is good."

Street Car Wheels.

"Wheels and axles, and their relation to the track," was the subject of papers and discussion at the regular meeting of the New England Railroad club, Boston, Feb. 8; and at a later meeting of the New York Railroad club, papers were read on wheel guarantees, steel wheel mileages, and safety of cast iron wheels. The paper on wheel guarantees was prepared and read by Mr. W. W. Snow, of the Ramapo Wheel and Foundry Co., and his introductory paragraphs show the light in which the subject is held by both sides of the interested parties. He said:

"This subject is one of unusual interest, both to railroad companies and wheel manufacturers, and one that has often been discussed in this room and before this club. There is perhaps no other subject, of its class, which is and has been treated so variably as car wheel mileage. The railroad companies on their part, are anxious to obtain as much mileage as possible for the money invested. Some railroad officers think they can do this by purchasing cheap wheels, and others by demanding a very high and rigid specific guarantee.

"This situation has prevailed to a great extent. We often hear railroad men say, 'Yes, we have a guarantee of 50,000 miles, but if the wheel runs from 40,000 to 45,000 miles, we let it pass.' Yet we also know, that on many roads when wheels guaranteed at 50,000 miles, fail at 49,000 miles, the manufacturer is obliged to furnish a new wheel, without receiving any credit for the mileage of the old. Shall we not try to correct some of these abuses! Is it right for any railroad official to give the wheel manufacturer 10,000 miles of service, when it justly belongs to the railroad company he represents? Again, is it right for a railroad company to exact a new wheel on the failure of only 1,000 miles, and give no credit for the mileage the wheel has performed? Is there equity in such dealings?"

Up to this point, the street car wheel question is analagous to that of the regular railroad wheels. But at this point, the consideration of the heavier class of wheels differs considerably from that of the other.

Although the wheel question has never been discussed by the American Street Railway association, it is an important subject, and deserves study not only on the ground of economy but also in regard to the safety and convenience of passengers. And nothing is more annoying to all parties concerned than to have a wheel breaking under a street car full of passengers, and especially when far away from the car shops. Car No. 782 of the Chicago West Division Ry. company was disabled in front of the Chicago Y. M. C. A. rooms one evening, through the loss of a wheel, and the mishap attracted a crowd of onlookers. It caused a great deal of discomfort and unpleasantness although no one was hurt. About 8 p. m., January 23rd last, the Chicago Passenger Ry. company's car No. 72 was disabled, by the breakage of a wheel, while taking a load of passengers down town. The car was built by the Pullman company, but the wheel was Griffin's. Men came from the car shop, with a new wheel, and the car was taken to "hospital." These wheels were of cast iron, as nearly all street car wheels are. New modes of manufacture, and economic considerations have "combined to lower the quality of car-wheel irons, until probably not a single blast furnace in this country is using the same degree of care in the selection and preliminary preparation of its ore and the same mild cold blast that was used by car-wheel manufacturers 30 years ago." So says Mr. Peckham, of Syracuse, N. Y., in his paper read before the New York RR. Club. And he shows how inferior wheels have come into the market, and points out that "perfect" cast-iron wheels may yet be manufactured.

Mr. Peckham says: "The prevention of accidents caused by breakages of wheels and axles can only be secured by providing against all known imperfections in manufacture, and adopting only such materials and appliances as have been found by years of practice, both in this country and Europe, to be the most reliable, with such improvements as will increase strength and safety in accordance with the well-known mechanical laws. The safety of cast-iron wheels depends mainly upon the quality of the pig-iron used in their manufacture, although it is important that great care should be used in the manufacture and inspection of wheels before leaving the works. The dangers to which cast-iron wheels are liable are: breakages caused by the use of inferior pig-iron; contraction during the process of cooling, and crystallization. By careful inspection and testing before leaving the works it is calculated that all flaws caused by unequal contraction in cooling can be detected. Providing this is done it still leaves the wheel liable to break from an excess of phosphorus in the pig-iron (which makes it cool short); or want of sufficient toughness, due to a lack of care in its manufacture, and crystallization. It is possible to overcome these imperfections and render the wheels safe except as regards crystallization, if wheel manufacturers will demand the same care in the manufacture of the pig-iron as was demanded 30 years ago."

The car-wheel question has come into great prominence with those interested in the steam railroad cars; and it has been so discussed in our valuable contemporary the *American Machinist* that it has reached a fine point—nothing less than the distinction between power and force. A correspondent says: "I think we have a right to assume that when A. B. A. asked his question in the January 7 number, he did not appreciate the technical distinction between power and force, and was not aware of the contradiction of terms in saying the power was *fast* to the car, for the simple reason that if he had the technical education to distinguish all these fine differences, and their full import in relation to the problem, he would have known enough about it to answer and explain the question for himself and others without applying to the *Machinist* for information."

We readily confess that more information is desired for the STREET RAILWAY GAZETTE, in reference to street car-wheels, than we possess.

and we should be glad of enlightenment. We had much pleasure in calling recently upon those within convenient reach. We boarded one of the Madison street cars of the West Chicago Street Railroad company to get to their car shops on Western avenue. It was a remarkably light and comfortable car (No. 801), built by the Laclede Car company, St. Louis. This seemed so astonishing (as the West Division Ry. company had always built their own cars) that we asked the conductor if that car went to the car shops. It got there anyway, and the foreman of the car works said they had recently procured half a dozen of the Laclede cars.

Mr. F. T. C. Brydges has only filled the position of foreman here since December 21 last. But he was previously mechanical draughtsman, and has had much experience with the N. Y. Central and Hudson River RR. company. He could not say how long the wheels lasted, or how often break-downs occurred on account of defective wheels, without investigating the books, etc. The wheels they use are those manufactured by the Griffin Wheel and Foundry company, and those of the Barnum & Richardson Mfg. company. Speaking "off book" Mr. Brydges said the average life of a wheel was from 12 to 15 months. They run about eight or nine months, and then want grinding; after being ground they run four or five months more.

GRINDING WHEELS.

Mr. Brydges wishes to know what is the practice of other companies with regard to grinding wheels. His company, or rather their predecessors, have done a good deal of grinding; and the new general manager (Mr. Parsons) has raised the question, Does it pay? Mr. Brydges is inclined to answer in the negative; but he is anxious to know what is done by other large street car companies.

Thence we proceeded to the car shops of the Chicago Passenger Ry. Co., also on Western ave., about 7 or 8 blocks to the south from the West Chicago shops. The foreman (Mr. C. E. Shreve) was found superintending the repairing of a damaged car. The Passenger system was opened Nov. 17, 1885. They started with wheels from the Baltimore Car Wheel company, which have been in continual wear, during the box car season, ever since. The Baltimore wheel has seven spokes; its chill is very deep, and "it is the best by a long way," said Mr. Shreve. But "cheaper" wheels (that is, costing less) are obtainable, and this company have tried the Fulton foundry, the Frank H. Andrews, the Whitney and the Griffin wheels, all of which cost 17 per cent. less than the Baltimore wheel. There has never been any trouble with the latter, however, while the Whitney and the Griffin particularly have been mischievous. They had one hundred of the Philadelphia (Whitney) wheels over two years ago, and since the description of Messrs. Whitney's new patent contracting chill, in the STREET RAILWAY GAZETTE for November last, they have resolved to get more of their new wheels, which are well spoken of.

Mr. Shreve's greatest trouble has been with the Griffin wheels, but "it wasn't the fault of the wheels" he added, emphatically. The Griffin wheel has eight spokes; they commenced with these last October. "They were of the wrong pattern, and too light for the service." A later supply, of the right weight and pattern, will equal any of the other makes, it is expected. This company uses an equal number of Pullman and Laclede cars.

"Do you grind your wheels, Mr. Shreve?"

"No; not as a rule. I don't believe in grinding, except in some peculiar cases: if a wheel has soft patches, those parts wear uneven after grinding as much as before, and when they become too bad to use, it is best to throw them away."

We next called at the shops of the Chicago City Ry. Co. (South side), where we found 400 Griffin Wheels just delivered. Mr. J. B. Wright, (master mechanic) stated that they used the Griffin wheels, and no other; the pile now delivered are for 130 new summer cars, now in course of construction. "The average life of a car wheel," says Mr. Wright, "is about twelve months, in our service."

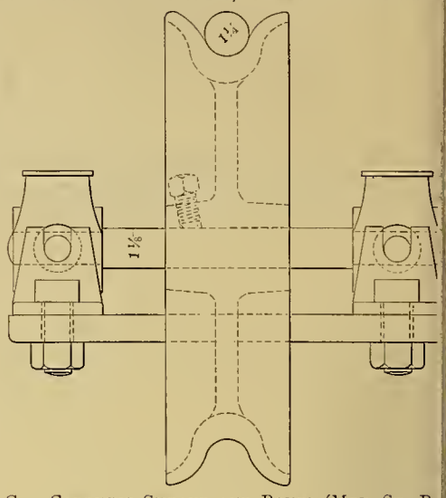
Cable Railway Practice.

BY EDWARD J. LAWLESS.

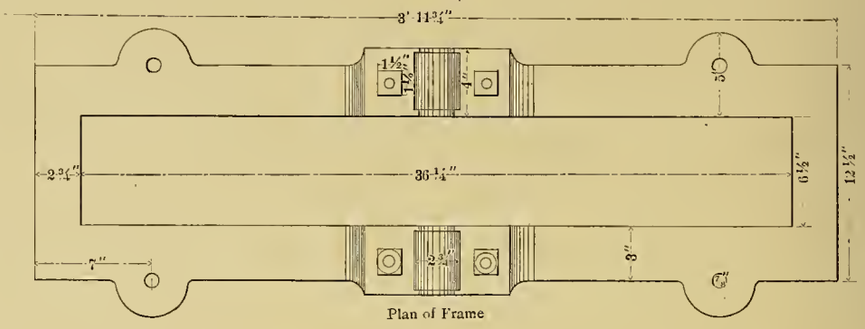
ARTICLE II.

When constructing, it is advisable to have the top of slot rail laid one inch higher than the track rail. This will prevent a great deal of dirt and water from entering the conduit, and many wheels from catching in the slot, should it happen to be a little wide at any point. At joints, both of slot and track rails, allowance should be made for expansion and contraction. Extra care must be taken when bolting the slot rail at joints, so that an even surface is presented for grip shanks to pass. With Z form of slot rail (see last paper, form B) one or two tie rods can be used at the joints. If one, cut a half hole at each end of slot rail, bolt a small plate inside, and pass the tie rod through this plate. This will make a good joint and not interfere so much with the pavement as double tie rods. A three fourths of an inch slot opening is about the correct gauge. When laying to this gauge it should be laid fully one-eighth of an inch wider; that is to say, if you desire a ¾" slot opening, lay it at ⅞". When your tube and track are completed and thrown open to travel, it will quickly settle to ¾".

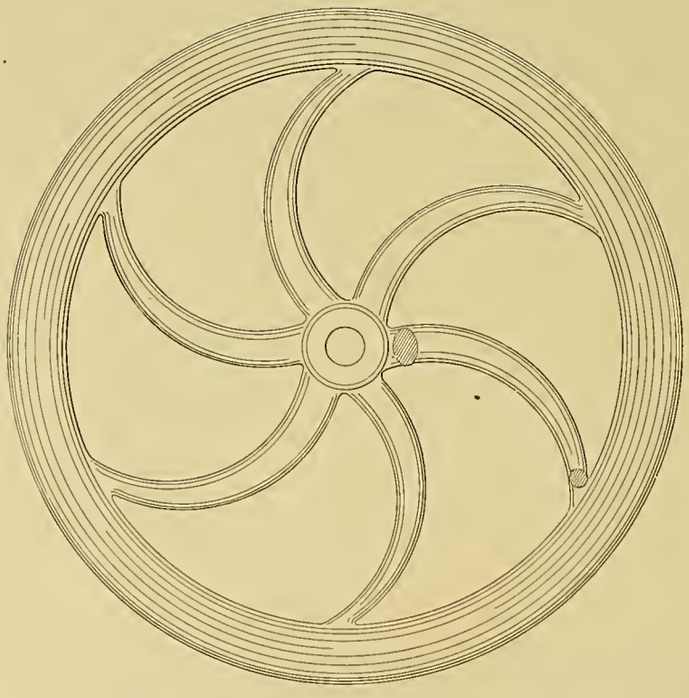
sheaves. The continuous conduit is preferal although a little more expensive, it bei larger and deeper, consequently less liable to g clogged with dirt, snow, ice, etc., and gives p fect freedom to the cable, it also has the adv



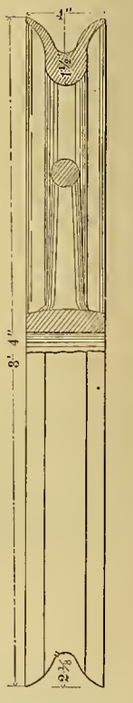
G.—CARRYING SHEAVE AND BOXES. (MET. ST. R



Plan of Frame

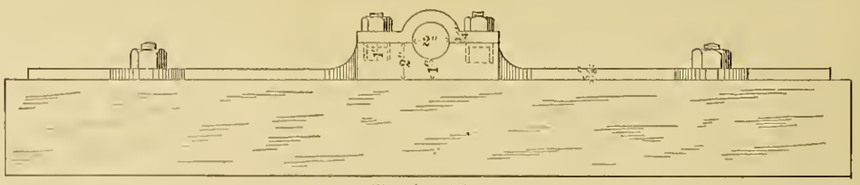


Elevation of Pulley



Section of Pulley

Sh.



Elevation of Frame

H.—CROWN PULLEY (METROPOLITAN STREET RAILWAY, KANSAS CITY).

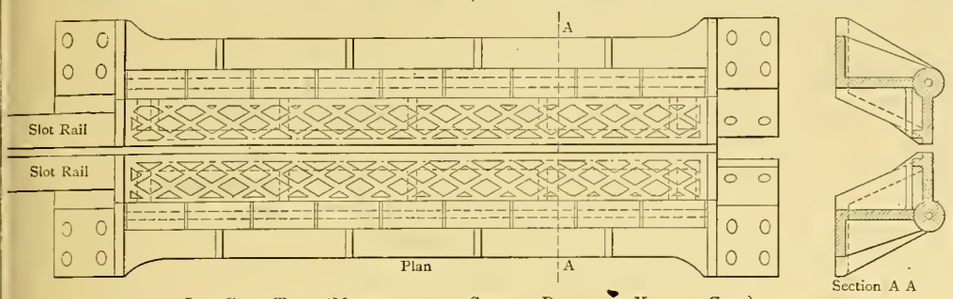
The conduit can be either continuous or sectional. In the former, the carrying sheaves are placed in the conduit proper. In the latter, special excavations are made for these carrying

tage of being easily cleaned by flushing. In termining the depth of a continuous conduit following figures will give an idea of what is quired:

)p of slot rail to bottom of grip ..... 18 in.
earance between grip and carrying sheave, 2 in.
rrying sheave ..... 12 in.
earance from carrying to bottom of conduit ..... 6 in.

Total ..... 38 in.

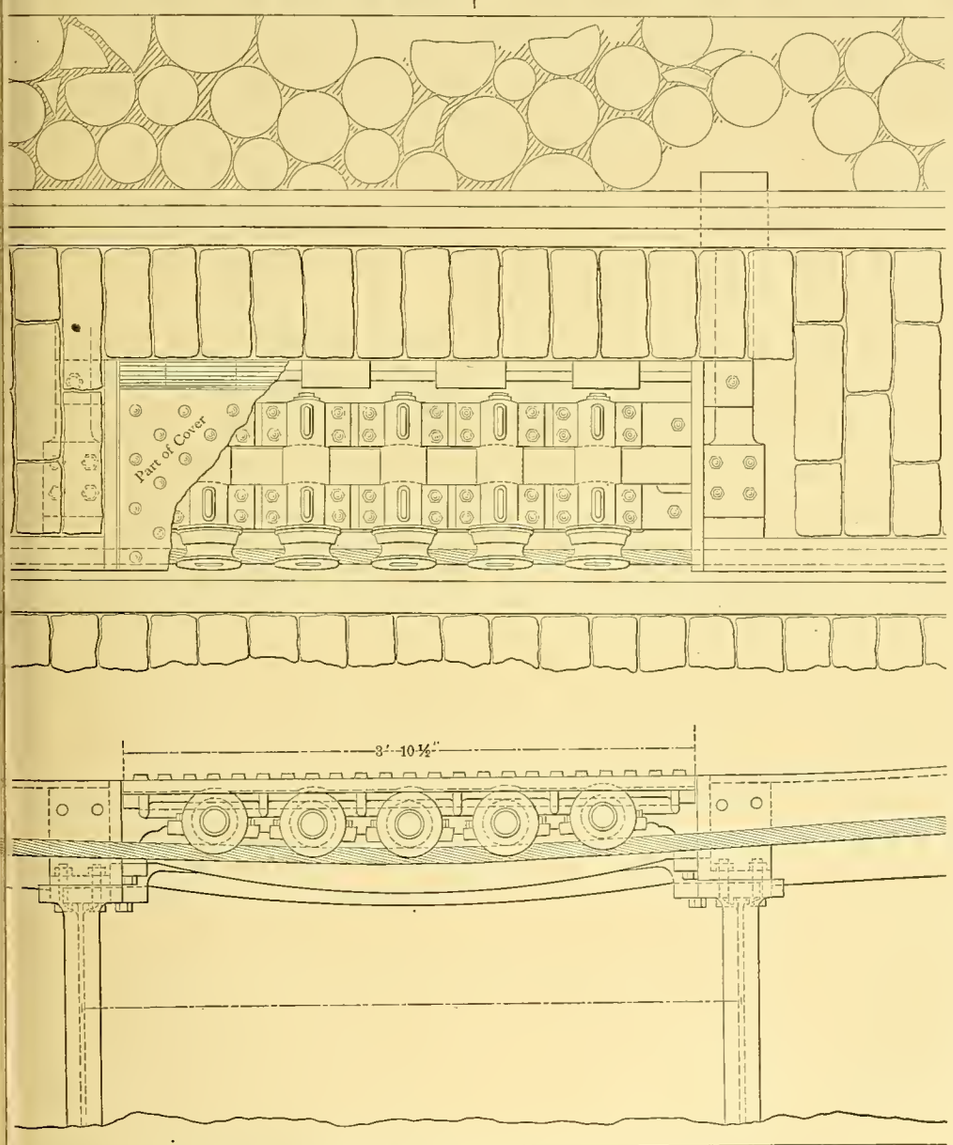
I believe it is generally conceded that concrete the best material with which to form the conit, as it seems to improve rather than decay



J.—Grip Trap (Metropolitan Street Railway, Kansas City).

:h age. English or German Portland is the st cement to use for this purpose. The sand)uld be clean and sharp, and the rock free m dirt; the larger stones should pass through ″ ring. Where the soil for background of nduit is solid, the concrete should be not less in six inches thick; elsewhere nine inches.

to settle, causing the slot to close or yokes to break, a trouble very difficult and expensive to remedy. Having laid the iron and concrete, and allowed sufficient time for the latter to set, you next proceed with the pavement. Stone blocks are generally used for this purpose. Wood pavement has been tried in some places, but the results were far from satisfactory, as sudden changes of temperature caused the wood to expand or contract and the slot to close or open accordingly. I have seen, on a track paved with wood, a slot having an average width of ¾″ in the evening, closed to ⅜″ the next morning. When paving with stones, the blocks should not be less than 6″ deep, and special care taken to have the end joints come close together, and stones fit close to both slot and track rail, so that



I.—Depression Pulleys (Metropolitan Street Railway, Kansas City).

ıen excavating, to lay the iron work, care)uld be taken to cut out only so much earth as l be replaced with concrete, as it is not advise to throw any loose earth back. When ssing a fill, or street recently raised to grade, ıcrete piers reaching to solid ground should laid (if too deep, piling should be driven),)ut eight feet apart, on which to rest the ck. If this is not done, the conduit is liable no rut or groove will be formed by constant driving of wagons, etc. With form D (see Article I) the bottom of the stones should be cut so as to have a good bearing on the bottom of the slot rail, and at the same time have the top of the stone close to and flush with the top of this rail. Ram the joints well with gravel and fill with tar or cement grout. After removing the frames, around which the concrete is placed to form the conduit, the inside of conduit should be smoothed over with Portland cement.

At the foot of the grades, excavations reaching from track to track, about five feet deep and same width as space between yokes, commonly called "drain pits," should be made, connecting with the main sewer for the purpose of carrying off the water from the conduit. In those districts not sewered, special drains will have to be laid between the tracks connecting with the conduit at the carrying sheaves. These drain pipes should be ten to twelve inches in diameter, as the tar dropping from the cable will adhere to the bits of wood, dirt, etc., and clog the pipes, if smaller be used. According as sections of the roadbed are completed some constructors place wood strips in the slot, so as to keep dirt from entering and filling the conduit, which strips can be easily removed when ready to place the cable in position.

Having completed the construction of the conduit the next move is the placing of the sheaves, or wheels, on which to carry the cable in this conduit. The average size in use is about 12″ in diameter with 4″ face, grooved according to the diameter of cable it carries. I have tried carrying pulleys 12″, 15″ and 22″ in diameter with cables running up to a speed of nine miles per hour, and got as satisfactory results with the 12″ sheave as with the 22″ sheave. It is desirable to have these carrying sheaves chilled, care being taken to have a perfectly smooth surface so as not to chafe the cable. They should not weigh over 20 lbs. A very simple and cheap way to hang these sheaves, should your yokes be of cast iron, is to have a lug cast on the yoke to which you can bolt a cast iron frame and in this frame place your sheave and boxes (see figure G). Be sure that these carrying sheaves run "true" and in perfect line. I have noticed, on various cable lines, carrying sheaves making a disagreeable noise and on investigation they seemed to have a desire to run in two directions at the same time. This not only causes wear on the sheave and cable, but if there are many, it makes a considerable difference in the horse power developed by the engine. When bolting the pulley frame to yoke put a strip of sheet rubber between them. It will deaden any humming sound caused by the revolving of the sheaves. Manholes with cast iron covers should be provided at each of these carrying sheaves for the purpose of adjusting and oiling them. At the crowns of hills the diameter of these carrying sheaves should be increased to three or four feet, on account of the angle made by the cable and increased pressure on the sheave (see figure H). These will have to be hung in frames placed between the yokes and special excavations made for them reaching from track to track commonly called "crown pits." It is not necessary to chill these large sheaves. It would be very expensive to do so, and they last a long time without chilling. On grades exceeding about six feet in 100 feet, where the incline makes an upward angle, it is necessary to place depression pulleys to prevent the cable chafing against the slot rail. These are required to be small, about 6″ in diameter, so as to clear the upper jaw of the grip (see figure I). Should this style of depression pulley be adopted, the shafts must have about 8″ bearings; and, at the back, collars securely fastened with keys (not set-screws) to prevent the shafts from working out towards the slot, thereby offering an obstruction to the grip which might cause a very serious accident. These pulleys should be well chilled, having the groove, for cable to run in, towards the outer edge. We use five of these pulleys set on a vertical curve of twenty feet radius, and secured to one solid cast iron frame, as shown in the accompanying cut. At each end of all switches and curves, as railroad crossings, at the foot of heavy grades and all those places where there is increased danger of grips being broken, grip traps should be placed for the purpose of taking out damaged grips. They should be large and roomy as, usually, when it is necessary to take out a damaged grip, it is in a twisted condition and great delay will be occasioned if you have not ample room to do so.

The accompanying cut (J) shows a grip trap with two hinged leaves or covers, the outer edges of which take the place of the slot rail.

To be continued.

The
Street Railway
Gazette.

E. V. CAVELL, - - - - - MANAGER.

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THE North Side cable, Chicago, has been thoroughly tested (after getting rid of the ice mentioned in another column), and Superintendent Threedy states that it will be in permanent operation after March 14th

MR. C. B. HOLMES has made a lasting impression by his address to Bostonians on the cable railway system. They not only believe all he told them, but they are actually going to construct a cable railway in Boston right away. It will cost, it is estimated, about $100,000 per mile in that city.

MR. LAWLESS says a friend of his has recently returned from Scotland, and from the description he gives of the construction of the cable railway, or tramway, as they say over there, at Edinburgh, Mr. Lawless thinks it will not be very successful.

GEORGE H. CORLISS, born in 1817, "passed to a higher life," Feb. 21st. A tribute to his name is needless, as the numerous Corliss engines (the first of which was completed in 1848) afford undying monuments to his memory.

THE *Cincinnati Artisan* informs the STREET RAILWAY GAZETTE there is but *one* George B. Kerper, and that the Findlay (O.) street railway will be a success if Gen. Kerper is at the head of the enterprise.

"URBAN Rapid Transit" is the title of an interesting paper, by Col. S. W. Nickerson, in which he positively advocates elevated railways, written expressly for the STREET RAILWAY GAZETTE. We are obliged to hold it over (this time) for want of space. Col. Nickerson is an intelligent, skillful railroad lawyer of Boston, and is general counsel for the Riley Railway Construction company. He writes with that cultured diction peculiar to Boston; and we shall have much pleasure in giving publicity to the other side of the rapid transit question as presented by the colonel, especially as much prominence is given in our present issue to the underground system of street railways, in favor of which Prof. Haupt, of the University of Pennsylvania, and Mayor Hewitt, of New York, have pronounced very decided opinions.

ELECTRICITY VS CABLE is the title of a paper read before the Technical Society, of Chicago, Feb. 17, by Mr. H. A. Stoltenberg, C. E. He is sound in the faith that "electricity will supplant both horse and cable power," and he seems glad of M. Julien's improved "storage boxes."

MR. DEWITT C. CREGIER has resigned the superintendentship of the West Chicago Street Railroad; and his whilom assistant, Chas. L. Nagle, has been promoted thereto. Mr. Cregier is spoken of a likely candidate for the postmastership of Chicago, as soon as S. Corning Judd resigns. Others remark that he is likely to turn up on top of one of the elevated railway projects now being hatched in the city.

A new invention for the propelling of street cars is in the application of the gas-engine to a moving train car. All such attempts have failed heretofore for the reason that the gas engine starts and stops too slowly. In this case, says the N. O. *Picayune*, the engine will be in motion continually, and the power will be thrown off and on, as the occasion may require, by the use of movable friction-wheels geared on an endless link-belt. This belt is to be attached to the engine. Ordinary gas will be used.

FEEDING horses is a subject about which too much cannot be known by street railway managers, who use horses. And whether "the horse must go" ultimately or not, the immense number of them now used to pull street cars justifies us in publishing the interesting article thereon, by Mr. Challenger, to be found in another part of this number. It has already seen the light of publicity across the Atlantic, in the columns of the *Exchange and Mart.*

STREET railway electric motors have been investigated by Capt. Griffin, and the result reported to the Engineer Commissioners at Washington. He states the peculiarities of each system, and after pointing out several serious questions to storage batteries goes on to say: "The use of storage batteries seems feasible, and as the system possesses many advantages, it will probably take its proper place in the list of electric tramway systems. Storage batteries must and doubtless will be improved in the directions of reduced cost, reduced weight, greater efficiency and longer life."

MRS. LANGTRY'S lawyers in New York have notified the commissioner of public works (Gen. Newton) that the "Manhattan railroad's wooden building at Ninth avenue and 23rd street is, saving their rights as an elevated road, illegal in the manner and form of its construction and a needless obstruction to the street." This has been done because the commissioner has decided that the railing and posts in front of Mrs. Langtry's house extend beyond the building line and are an obstruction in the street. And she thinks that what is sauce for the goose should be sauce for the gander.

A PRAYER was directed along the motor line at Duluth recently, if we are to believe the Duluth *Paragrapher:* "Reveal unto us," prayed a Duluth pastor last Sunday, "if we are to have a real estate boom this winter, and may this congregation be duly informed whether it will come on the hillside, along the motor line, or as it were on the very periphery of our city, that the brethren may catch on and enlarge their earthly possessions, for greatly do we need a new temple in which to expound Thy gospel. In 1880 we had but 3,470 population; in 1885, 18,035; and in this year of grace, 30,017. Having kept the command to multiply, these statistics are respectfully submitted, and it is our petition that the boom that struck the Presbyterians and Congregationalists last winter may now strike us."

ST. PAUL'S (Minn.) cable railway is regaining public confidence, having procured effective brakes. The cars are now under perfect control when going down the incline. The effect of the recent accident is passing away.

HALLIDIE'S patents are considered essential t the proper working of cable railways; and, i reference to the U. S. Circuit Court decisio mentioned in the February GAZETTE, mulctin the Brooklyn Bridge trustees in heavy damage payable to tbe National Cable Ry. company, th *Mining and Scientific Press* says: "This decisio is an important one, but was only to be expecte Several of the roads built in the East have er deavored to evade this and other patents. I doing so they have tried all sorts of impract cable plans and made many failures. The when they did adopt something practical, the infringed patents which had originated in Sa Francisco, where the cable system is the mo complete and perfect."

CABLE railway fatal accidents, such as tho recorded in the last and previous issues of t GAZETTE, have stimulated invention to preve the horrible spectacle of a car losing hold of t cable, and, with inoperative brakes, rushing dow an incline to a fearful smash-up. Benj. Cobb, Odessa, Mo., says he has a three-wedge lock brake, consisting of a sliding wedge operati between two inclined wedges, which is design to run in a channel with vertical sides, to be la on the road bed between the cable slot and t outside rail. The brake chain is to be attach to the sliding wedge. When the brake is tighten the sliding wedge forces the two others agair the sides of the channel with such power that would appear impossible for the car to move inch until the pressure was removed. This calculated only for use on an incline; and the i ventor claims that a boy 16 years old could ho two trains in the middle of a steep incline wi it.

"CRANKS" have troubled a well-known cal railway president with several "safety device for inclines. G. W. Elliott, of Riverview, Ka sas, has a scheme which he does not want to thrown into the waste-basked. "My plan," sa he, "is to place another T rail along side of t present rail from the bottom to the top of the i cline on both tracks and to have it well spik to the ties. Under the ball of the rails make number of holes a foot apart through which ir pins are placed forming a ratchet between t wheel rail and the extra rail. Then make a s of heavy dogs and when the train would start the incline the dog would run on the rachet a would catch on every pin to the top. The the hill brakeman would displace the apparat and be ready to descend the incline. Now, wh the train descended, the dog would be attach to the rear of the train and slide on the ratch rail with a runner handle attached to it. N should the train slip the dog would drop. would be the hill-brakeman's business to see t it so dropped. The dog would take a strain 100,000 pounds and you would have no hill ac dents."

LOWRIE'S cable invention has been much talk about of late. Some engineers consider it i practicable. H. C. Lowrie is the city engin of Denver. His cable is enclosed in a solid sh of cast iron about seven inches deep and two a a half wide, inside measurement. This cond is flanged at the base like a T rail, and is bolt to the cross-ties. The interior walls of the co duit are vertical, and the slot is, therefore, t and a half inches wide at the top. This w slot is closed, however, with a continuous cha like cover, and this constitutes the great novelty the invention and gives the patent its val This cover is close-jointed after the manner the well known toy snake. It will move v tically with ease upon being lifted from one e and may be continuously raised in a short le from one end to the other, but never very mu in one place. It is rigid laterally, except tha will readily conform to curves. It rests upon beveled sides smoothly planed to fit the inclin and smooth slot of conduit. Plow points, as were front and back of the grip-shank, pick cover up, pass it through an aperture in shank and lay it in place with perfect ease a precision. The cover will sustain the heavi traffic and will prevent the side of the slots fr closing together.

ELECTRICAL science is making such gigantic rides daily, says *Dixie*, "that it requires a great rain to comprehend" the same. It further ays, in an article on "storage batteries for loco- iotion" (by Otto Roffsberger), that "the :orage battery is yet (February, 1888) in the :ate of experimentation, and there are those who elieve that the present compares with that of ie future scarcely more favorably than did Vatt's kettle with the steam engine of fifty years ter. The sceptics, doubtless, will in time be- ome convinced that electro-motors are all the cientists have claimed them to be—and more! * * In no field of research have develop- ients been so rich as in that of electricity, and hat has been achieved in the past only fore- adows that which is yet to be."

SPRAGUE electric motors for street cars ave been misrepresented so grossly in some apers that they are beginning to correct them- elves. Thus the *Age of Steel*, March 3, says: A Sprague motor has never been used on a treet car in St. Louis. We fell into the error in way we will cheerfully explain, and which was atural, though not strictly excusable, in the cir- umstances. In May or June last Mr. Maxon, s he has just assured us, contracted for a Sprague otor to be used in connection with the Julien attery on the Lindell avenue railway line. About ie same time he also gave an order for a Brush otor, his idea being to test the Julien-Brush and ie Julien-Sprague combinations, each on a single ar. Subsequently, his order for the latter ma- hine was canceled. But the general impression St. Louis, gathered from erroneous reports nd inferences in the daily newspapers, was that ie Sprague motor had been given a trial on the indell railway line, and rejected, whereas Mr. laxon says that such was not the case. Not aving kept the distinction clearly in mind we nintentionally repeated the error."

Married.

BAKER—CAREY. Mr. W. S. Graff Baker and Miss Grace N. Carey were married at the resi- ence of the bride's parents, Baltimore, Md., larch 9. Mr. Baker arrived from England, by S. Aurania, March 6; and he returned, with his ride, by the same steamer March 10. We eartily wish Mr. and Mrs. Baker a prosperous appy, fruitful and brilliant life.

Motors Wanted.

Mr. Chas. W. Fish, secretary and manager of ie Citizens' Ry. Co., Elkhart, Indiana, writes aying: "We have now 6½ miles of track, and in- end immediately to build about half a mile more, hich will make a circuit of about four miles assing through Highland Park and North Elk- art) of which two miles is suburban. We are nxious to find some power other than animal, r running at least the suburban portion of our ne, and would be pleased to hear from manu- acturers of motors, with approximate capacity nd cost of motors. We have no very heavy rades, and no very short curves. Our gauge 4 ft. 8½ in. Rail, in suburb, 20 lbs., part tram nd part T. We fear our track is too light for eam motors. Our suburban business is largely xcursion, and a motor should haul two or three ars."

Doubtless some of the manufacturers of motors, r dealers therein will be kind enough to furnish ie information Mr. Fish desires.

Thirty years ago, says Mr. Peckham, Syracuse, . Y., cast-iron car wheels might well have been onsidered practically safe, as they were manufac- ured strictly from only the best of specular ores (i. , those containing the smallest percentage of hosphorus), with charcoal as fuel, and with a rictly cold blast, the greatest care being used to reak up the ore and calcine it thoroughly before s introduction into the blast furnace, which was onstructed of small capacity, requiring only a uild blast. The product of the furnace being nall, allowed the ore sufficient time in the upper one of the furnace to become thoroughly disin- grated and de-oxidized before its introduction nto the zone of fusion, the result being an iron s chemically pure and tough as the average steel f to-day."

Underground Street Railways.

"Congestion of Cities" is the title of Mr Hale's treatise in the *Forum*, in which the evil of over-crowding populations is dealt with in a masterly manner. Prof. Lewis M. Haupt, again, has de- livered an eloquent address before the Franklin Institute, Philadelphia, on "Rapid Transit in Cities," the pith of which was reproduced in the January GAZETTE. Both of these prominent men of light and leading look philosophically at the rapid growth of prosperous cities, and point out the necessity of extending space in accordance with the increase of population. People want to live near enough to their place of business so that they may reach it in the course of half an hour, whether they walk or ride. The object is to "get there" in about that time. And Prof. Haupt reduces the question of "rapid transit" almost to a mathematical formula, showing that distance is not to be measured by miles so much as by minutes—not by length so much as by time of transportation. That is to say, if a man lives within a couple of miles from his office, or his work-shop, he may walk it; if his home is three miles away, he needs a horse-car; if the distance be four or five miles, a cable car will take him in the time(half an hour); but if he lives six or seven miles off, he wants an elevated rail- way, such as those now in operation. The latter would serve a city with an area of 72 square miles, and place all the inhabitants at a "reasonable" distance from the centre. That is Prof. Haupt's estimate; but he goes far beyond the facilities obtainable from an elevated road, and says that an underground street railway, moving at the rate of ten miles per half hour(20 miles an hour) will enable a city to extend its area fully two hundred (200)square miles, without any being "too far." In fact, according to Prof. Haupt's show- ing, underground railways are incomparable for passenger transportation in large cities.

That is not a matter of theory only: The Metropolitan, and Metropolitan District railways, in and around London (with its five millions and more inhabitants), are examples of the under- ground system of rapid transit. The first section of the "inner circle"—the line from Paddington to Farringdon street—was opened in January, 1863. Several consecutive extensions into the City and towards Westminster and the Mansion House were made at different times, until the "inner circle" was completed in October, 1884, thirty years after the passing of the first underground railway Act, and twenty-four years after the com- mencement of the work of construction. The inner circle of railways as constructed is the di- rect outcome of the recommendation of the Lords' Committee of 1863, that they should abut upon, if they did not actually join, nearly all the prin- cipal railway termini in the metropolis, completing the circle by a line on the north side of the Thames. The total length of the inner circle is 13 miles and 176 yards. About two miles of this are laid with four lines of rails; and there are 27 stations on the circle at an average distance of half a mile apart. The combined length of the two systems, including the extensions beyond the inner circle, amounted in December, 1883, to 40 miles. That is how "greater London" has grown, and keeps moving.

New York has done without underground rail- ways hitherto, but several miles are now under contract. The Empire City held to the omnibus system of transportation as long as it could; horse cars were resorted to at last. In 1867 a portion of elevated railway was built, and was at first worked by a wire rope and stationary engine —the first cable railway used for passenger trans- portation. That line passed into other hands in 1872, and the New York Elevated Railroad com- pany was formed. In 1880 the elevated system was worked over 34½ miles of line. Extensions have since been made, from time to time; and recently the fare has been reduced to five cents a ride. The cars are continually crowded. The population keeps on increasing, and the demand for more facilities for rapid transit is still on a far greater increase. Something must be done to prevent the congestion of the city's lungs. The New York correspondent of the New Orleans *Picayune* remarked, in a recent communication, "A viaduct road is talked of for the west side of the city. Why cannot large property owners see that urban rapid transit should be underground?"

Well, some of them do see. A great system of underground railways is projected in New York city. The New York District Railway company has long lines under contract. The Broadway division will reach from the Bowling Green along Broadway to Union Square, entering to its junction with the Fourteenth street di- vision,and continuing along Broadway to Madison Square, where a junction will be made with its east and west divisions; it will proceed along Madison avenue to and under the Harlem river to a junction with the main lines of railways which enter New York from the north and east. The Fourteenth and Twenty-Third streets di- visions will commence at the west side of Ninth avenue, and the east side of Second avenue, res- pectively, joining the main line at the junctions mentioned—at Union and Madison Squares. The western division will proceed from the Madison Square junction, and follow the line of Broadway to Fifty-Ninth street at Eighth avenue, about thirteen miles in all. Then there are the lines of the New York Underground Railway company, and those of the Broadway Under- ground Connecting Railway company.

The Boston *Home Journal* emphatically (and somewhat sarcastically) "agitates" for under- ground railways for the "Hub"; and one of its regular correspondents says: "New Yorkers can no longer point with pride to their elevated rail- roads, so far as the safety of these spider-legged contrivances is concerned. Accidents on the 'L' are becoming altogether too common these days, and Boston should take warning. I have always advocated an underground road for Boston."

Philadelphia is already ahead with an under- ground railway scheme. The motive power will be electricity, and each car in the train will seat thirty-eight persons, the doors being on the side. The rate of speed is to be thirty miles an hour, stations to be three to the mile in resident por- tions of the city, and four to the mile in business portions. This rate will enable trains to accom- plish twenty miles an hour, allowing the differ- ence for stops, which is almost double the speed of the elevated roads in New York. The tracks will be double, and there will be no switching between stations, which are to be enclosed. The building in each case is entered from the street, and a descent is made to the platform immediately beneath the pavement. Ventilation is fully pro- vided for, and, in addition to the moving of trains, the subway is designed for the housing of all classes of pipes and wires.

CHICAGO WILL NOT GET LEFT.

There is an urgent demand for increased facilities for rapid transit on the West Side of this growing city, whose inhabitants prophesy that Chicago will equal New York when the next census is taken, and put London in the shade a decade or two later. Mr. C. T. Yerkes is seeking an ordinance to cable the extensive street car system in that district; and the new Adams ele- vated railway system is likely to be in operation along some of the West Side streets ere long. But Chicago's ambition aims at the best known system of rapid transit, the best for "long hauls" certainly, and is ripe for an underground railway along Monroe street, right from the lake front to the western limits of the city. "The fact that the Chicago river, which divides the East from the West Side, is a public water-way and sewer which relieves us from epidemics, and is likely to remain so for many years to come, is an insuperable obstacle to any system of rapid transit on or above the surface," says the *Indus- trial World*. "Among the many schemes that have been suggested," continues the same paper, "the most practical we have seen is the project of Col. C. H. Crawford, a practical man and an engineer in the service of the government during the war." Col. Crawford has since died, but the underground street railway which he hatched is being matured, by the Arcade Rapid Transit Company of Illinois.

The "tunnel," or underground construction, will be divided into two compartments, both well lighted (by electricity) and properly ventilated. Cars going westward will pass along one com- partment, and return by the other, thus avoiding "collisions of currents," and making accidents impossible. The cars will be so constructed as to expedite the extrance and exit of passengers at

stations. They will be run singly, or in trains. The motive power is to be electricity, or cable. By this method they can handle an enormous amount of traffic with ease and despatch, and all obnoxious odors, gas, smoke and noise will be avoided.

The station platforms are to be about ten feet below the street surface. "Passengers cannot go upon the track or upon the floor of the arcade, in the way of moving cars." In the work of construction, the middle of the street will be excavated to a depth of 13 or 14 feet. City datum ranges from 14 to 15 feet below the street surface. A thick flooring of cement and rubble will exclude all dampness. The side-walls will be 23 feet apart; the space from each to the middle wall, or partition, which will form an additional support to the roadway, will be 11 feet. The walls and masonry will be of the most substantial character. Between the side-walls and the curb line on either side there will remain a space of about six feet, which will afford splendid accommodation for sewer, gas and water-pipes, electric wires, etc.

The roof of the arcade will be about 30 inches below the surface grade of the street, and it will be supported by strong steel girders. Over the arched masonry will be placed a covering of concrete which will form the bed of the street pavement.

Not much difficulty is experienced in obtaining consent of property owners for "street railways" under the surface; those by whom such a scheme is not much understood, previously, readily comprehend the advantages secured by underground railways—electric subways — that afford rapid transit, with economy, safety and comfort. The Chicago *Evening Journal* has declared in favor of underground railways; the *Daily News* declares that "Underground Chicago presents no difficulties — on the contrary, unusual facilities—for the economical construction of comfortable, well-lighted, and thoroughly ventilated subways, which may be multiplied indefinitely, and through which any desired rate of speed may be reached." The *Herald* regards underground railways as "too costly;" but the Arcade Rapid Transit company of Illinois are not only ready to proceed with the work, but they undertake to "pave the street from curb to curb in a manner acceptable to the property owners, and keep such pavement in repair during the term of the charter of the said company."

There is a strong probability that Chicago will be the first great American city to have an underground railway in operation. And in the language of the Cleveland *Leader* "the projet is in the line of progress, and its success will be watched with interest by the people of the growing cities of this country."

The Electric Motor and its Applications.

The discussion of the electric motor is no longer confined to the STREET RAILWAY GAZETTE and the electric papers, but it is the theme of articles, reports and paragraphs in all the newspapers and periodicals; and men of "light and leading" vie with each other in giving its history as accurately as possible. The latest valuable contribution is by Mr. Franklin Leonard Pope, in *Scribner's Magazine* for the present month (March), in which the able literator piles up the evidence with the ability of the thoroughly experienced lawyer, and yet with the artistic charm of a popular novelist. He shows that the electric motor dropped into the mental stocking of "Michael Faraday, late book-binder's apprentice, now turned philosopher," Dec. 25, 1821, and he is represented as showing this new gift for mankind to Mrs. Faraday that Xmas morning.

"The problem of the application of electricity as an universal motive power was taken up with great zeal by a host of sanguine inventors. In 1832, Sturgeon constructed a rotary electro-magnetic engine which he exhibited before a large audience in London in the spring of 1833. In our own country, perhaps the earliest electric motor was the production of Thomas Davenport, an ingenious Vermont blacksmith, who, having seen a magnet used at the Crown Point mines in 1833 for extracting iron from pulverized ore, was seized with the idea of applying magnetism to the propulsion of machinery. In 1834 he produced a rotary electro-magnet engine, and in the autumn of 1835 he exhibited in Springfield, Mass., a model of a circular railway and an eletro-magnetic locomotive.

"Many citizens of New York will recall the erect and and handsome figure of a venerable gentleman, dressed with scrupulous neatness in the Continental costume and cocked hat of the period of the revolution, who fifteen years ago was to be seen on Broadway every pleasant day, and whose resemblance to the accepted portraits of Washington was so striking as to at once arrest the attention of the observer. This was Frederick Coombs, who, as the agent of Davenport, visited London in 1838, where he exhibited a locomotive weighing 60 or 70 pounds, propelled around a circular railway track by electric power, which excited the greatest interest in the scientific circles of the metropolis."

The development of the electric motor is given, step by step, enumerating successive improvements, up to date; and "in conclusion, the writer cannot refrain from expressing his conviction that the day is not far distant when rapid transit between the principal cities of America will be effected to an extent which to persons unfamiliar with the developments of electricity must seem utterly visionary and chimerical. Once admit, as we must do, the possibility of applying almost limitless electric power to each axle of a train, with the possibility of laying a track almost as straight as the crow flies from city to city, rising and falling as the topography of the country may require, and the complete solution of the problem becomes little more than a matter of detail. Not that such detail is unimportant, nor that the innumerable minor difficulties can be overcome without much experiment and study, but it may nevertheless safely be affirmed that the ultimate result is already distinctly foreshadowed, and that we may expect within a few years to be transported between New York and Boston in less than two hours, not by the enchanted carpet of the Arabian Nights, but by the potent agency of the modern electric motor."

Feeding Draught Horses.

BY CHAS. CHALLENGER, BRISTOL, ENGLAND.

Much ignorance regarding the subject of horse feeding always exists, as can be proved at any time by referring to the "Queries" column of any of the periodicals which undertake to answer questions having reference to the management of live stock.

The novice must learn; and, to avoid paying dearly for experience in the shape of deaths, he either writes to some paper for information, or what is the wiser plan, he procures at once a plainly-written, reliable book, which fully treats of the subject. When procuring a book he should aim to secure the latest on the subject; for, if we believe what a popular writer has said—and the statement seems to be just—we shall have in a condensed form an epitome of all previous teachings. He says, "The writer should make the accumulated knowledge of the past the starting point of further discoveries." Each succeeding new book should, at least, have something new to tell.

Stewart says, and with much truth, "The food is deficient when the horse loses flesh, and gets less corn than he would eat. The work is in excess when he loses flesh, and has all the corn he will consume."

Many horses, whose work demands much strength and exertion, and which must be fed on corn more or less to give them the condition which such work requires, are injured during the summer season by acts of kindness on the part of the owner in supplying them with green food, which weakens them, when it is thought that such really invigorates them.

Armatage says: "Great mischief occurs among all working horses by the indiscriminate use of vegetable food. Containing much water, it causes the animals to perspire very freely; they also urinate profusely, the food is hurried through the body, and being weakened thereby they are liable to take cold easily. They are thrown out of condition, which hard corn and proper exercise only make, and the profits and peace of mind of the owner often considerably endangered thereby. . . . . Grass, clover, and vetches produce greater harm than many suppose. During their use in summer, violent colic, sore throats, coughs, colds, influenza, laminitis, swelled legs, etc., occur most commonly among our cab, omnibus, tramway, and cart horses. When animals are in good condition, healthy, and doing their work well, it is a great mistake to change the diet to green food."

Stewart, writing fifty years ago, says of green food: "Grass is often given in the stable under a vague impression that it removes impurities or foulness, produced by the continual use of a strong, stimulating diet. . . . It is not true that green meat is absolutely necessary for any horse in health."

The writer is able, from practical experience to endorse what the above authorities say with refererence to green food, and for five years past he has discontinued to encumber his returns with accounts of green food, which, he is sure, does more harm than good to hard-worked horses.

The same condemnatory evidence may be adduced regarding cooked food for horses. Armatage, who speaks from practical experience of cooked-food feeding in the North of England, condemns it. In France, "Le Blanc found that animals fed upon boiled food fattened, but lost vigor and became affected with disease; while dry food had a contrary effect." M. Charlier says: "With cooked food the animals are very subject to disease, but since the regular adoption, by omnibus proprietors, of dry, bruised, and cut food, founder, colic, and illness generally, which each week were numerous, had become quite exceptional." Even damped food is injurious, if long continued. Damping is not a substitute for natural saliva.

All authorities, however, who have studied the subject agree that straw mixed with the hay, in chaff, is beneficial and greatly conducive to health. Armatage says: "Hay and straw with bran are articles used entirely for the purpose of giving bulk to the forms of food which occur in grain, etc., and also on account of their mechanical action on the coats of the digestive organs. By their use the food is more perfectly masticated and digested, and healthy action maintained with greater persistence and regularity. . . . Greater economy is to be maintained by cutting up the hay and mixing with it one-fourth or one-half cut oat straw." Stewart says: "Straw may often be used where hay is used . . . . The late Mr. Peter Mein, of Glasgow, kept his coaching horses in excellent order for nearly eight months without a single stalk of hay. . . Wheat straw is to be preferred, but few object to that of the oat."

Then as to a mixed diet and regular hours of feeding. The writer keeps posted up in each stable instructions as to the hours of feeding. He appoints five times a day for both watering and feeding. Feed at 6, 9, 12, 3.30 and 6.30 to 7. Horses that are due out at meal times to be fed and watered a little earlier. If the work required the speed of the stage-coaches he would do as those proprietors did; not feed or water within an hour of going out on the road. "Digestion ceases to act during great exertion, but goes on naturally with slow work." The nose-bag should be carried, and no horse should fast longer than five hours, excepting by night when resting and sleeping. If he did not eat his full meal before commencing work, five hours would be too long to fast.

"Mr. Walker, of Glasgow," says Stewart, "gives his horses five feeds a day. They are fed at 6, 9, 12, 4, and 7 o'clock." The same authority speaks of watering as follows: "The horse should have water four or five times a day, and the oftener he gets it, the less he will take at once. Under ordinary circumstances, two rules will guide the groom. The first is, never to let the horse get very thirsty; the second, to give him water so often, and in such quantity, that he will not care to take any within an hour of going to fast work. Water should always be given before rather than after food."

Theory and science always insist that the horse should be watered before feeding: that there is danger in giving water immediately after food. Horses, however, as far as the writer has observed, object to this principle, as regards the first morning watering. They seldom will take water first, being more anxious for their food. They have been tried repeatedly. Stablemen, too

ave a deep-rooted objection. for which they offer arious reasons; horse is set shivering, its coat made rough, it does not "do well," and the ke. The writer, therefore, feeds first, and gives full allowance of water in an hour after —at even o'clock. During the remainder of the day is usual to give water between meals. The orses are usually turned out loose to the water-rough, and drink as much as they desire.

If more explicit instructions be required respect-ng the important subject of watering, the writer ould say: In summer give full quantities uring working hours, every three hours. If ne horse has, however, to travel fast, which he ould not continue to do during many three-hour eriods, the watering during such exertion must e less in quantity than usual. When the horse resting in the stable, and during the winter nonths, while working, water in full quantity hould be given every four to four-and-a-half ours, between six in the morning and stable-clos-ng at night. The writer has never experienced ny ill effects by allowing his horses to drink noderately immediately upon returning from ork, whether sweating or not, summer or winter.

The following scales of food may help the inex-erienced to a knowledge of the requirements of a orse under various conditions of labor. The rst seventeen in the list are copied from a recent ssue of a tramway periodical, and the others are rincipally from Stewart's "Stable Economy," nd Armatage's "Horse-owner and Stableman's Companion." Many more scales of mixture ap-ear in the latter book for draught horses, the six ist in the following list being selections; and ne weekly amount of N. M. is in no case in rmatage's book less than 21lb.; some as high s 29lb. per horse.

	Hay.	Straw.	Bran.	Beans.	Peas.	Barley.	Oats.	Maize.	Linseed.	Tares.	Wheat.	Daily Totals.
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
elfast Tramway Co	14	--	1	1	--	--	--	13½	½	--	--	30
irmingham Cab Co	12	--	--	4	--	--	--	12	--	--	--	28
irmingham Central Tramway Co.	13	--	--	4	--	--	14	--	--	--	--	31
ardiff Tramway Co	13	--	1	4	--	--	4	9	--	--	--	31
ublin Tramway Co	12	--	½	--	--	--	2	15	--	--	--	29½
dinburgh Tramway Co	14	--	--	2	--	--	6	8	--	--	--	30
lasgow Tramway Co	10	--	½	--	--	--	5	11½	--	--	--	27
ull Tramway Co	12½	--	1½	1½	--	--	3	8	--	--	2	28½
ondon General Omnibus Co	8	4	--	2	--	--	10	5	--	--	--	29
ondon Tramway Co	12	1	--	--	3	--	½	9½	--	--	--	26
iverpool United Tramway Co	13	--	½	6	--	--	--	10½	--	--	--	30
eeds Tramway Co	11	--	--	3	--	--	5	10	--	--	--	29
anchester Tramway Co	15	--	--	4	--	--	3	8	--	--	--	30
orth Metropolitan Tramway Co	7½	2½	--	1	1	--	4	12	--	--	--	28
outhwark & Deptford Tramway Co	9	2	--	--	2	--	3	11	2	--	--	29
wansea Tramway Co	11	--	--	2	--	--	3	12	--	--	--	28
est Metropolitan Tramway Co	10	2	--	2	--	--	3	12	--	--	--	29
avalry Horses	12	--	--	--	--	--	10	--	--	--	--	22
addle Horses	12	--	--	--	--	--	10	--	--	--	--	22
unters	12	--	--	--	--	--	16	--	--	--	--	28
iggins, London	16	4	2	5	5	4	4	--	--	--	--	40
anbury and Truman	16	2	--	1	--	--	14	--	--	--	--	33
arriage Horses	12	--	--	--	--	--	10	--	--	--	--	22
or light work	10	5	2	--	--	--	12	4	--	--	--	33
it Horse	18	--	1½	--	3	5½	4	--	--	--	--	32
itto	18	--	2	--	5½	4½	2½	--	--	--	--	32½
itto	18	--	2	--	5½	4½	--	--	--	3	--	33
itto	18	--	1½	3	5	¾	--	--	--	1½	--	29¾
itto	18	--	--	--	7	3	4	--	--	--	--	32
addle Horse	14	--	½	--	--	--	10	--	--	--	--	24½
tage-coach Horse	16	--	--	--	--	--	20	--	--	--	--	36

In the above list of scales of food it will be een that Wiggins', London, is the highest as egards weight. This firm owned 300 cart-orses, nearly all being of the largest size. anbury and Truman's were of large size. The arriage horse scale is from an article which ppeared in the *Cornhill Magazine* on "Horse-eeping and Horse-dealing."

(To be continued.)

A dispatch from Easton, Pa., states that the st of a new electric road there quite re-ently proved entirely satisfactory. The road as built by the Electric Safety company of New ork, using the Daft system, and the experiment as of special interest on account of the steep rade, the rise for a distance of 1,200 feet being bout nine feet in every 100.

Snow "tied up" the street cars, the elevated ars, and the steam railroad cars, all at the same me, during the recent blizzard.

Revision of the Patent Law.[1]

By C. A. Brown.

A BILL CREATING A COMMISSION TO EXAMINE AND REPORT TO CONGRESS NEEDFUL REFORMS IN THE PATENT LAW.

"*Whereas*, The patent laws of the United States are deemed to be in such condition as to require revision; therefore,

"*Be it enacted*, by the senate and house of representatives of the United States in congress assembled:

"Section 1. That a commission be, and the same is hereby created, to consist of three suitable persons to be appointed by the president of the United States, who shall hold office until a final report of this commission is submitted to and accepted by congress, and who shall receive for their service a compensation of $5,000 each per annum.

"Section 2. It shall be the duty of this commission to examine thoroughly the patent laws of the United States, and those of other countries, and their practical operation and effect, in meeting the needs of the public and fulfilling the purposes for which they were created; to formulate a report to be submitted to congress which shall set forth the results of this investigation and their conclusions therefrom, with reference to changes in, or additions to, the present law pertaining to patents. The report shall also contain a draft of an act which will provide for the changes found necessary by the investigations of the commission.

"Section 3. The commission is authorized to employ such clerical force as may be necessary for the proper conduct of its work and to incur such other expenses for stationery, printing, etc., as may be found expedient

"Section 4. The salaries of the members for this commission as well as all expenses legitimately incident to its work, shall be paid from the surplus in the United States treasury to the credit of the patent office. All expenditures by or for said commission, other than the salaries of the members, shall, however, be under the control of and authorized by the secretary of the interior."

When this bill is introduced into the fiftieth congress is it not likely that some congressman will ask, "If some one knows that the patent law needs revision why doesn't he point out in what respect the revision is necessary?" If this congressman should be "a terrible granger from the west," to use an expression of Mr. Walker in his speech at a recent meeting of the American Institute of Electrical Engineers, will he not go on and exclaim, "Fifteen thousand dollars a year and expenses to investigate the English and French, the German and Russian, the Swiss and Dutch patent laws and their practical operation!" [We are all aware that patent laws in Switzerland and Holland are like snakes in Ireland—there aren't any.] He will ask further, "Why can't we use the investigations which have already been made and the reports which have already been rendered about the foreign patent systems? Such reports are found in numerous books." And then he may assert that this commission scheme is a device of protectionists to reduce the surplus without reducing the tariff, and thus will be blighted the hope of those who favor this bill on the ground that it will allay the suspicions of congress as to the ulterior motives of its promotors. It may seem to some misguided granger that the advocacy of a bill proposing three $5,000-a-year jobs is in itself proof of an ulterior motive.

There is no dispute as to the advisability of a revision of the patent law in some respects. Mr. Steuart and others have pointed out numerous features which require change. Some of the faults that are found with the law are rather fanciful, but whatever they are can anyone say that it would be more difficult to have them remedied by applying directly to congress than it would be for instance, to secure the enactment of the proposed law creating a commission? And then we have to take the risk of the commission not being able to accomplish any good, and the possibility that the commission may consist of men who will do the patent law more harm than good.

Without claiming that we have "nothing to do with abroad," with entire willingness to learn whatever may be learned from foreign patent systems, and with due acknowledgment of the fact that the patent law of the United States is the offspring of the system of Great Britain, we can justly claim that our patent system is superior to that of any other country, both theoretically and practically, and a glance at the history of our patent law will show that it is not impossible, even without the aid of a commission, to amend it as occasion requires.

The constitutional provision for patents is contained in Article I, Section 8, of the fundamental law of the nation: "The congress shall have power to promote the progress of science and the useful arts by securing for limited times, to authors and inventors, the exclusive right to their respective writings and discoveries."

The first patent law, which was approved April 10, 1790, and has been amended and changed many times since without radical departure from the system originally founded, prescribed a petition to the secretary of state, the secretary of war and the attorney general and demanded a fee of five dollars. February 21, 1793, the act of 1790 was repealed and a new one was passed permitting the merger of existing state grants in regular national patents, and raising the fee to thirty dollars. By act of July 4, 1836, the patent office and the office of commissioner of patents were created; patents ran for fourteen years, conditionally extensible for seven more; provisions was made for examination into the novelty of the alleged invention; the fee for citizens was kept at thirty dollars with a drawback of twenty dollars if the patent was not allowed. The act of August 29, 1842, made designs patentable. The act of March 2, 1861, abolished extensions and made the term of patents seventeen years; the application fee was made fifteen dollars, and the final fee twenty dollars. Later acts are substantially codifications of the act of 1861, as modified by the construction which courts have put upon it.

In the discussion, at a recent meeting of the American Institute of Electrical Engineers in New York, of the question of the expediency of agitating patent law revision now in view of the hostility to the patent system which might be brought into active exercise, Mr. Phelps gave expression to the foreboding that an effort might be made to sweep away the entire patent system. George Ticknor Curtis asked if it would not be necessary to strike out part of the constitution to reach that? Mr. Phelps very cleverly and acutely replied by asking Mr. Curtis if the provision in the constitution were not that congress *may*.

This question of Mr. Phelps brings out very clearly a point that is worthy of careful atten-

[1] Read before the Chicago Electric club, January 16th.

tion, viz., the reason, as presented in the language of the constitution, why patents are granted. These reasons are not the ones that popular understanding supposes them to be. The belief is general that inventors have a natural right to the exclusive use of their inventions, and that the chief end and aim of the law is to give reward to the inventors. Such is not the case; an inventor has no natural right to the exclusive use of his invention. As a learned judge has said: "An inventor has no right to his invention at common law. He has no right of property in it originally. The right he derives is a creature of the statute and of grant, and is subject to certain conditions incorporated in the statutes and in the grants. If to-day you should invent an art, a process or a machine, you have no right at common law, nor any absolute natural right, to that for seven, ten, fourteen, or any given number of years against him who invents it to-morrow, without any knowledge of your invention, and thus cuts me and everybody else off from the right to do to-morrow what you have done to-day. There is no absolute or natural right at common law, that I, being the original and first inventor to-day, have to prevent you and everybody else from inventing and using to-morrow or next day the same thing.

"If an inventor has a natural exclusive right for his invention for one moment, he has it forever; and if any limit of time can be set to such a right, only infinite wisdom is adequate to the task. To state the doctrine of natural right thus is to show that it does not exist. The law has never recognized the doctrine of natural right for it can not recognize what does not exist.

"The constitution of these United States gives congress power to enact laws for a definite purpose, which is "to promote the progress of science and the useful arts," and the means to be used are, "by securing for limited terms to authors and inventors the exclusive right to their respective writings and discoveries."

The reason for enacting patent statutes is clearly stated in the fundamental law, but I submit that there is nothing in this fundamental law that renders it imperative on congress to enact patent statutes, or to prevent congress from sweeping away at once, constitutionally, all patent statutes that have been enacted. The safeguards of the present system are its wisdom and beneficent results.

It is estimated that at present one-half of the important inventions the world over, originate in the United States The records of our patent office are sought for and studied by the inventors and scientists of every nation, and the wisdom of our advanced policy is almost universally admitted by men of the best intelligence. Sir William Thomson said in 1876, "if Europe does not amend its patent laws, America will speedily become the nursery of important inventions for the world."

Generally speaking, foreign patent systems differ from the American in not requiring an exhaustive preliminary examination of the invention as to novelty and utility before issuing the patent, in collecting annual taxes on patents and in requiring the invention to be worked within a given period.

DISCUSSION.

Mr. Barton: I do not agree with Mr. Brown as the natural right of one in an invention. He who makes an invention should, as a matter of right, be entitled to something for it. One who devotes himself to making improvements should not go empty-handed. It is right that he should have adequate remuneration. It is well settled, of course, that the common law gives no one any exclusive right in an invention. One who makes an invention, Mr. Brown seems to consider, is entitled to only what the government in its generosity gives him. In the opening of Mr. Brown's paper I noticed that he used the phrase "monopoly granted by the government"—just as if the government had given an inventor something. I repudiate the whole doctrine of gratuity in the grant. A man raises a bushel of wheat on his own farm and everyone says it is his. I don't know as anyone disputes that, and I don't know why the natural right does not apply equally in the case of a patent right. There is a different kind of right in a bushel of wheat—not but what it can be bought and sold the same—but it is a different species of property and therefore must be protected in a different way and consequently special statutes are enacted to protect it. If I could in any way make people generally understand that a patent right is property, that it is just as sacred as any other property, I think it would be a mission that I could heartily undertake. But it is a fact that people think it is not stealing to infringe a patent if they can do it without being caught; that is the general feeling and it is right on this subject that the public should be educated. We should then have a better regard for the patent law and for the patent system.

I don't care to speak about the specific reforms that have been proposed. I have given this subject a good deal of thought, and I will confess that I question the propriety of nearly everything that has been proposed in the recent discussions that I have heard and read. There are two or three simple amendments that all agree would be advantageous. I do not see how there is any substantial good or substantial improvement in the patent law to be gained by creating a commission. As has been stated, the creation of a commission is going indirectly instead of directly to the point. To create a commission would be to postpone for a year or two what should be done at once.

Mr. Shain: In some foreign countries do they not offer premiums for inventions? In this country no premium is offered, and a man obtains his profit from the sale of his invention.

Mr. Kempt: I think the points Mr. Brown makes are well taken. We are asked to meet very soon and take action on this matter, and the indications are that efforts will be made to petition congress to appoint a commission to revise the patent laws. The question is, is the position taken by Mr. Brown a wise one? Is it wise to indorse that position as electric light people? I agree with Mr. Brown that it is unwise for the proposed act to be passed by congress. I think the less we have to do with the changing of our patent laws the better. We all know that the patent law as applied to our business, is a very mixed-up affair. One able judge will decide one way, and another equally able judge will decide another way, and that, too, under the same law. The more we meddle with the law, the more we mix it up. I think that the reforms in the patent law should be in the preparation of the patents themselves. The wording should not be ambiguous. If we had a commissioner who could express the rights granted an inventor under a patent in plain, simple English that a child could understand, the better it would be for us.

ELECTRIC EXPRESSAGE, invented by David G. Weems, of Baltimore, is one of the latest developments in rapid transit schemes, and by means of which newspapers, mail matter, and express packages will reach Chicago, from New York, in about two hours; and in seven hours more, the "matter" would reach San Francisco, Cal. This car will travel at the rate of nearly four hundred miles an hour, on a light elevated railway, and will run automatically, just the same as some of the cash carriage contrivances used in large stores; and the system is in some respects similar to the Adams Elevated Railway (described in the December GAZETTE), only on a much smaller scale. The Electric Automatic Transit company has been organized to build a test line in Washington at once, and a line is be constructed in Maryland in a few months.

Arrangements are nearly completed for the organization of a company and the construction and operation of an electric road between Detroit and Mount Clemens, a distance of twenty-two miles. It will be the longest electric road, it is said, in the country. It is proposed to locate a central station about midway between the two terminal points, where the motive power for the entire system will be generated. There will be three electric motors of 50 horse power each, a 200 horse power generator, with boiler and engines commensurate, and $20,000 worth of half-inch copper wire conductors.

Chicago "Rapid Transit" is in *statu quo*.

The Rapidest Transit.

Underground railways have a good show i our present issue, as they should have after New York's famous mayor has given them such "boom." Mayor Hewitt describes rapid transi as a system that will provide a speed approachin that attained on a first-class railway (say 40 to 5 miles an hour). No construction above the surfac can give the solidity necessary for such speed, an therefore he favors an underground plan. "Ou object should be to develop as much of the an nexed district as possible, in order to get th benefit of taxation upon the increased value o property, which, according to the best authority increases as the square of the velocity of th travel." The mayor would have the city con struct such railways, and also sub-ways connect ed therewith for pipes, wires, etc., and rent then to companies using them. The enormous ex penses of laying down pipes, conduits and othe appliances, and repairing underground communi cations, would thus be avoided, to say nothing o saving the streets from being perpetually torn up

Anent the message, the Chicago *Daily New* says: "Oh, that Chicago had a Mayor Hewitt His message on the rapid transit question sur passes anything yet presented to the metropolita mind."

NEW PROJECTS, PASSING EVENTS, &c

ALABAMA.

Birmingham. R. L. Polk & Co., have jus published a directory of this city, and he esti mates the population at 41,600. When the las general census was taken, the number of soul in Birmingham was only 3,086. The North Bir mingham Street Railway company report 5½ miles of track in operation, with six passenge cars and three steam dummies; and further ex tensions are contemplated. John W. Johnston i president; A. B. Johnston, treas. and manager R. Hubbard, superintendent.

Decatur. The Decatur Street Railway com pany report 2½ miles of track in use, with thre cars and fifteen mules. The line is being ex tended, and additional cars ordered. W. G Wharton is president; and S. D. Wharton, secre tary and superintendent.

Tuscaloosa. The Tuscaloosa and Lake Lor raine Street railway is completed and has bee in operation some time. Length of track, 4½ miles; 25 lbs. steel rail; eight cars, 40 horses an mules. James H. Fitts, president; Samuel F Alston, secretary, treas. and gen. manager. Durin the forthcoming summer they will discontinu horse cars and adopt dummies; will sell out th cars and live stock; and they will want two ne dummy engines and four coaches.

ARKANSAS.

Little Rock. "This city is booming." A gi gantic street-railway scheme has developed, an in addition to what has already been published the following is learned: The charter provide that they shall use any power adapted to opera ting street railways. The company is negotia ing now for a newly invented motor used exclu sively on street cars. It is a locomotive of suita ble dimensions. A house, or cab, covers th entire machine, concealing it and giving th motor much the appearance of an ordinary hors car. An exhaust injector is provided for eac cylinder, which forces the steam from the cylin der into receivers, and then by suitable device it is returned to the boiler at a temperatu above the boiling point. There is no puffin sound to be heard, and no noise from the safety valve. There is no steam to be seen. Any in telligent person can learn to run the motor in few hours. There is automatically kept a co stant water level in the boiler, which seems t insure perfect safety. By using hard coal c coke as fuel, annoyance from smoke is avoide But very little fuel is required to make the re quisite amount of steam, only about one hundre pounds being ordinarily carried. The motion controlled by a powerful brake operated b steam, convenient to the engineer and easi worked.

The work of building the road must commen within ninety days from the date of the contra and one mile of road to be completed and reac for use within six months. Within five yea

ie tracks on all the streets named in the deed f gift must be finished under penalty of forfeit- re of the right to such streets upon which no ack is laid. The tracks must conform to the rade of the streets, the expense incurred by a econstruction of the tracks by a change of grade be borne by the company. A privilege tax of 25 a year must be paid on all cars owned by ie company. The company must keep in good epair and order the space between the tracks or ails, and two feet on either side of the tracks on ll streets hereafter paved. The fare is to be ve cents.

This is in addition to Mr. Howard Adams' pro- ect, reported in our last issue.

CALIFORNIA.

San Diego. The Electric Rapid Transit Street ar company, who use the Henry system of pat- nts, and whose officials are stated in our Direc- ory Supplement, report that their Old Town oad (4 miles long) has a 4 per cent grade, weight f motor 2,000 lbs., running time twenty minutes, rack, courses and grades in very bad shape. The road is now being entirely reconstructed nd extensions made. On the 4th street road, resent length 4 miles; there are nine per cent rades to encounter; the length of this grade s about 400 feet, the rise 36 feet. With one 2,000 b. motor they have frequently taken about 150 assengers up this grade on a train of two cars. The motor has connection with but one axle and he drivers never slip; it is needless to say that nagnetism and electricity assist materially in the dhesion. The peculiarities of this system are: irst, the main current is carried on insulated onductors buried parallel with the track; they re connected at intervals to light hard-drawn opper wires; the contact is made by a carriage aving grooved wheels sprung over the sides of he wire; the connection between the motor and ar axle is a peculiar gearing designed for the urpose, which is covered with a dust proof ousing; the pinions and bearings run in an oil ath; the armature weighs nearly 500 lbs., it is llowed to revolve constantly, no matter what the ar is doing; when doing work its speed varies rom 8 to 9 hundred revolutions, when the car is lisengaged the armature runs free at about 1,200; n starting the car this tremendous inertia and lev- rage is used. The motors are said to be designed o well magnetically that nearly all grades of vatches can be placed within a few inches of hem without injury. The electrical pressure sed is about 300 volts, which they consider per- ectly harmless. The motor brushes cause no rouble whatever; a set will last fully six months. The cars run hundreds of miles without adjust- nent of the brushes. Pres. Gochenauer says they ave purchased thirteen large machines, and have nore under way.

The National City and Otay Ry. company perates a steam railway through San Diego and National City and into the suburbs of the Mexi- an border (19 miles) south, and a branch from National City east to La Presa at the Sweet- water Reservoir (9 miles) In connection with his railway there is in San Diego a street rail- way, operated by mules, ¾ mile long, giving free transfer from the main railway and collect- ng fares on local travel. The officials' names are given in our Directory Supplement. Under the head of cars they report "14 coaches, 2 com- bination baggage and coach, 30 flats, 2 street cars."

San Francisco. The Presidio and Ferris RR. company have completed about 14 miles of track: 2 miles operated by horses, 5 miles by steam dummies, 7¾ miles of cable track. Officials' names and further particulars appear in our Di- rectory Supplement.

San Jose. The San Jose electric railway is now in operation.

DISTRICT OF COLUMBIA.

Washington. On Feb. 23, the Senate took up the bill to incorporate the Washington Cable Electric railway of the District of Columbia, and was addressed by Mr. Vest, who spoke of the proposition to sell the franchise to the highest bidder, and referred to the city of New York as having resorted to the system of giving street rail- road franchises to the highest and best bidder, being driven thereto by the scandals which had expatriated certain men and threatened the liber- ties of others.

Mr. Riddleberger argued against the proposition to sell the franchise at public auction, and spoke of the possible time when the president of the United States would go into Senator Vest's room and sign a bill to sell him (Vest) with the senate.

An amendment was adopted requiring the company to pay a tax of 4 per cent. for the first four years, 6 per cent. for the next four years, and after that 8 per cent. The bill then passed.

FLORIDA.

Jacksonville. The extension of the Jacksonville Street railway system, mentioned in the February GAZETTE, is to comprise a continuation of the Hogan Street line, a distance of 3,000 feet from the present terminus. The grading of the road is now in progress.

GEORGIA.

Atlanta. The Georgia Terminal Railway company, Atlanta, has been organized. Capital stock, $1,000,000. E. P. Howell and others, incorporators.

ILLINOIS.

Chicago. The West Side Cable ordinance has at last passed the council for a second time; but Mr. Yerkes says it will not be accepted. This latest ordinance provides that the rate of fare shall not exceed 5 cents, and not more than 4 cents when tickets are bought: i. e. 25 rides for $1, or 12 rides for 50 cents. Another unacceptable provision is that the company should pay $200,000 into the city treasury, on the acceptance of the ordinance, towards building a steam bridge on Madison street. The ordinance will be void if not accepted within twenty days. Meanwhile the Washington street tunnel, which Mr. Yerkes offered to keep in repair for the privilege of running the cable through it (and the council refused) is becoming so dilapitated that it has been ordered closed. This seems like a new edition of "the dog in the manger."

Mr. Yerkes has notified Commissioner Swift that he is ready to remove the Wells street bridge to Dearborn street, in accordance with the terms of the North Side cable ordinance. The cable on the North Side has been tested several times, and will now be running regularly very soon. The last hitch was the freezing of the South Side loop of the system: a flood of mud had run into the tube and solidly frozen, and in which the cable was imbedded.

The Englewood division of the Chicago City Ry. company has been infested with pickpockets recently. Mr. Holmes commenced his crime-checking efforts none too soon.

A committee recently waited upon Mr. Holmes to ask for better street car service on Wentworth avenue. Mr. Holmes promised the matter should be attended to.

The Chicago Passenger Ry. company (popularly called the Adams street line) have held their annual meeting, and elected as directors: Austin J. Doyle, hitherto superintendent of the line; Mr. Webb, the treasurer of the West Division Street Railway; W. T. Verbuck, C. T. Yerkes, and ex-County Attorney Bliss. Mr. Doyle has been chosen president. The annual report which was for the year ending Nov. 31, 1887, showed that the road carried an average of 17,000 passengers per day, and had earned above fixed charges and expenses $34,000. The year before, its net earnings were only $19,000. This shows a dividend earned of 3 4-10 per cent on the stock. The company has nineteen and seven-tenths miles of single track, and has the right to lay about twenty miles more on streets where new franchises have been granted. These expire Nov. 1, next, and to avail of them the new tracks must be laid before that date. The cost of carrying each passenger was put at 3.38 cents each. No dividend was declared.

The West Chicago Rapid Transit company has been incorporated; capital stock, $6,000,000; object, to construct, maintain, lease, or acquire, and operate elevated railways in Chicago on Lake, Randolph and Van Buren streets, from the lake the entire length west on such streets, and on Milwaukee, Ogden and Blue Island avenues, Halsted street and other parallel and cross streets; incorporators, John D. Jennings, E. Nelson Blake and Abner M. Wright.

The Inter-Ocean Rapid Transit Railroad company has also been incorporated, March 7, with a capital stock of $7,500,000, and principal business office at Chicago. It is proposed to construct this road from Fifth avenue, between Adams and Van Buren, westerly to the city limits, and branches from between Clinton and Halsted, to or near Twenty-second street, and thence west to the city limits; from between Ashland avenue and Wood street to near Milwaukee avenue, thence to or near Humboldt Park. The incorporators and first Board of Directors are Charles W. Rigdon, Silas S. Willard, James W. Sheridan, George P. Everhart, and Sidney Story.

Lake View. This is a new city on the north side of Chicago. The suburban council recently refused permission to experiment with electric cars within its boundaries. Last month they "resolved," that the Chicago & Evanston Ry. Co. should not run passenger trains faster than ten miles an hour, nor freight cars faster than six, through the city area. The council threaten further restrictions. The company replies, "Gentlemen, go ahead. Since the construction of our road, 6,000 people have settled around the line of tracks, and property has been increased thousands upon thousands of dollars. Our interests are the same as theirs, and we do not intend to injure either. There is no money in suburban traffic, and, with two possible exceptions, every railroad in Chicago would be only too glad to abolish it. A steam railroad can not do a street car business and successfully compete. In spite of every precaution we can take, passengers get hurt and killed. The damages eat up the small revenues. We have to lease tracks from Kingsbury street to the Union Depot, and pay for the bridge and the use of the depot, all of which costs us one and two-thirds cents for every passenger carried. It is simply impossible to carry people at five cents, and the sooner the people of Lake View understand this the better it will be for them."

Peoria. Martin Kingman and Col. James Rice have organized a company to build an electric railway, five miles long; capital $10,000.

Quincy. The Quincy Belt Ry. and Transfer company has been incorporated for the purpose of building a belt railway around the city. The incorporators and directors are: Frank D. Schermerhorn, Joseph F. Durant, John H. Duker, Henry Root and Michael Piggot of Quincy.

IOWA.

Des Moines. The street railways of this city receive much attention from newspaper men of late. Here is an extract of a *Leader* man's experience on the narrow gauge line, en route home on a yellow car: The cold was intense, but a generous fire of anthracite, provided by this public spirited company, glowed in the welcome stove, and diffused a pleasant warmth in the car. The few persons on board were tired, and glad of the prospect of reaching home at the close of a day of toil and care. After leaving the barn on High street, the car began to go over the frozen road at a terrific gait. The horses went around the curves and up the inclines in a gallop. The driver was drunk. That was his last trip. Charles Grefe, the capable and genial superintendent, hearing of his condition, followed in the next car, and on reaching the barn at the western terminus discharged him. The writer knows something of the street car service in most of the great cities and many of the lesser, between the Atlantic and the Pacific, and has little patience with the few untraveled people who complain unwisely and unjustly of this service in our city. There are not many lines anywhere that provide as thoroughly and efficiently for the comfort of their patrons as our narrow gauge roads. Fires in street cars are seldom found in any city. These cars are clean, spacious, well made and nicely upholstered, while the track is smooth and solid.

KANSAS.

Fort Scott. The *Monitor* opposes street railroads operated by horse and mule power and urges the street railway company in that city to operate its lines by electricity.

Kansas City. The Citizen's Street Railway company of Kansas City, Kan., has been incorporated; the purpose is to build, own, operate either horse, cable or motor railway in Kansas City, Kan., and Wyandotte county; estimated length, ninety-five miles. Incorporators: Allen Chadwick, M. B. Snyder, E. W. Anderson and K. B. Snyder; capital, $100,000.

Salina. A. J. Anderson, receives $100 per month for propelling each car of the street car line.

Topeka. The East Side Street Railway company of Topeka has been incorporated; capital stock $100,000. Incorporators: W. O. Curry, John R. Mulvane, G. W. Veale, W. D. Alexander, T. W. Harrison, S. Seabrook, J. K. Hudson, all of Topeka.

KENTUCKY.

Bowling Green. The Park City St. Ry. Co., (E. P. Neale president; W. H. Blakeley, secretary), will build about four miles of track, flat rail, forthwith. They calculate to complete the road by August next. Kind of motor not yet decided, nor gauge, etc.

STREET RAILWAY FRANCHISE FOR SALE.

Mr. W. H. Blakeley (of the Real Estate *Exchange Journal*), 937 Summer street, this city, says: "There is a company here who have the exclusive right to the streets of a city of 10,000 inhabitants for a street railway, and I think the franchise could be bought at a reasonable price; the city is spread out over a large area, and a street railway will pay well. A city near here, of 4,500 population has a line that cost more than the one in question will, whose stock cannot be bought for $240 on the $100 share."

LOUISIANA.

New Orleans. The street railways are still troubling the city council. The Carrollton R. R. Co., are petitioning for a twelve years' extension of their franchise, after the present franchise (which has many years yet to run) expires. The company says their business has been unprofitable, and ask for the extension of time to try to recoup their losses. The *Picayune* says, "There certainly can be no reason strong enough to justify the council in saddling upon the city the promise of a valuable grant so far in advance of any necessity arising for it; while to do so without exacting an adequate pecuniary return would be little less than criminal."

MAINE.

Biddeford. The owners of the Biddeford and Saco Horse Railroad Company have made arrangements with Worcester parties for building a road between Biddeford, Saco and Old Orchard this spring. They agree to build a first class road, to be ready for operation July 1. The Worcester parties are Charles B. Pratt, treasurer and secretary of the Worcester Horse Railroad, and J. M. Ackerman, superintendent of the same corporation.

MASSACHUSETTS.

Boston. The managers of the West End Street Railway company have petitioned to introduce the cable system on specified streets. Should they get permission to do so, they certainly will have the benefit of the experience of other roads, that is, they will know what is best, what to adopt and what to avoid.

The new general manager of the West End Street Railway company, D. F. Longstreet, is introducing such measures as he hopes will meet with public requirements. The city presents difficulties to be entirely surmounted or to be only partially ameliorated, that are not met with in other cities, especially those of more modern growth.

The Meigs Elevated Railroad company has petitioned the legislature for a change in its charter, and there seems to be every prospect of its being granted. The company wishes to be placed on the same basis as other street railways. The old charter has no provisions for appraisal of land damages or easements before giving bond for them. The legislative Committee on Street Railways was pleased with the presentation made by the company. As soon as the change is granted the company will make preparations for its line between Boston and Harvard Square. The most important recent invention is the contrivance for preventing collisions, which by electrical action, automatically shuts off the steam in engines approaching each other within a given distance on the same track.

Chicopee. A street railway company is being organized here.

Long Beach. A bill has been introduced in the Massachusetts legislature to incorporate the Long Beach Ry. company to build a railroad from Gloucester to Rockport, about three miles. Incorporators: M. C. Fitch, D. G. Presson, C. C. Cressy, J. O. C. Rowe, F. W. Homans, G. Steele, R. R. Fears, T. Hodge and D. D. Saunders' directors; D. G. Presson, clerk; F. W. Homans, treasurer.

MISSOURI.

Kansas City. The employes of the Kansas City Cable company have organized a benefit and relief association among their number, starting with a membership of 150. Their object is to relieve the suffering of any of their own number who are injured, and to provide for the destitute families of the same in case of death.

The directors of the Metropolitan Street Railway company held a meeting Feb. 23, and voted to increase the capital stock from $2,000,000 to $3,600,000, in order to provide for contemplated improvements. The building of the Eighteenth street line, it is estimated, will require some $800,000. This company now has the largest capital stock of any incorporated company in the city. In July, 1886, a company of capitalists, headed by Colonel C. F. Morse, purchased the street car lines owned by Thomas Corrigan. In August the present company was organized, with a capital stock of $1,000,000, which was increased on January 4, 1887, to $2,000,000, and now is $3,600,000.

St. Louis. Pres. Lightner, of the Lindell — Washington avenue — street railway, said to a St. Louis *Globe Democrat* reporter recently that, after having expended nearly $10,000 in experiments with electric motors, the company had finally decided that the electric storage battery system was the best in use. Its principle is that of the Julien battery, which has been in operation on street railways of Brussels, Berlin and Antwerp for two years. The batteries are charged at a power house and are placed under the seats of the car, being set in position through a door in the side of the car. When set up there they are ready for use. One plan is to have the machinery worked by an endless chain, or ropes, and another is to have it operated by cogs attached to an axle "We have tried this motor over the road a number of times," said Mr. Lightner. "In our last experiment we had power to spare, not using all we had. The difficulty attending the experiment was that the large and small wheels we used created so many revolutions that there was a disposition of the wheels to slip and make hot boxes. In our next experiment we will use wheels nearly of equal size, and yet we expect to get power sufficient to run the car. Again, our cars can be lighted instantly with a brilliant electric light from the same batteries that propel the car, so that passengers will have the advantage of reading on the cars if they want to. We are looking daily for the arrival of some of these machines to experiment further with."

The following reports made by the street railroads to the City Registrar, show the business done during 1887:

	Trips.	Passengers
Peoples	197,850	3,354,848
St. Louis	190,586	6,470,205
Union Depot	363,624	4,682,004
Union	221,456	2,194,849
Power Grove	159,040	1,005,705
Southern	177,377	2,542,366
Northern Central	232,886	2,574,824
Mound City	168,434	1,900,103
Missouri	428,146	5,419,460
Lindell	515,736	4,918,242
Jefferson Ave	133,294	1,525,832
Laclede	171,660	1,798,700
Cable	198,262	5,061,429
Citizens	338,266	3,513,108
Cass Ave	190,520	2,794,512
Baden	22,324	163,686
Bellefountaine	212,548	2,134,369
Grand Total	3,922,009	52,054,242

The Union Depot company operated three lines, the Lindell two and the Missouri two.

Definite arrangements have now been concluded for the early construction of the Wyatt Park cable road Mr. Hobson, of this city, one the principal projectors of the line, has been in New York some time on business connected with the project and it is now authoritatively given out that he has succeeded in placing the bonds of the company in a satisfactory manner and also in making contracts with responsible parties for the construction of the road, including the neces sary power houses and machinery. Work wi commence as soon as the season will permit.

NEW HAMPSHIRE.

Dover. The population of this city is now es timated over 17,000. The horse railroad is "pros pering finely" under the new administration They have to run more cars and oftener, owin to the increase of travel. The 5-cent fare ha taken immensely. And the marked improvemer is very flattering to "President Mary."

NEW YORK.

Buffalo. It is proposed to build several exten sions to the Buffalo street railroad.

New York. The Aldermen have received a pet tion from the New York and Long Island Rail road company, representing that they desire t construct two tunnels beneath the East river, a Thirty-fifth street, and thence beneath the street and private lands to a terminus at Ninth an Tenth avenues and Twenty-ninth and Thirtiet streets; also from Fourth avenue and Thirty fourth street to the Grand Central Station, als from West Thirtieth street and Ninth avenue t the Hudson river tunnel at Christopher street an North river. The tunnel is only to cross street and avenues, the rest of the route to be unde private property. The top of the tunnel is t average a depth of sixty feet below the presen surface, electro-motive power is to be used, an the surface communicated with by passenge elevators. Strong names are back of the petitio with large capital, and there would seem to be n doubt, therefore, that they "mean business."

A Fourth avenue car, operated by Julien sto age batteries, made some hundreds of trips, and i has never broken down or failed. Ten more car now building will be ready about the first c April, when they will be put on regular work i place of ten of the horse cars which the Fourt avenue company now run between the Gran Central depot and the post office. These will b entirely new cars, but the ten horse cars whic will displace will then be fitted with batteries an put to work in place of ten other cars, and i this way the whole rolling stock of the line wi gradually be changed. The Julien compan claim that with ten cars the operating expense will be about fifty per cent less than if horse were used.

OHIO.

Akron. The Akron Street Railway compan have almost entire right of way to run street car on East Market street to Sixth Ward, length thre miles. Grant call for cars propelled by electricity The company expect to break ground in May The managers are now in correspondence wit the different motor companies but have no decided which system they will adopt. Ther are two grades on the line that are about fiv per cent. In case the East Market line is a suc cess the old line will be run by electricity also Mr. Jno. E. Metler will be superintendent of th entire system.

Canton. The Canton Street Railway compan will add three new cars to the Lake View lin about May for the summer travel. They also in tend as soon as the weather permits to add abou one half mile new track to the north line and on new car for same.

Ironton. Mr. Dunham, of New York, has ob tained a franchise to operate an electric railwa here.

PENNSYLVANIA.

Carbondale The officers of the Carbondal and Jermyn Street Railway Co., are added t our Directory list. The company's capital stoc is $50,000. They will soon have 3½ miles mor track, with five additional cars fitted with Sprague electric motors.

TENNESSEE.

Chattanooga. The Rossville and Chickamaug Street Ry. Co. will build the longest street rail way in the state—it will reach the Missionar Ridge.

The Chattanooga Electric St. R. R. Co., hav elected C. A. Lyerly president, and C. E. Scot secretary.

VIRGINIA.

Berkley (near Norfolk). The Berkley Stree Railway company has been incorporated (b John M. Hodges, etc.) with $70,000 capital.

EUROPE.

Steam Car for Tramways.

The Rowan System for steam car for tramways is in extensive use in Europe. A car showing some modification from the older type has been lately constructed, which is intended for running on lines of heavy grades (75 to 105 ft. per mile). This car, to which one or more ordinary cars can be attached if necessary, can round curves with a curvature of 114.6 degrees (50 ft. radius). The engine emits neither steam nor smoke as the exhaust is condensed in a set of tubes, or surface condenser kept cool by a current of air.

The working expenses for such a car, having a capacity of from 50 to 60 passengers, are about the same as for a one-horse street car.

Germany.

Berlin. A new electric locomotive has been built at Berlin. The motor is speeded at three hundred revolutions, and connected with the axles by spur gearing. Electric power is supplied by a battery of E. P. S. accumulators, giving 200 volts and a maximum rate of discharge of 40 amperes. The total storage capacity is 300 ampere hours, and the estimated speed 7½ miles per hour.

Belgium.

Brussels. The Brussels Tramway Co. are now operating ten Julien electric cars (storage battery).

India.

Madras. The subject of electric tramways is attracting attention in India, and arrangements have been made in London to introduce the new tramway system into Madras.

Japan.

Tokio. Kwazokii Hawai, who is now studying electricity in the United States, and recently paid our sacntum a visit, says the Mikado (emperor) is in favor of having an electric railway in the capital of the "Sunrise Kingdom."

Patents.

The following list of patents issued last month relating to Inter-mural traffic is specially reported for The Street Railway Gazette by Wm. H. Henderson, solicitor of American and Foreign Patents, 925 F street, Washington, D. C. A copy of any of the following will be furnished by him for 25 cents:

376,986. Elevated railway structure—B. F. Hamilton, Lawrence, Mass.
377,094. Car brake and starter—J. N. Williams, Newark, N. J.
377,133. Car starter—J. O'Neill, New York.
377,215. Traveling current collector for electric-railway motor cars—W. M. Schlesinger, Philadelphia, Pa.
377,230. Electric motor—E. M. Bently, New York, N. Y.
377,329. Electric motor—C. T. Mason, Sr., Sumter, S. C.
377,255. Electric motor regulation—D. Higan, Philadelphia, Pa.
377,229. Electric locomotive—E. M. Bently, New York, N. Y.
377,107. Electric railway—R. M. Hunter, Philadelphia, Pa.
377,153. Elevated railway—J. M. Hannahs, Chicago, Ill.
377,023. Railway traction cable—P. J. Frasze, Chicago, Ill.
378,154. Cable coaster carrier, and ferrier—J. Van Zandt, Syracuse, N. Y.
378,328. Petroleum motor—V. List and J. Kosakoff, Moscow, Russia.
378,259. Electric railway—C. T. Mason, Sumter, S. C.
378,292. Track scraper for street railways—G. W. Davis, Hot Springs, Ark.
378,146. Rotary motor operated by fluid pressure—V. Popp, Paris, France.
378,480. Car aisle—J. Stephenson, New York.
378,476. Tram-car dash cap—J. Stephenson, New York, N. Y.
378,472. And 378,474 Tram car door hanging—J. Stephenson, New York, N. Y.
378,469. Tram car lamp house—J. Stephenson, New York, N. Y.
378,473. Tram-car window—J. Stephenson, New York.
378,479. Draw bar for tram cars—J. Stephenson, New York, N. Y.
378,478. Draw head hook for tram cars—J. Stephenson, New York, N. Y.
378,517. Rail connection for electric railways—E. L. Orcutt, Somerville, Mass.
378,672. Railway street sprinkler—J. R. Gathright, Louisville, Ky.

Patents Described.

The following is a brief description of patents relating to street railway interests issued during the past month; specially prepared by J. C. Higdon, Mechanical Expert and Solicitor of Patents, Rooms 55 and 56 Hall building, Kansas City, Mo. A printed copy of any of the following will be furnished by him for 25 cents (stamps).

Safety Car Door—H. L. Renne, Hammond, Ind. This patent covers an arrangement whereby ready egress from the car may be given the passengers in case of accident.

Car-Replacer and Portable Switch.—T. Holliday, Sanborn, Dak. A portable platform wider than the track at one end and tapering down near to the width of the rail at the other.

Cable Grip.—J. F. West, Staunton, Va. This patent covers an arrangement of vertical jaws which can be raised and lowered on a hanger-bar a sufficient distance to clear a cross-cable.

Cable Grip—J. H. Robertson, New York. Covers and arrangement of rods and levers for operating a grip from the platforms at either end of the car.

Cable-Grip—D. S. Mackey, San Francisco, Cal. An ordinary grip having its lower jaw hinged to the slide so that said jaw may be thrown to one side.

Street Car Road—W. M. Eccles, St. Louis, Mo. In this patent a series of motors are located along the line beneath the track, and the cars are propelled from one to another.

Draw-Gear for Street Cars—J. W. Evans, Newburyport, Mass. A device attached to the dasher by means of which the pin can be withdrawn by the driver without leaving his usual position.

Depression-Pulley for Cable Railways—G. W. Douglass, San Francisco. A series of vertical pulleys are mounted in a sliding frame so as to be moved out of the way by the grip.

Track-Cleaning Attachment for Street Cars—C. Peper, St Louis, Mo. A scraper is hung from the car between the front and rear axles and arranged to be depressed by a lever located on the platform.

Electric Railway—Maryland Electric Motor company, Baltimore, Md. A system in which the rails are used as conductors, the contact-points for the ingoing and outcoming currents being arranged diagonally opposite each other at intervals along the track. By this arrangement the distance between the contacts is considerably increased.

Books, Pamphlets, etc.

The London *Electrical Engineer* says the Julien accumulator appears to be giving very satisfactory results on the Brussels tramway.

Mayor Hewitt's "message" to the Board of Alderman, New York, Jan. 31, "has been entered at length on the minutes" and 500 copies thereof have been printed, in accordance with the Board's resolution. His honor has been kind enough to send a copy thereof to the Street Railway Gazette. The "message" contains much food for reflection for those interested in the problem of rapid transit in cities.

The signatures to the petition of the N. & E. River Ry. Co. of New York city for legislative power to carry out their electric railway scheme (Bentley-Knight system) contains eight long columns of weighty names, and it will probably receive the favorable consideration of the Governor and Legislature.

Chesebrough's street railway invention, according to specifications received, covers a toothed rack placed in a depressed channel, with a narrow slot above for communication between the driving toothed wheel and the rack. The inventor is Mr. R. A. Chesebrough, State street, Cor. Bridge, New York.

John Stephenson, New York, has not less than twelve street railway patents recorded in the *Official Gazette* of the U. S. Patent Office for Feb. 28: Tram-car lamp-house, roof, sash-rail, window, door-hanging, door-hanger, door-operator, dash-cap; car-axle box; draw bar for tram-cars; draw-head hook for tram-cars; and aisle-car. Mr. Stephenson means to keep in front, as well as being the original.

The Metallic Street Ry. Supply Co., Albany, N. Y., have issued an illustrated pamphlet (of Gibbon's patents), on the front page of which is the exhortation, "If you want a smooth, noiseless and permanent track, read the enclosed; it will show you how and where to get it."

A warning from the Edison Electric Light Co., comprised in a big pamphlet of 84 pages, recalls the attention of the public to a card issued by them May 24, 1885, with a few additional "cautions" which, they say, become applicable to the present situation "by virtue of the injection therein of additional sophistries designed to confuse the minds of those who are only just now inquiring into the subject of incandescent electric lighting." Electric railways are left alone.

The Standard Duplex Fuel Burner Co. (Cleveland, O.) have issued a pamphlet containing "something of interest to all manufacturers and users of steam power, and all consumers of fuel for any purposes." On the title page is exhibited a smokeless locomotive. The question arises, will the oil fuel, with this burner, be useful for street railways.

"The kind of mills we build" is the title of an elegant pamphlet just received from Edw. P. Allis & Co., Reliance Works, Milwaukee, Wis. Every alternate page is occupied by a plan of one of the mills they have built, the first being a side elevation of the grinding floor (stones) of the first complete rolling mill in America, viz. the Washburn experimental mill, at Minneapolis, Minn. There are nine other mills shown, ending with the Allis design for a thousand barrel mill, and lastly a cut showing their Bay State Works, which are devoted exclusively to the manufacture of roller mills.

Business Notes.

Adams' elevated railway is no doubt referred to by Dr. Grimshaw in his "Resume of recent (scientific) progress," in the New York *World*, Feb. 5, where he says; "Chicago is to have an elevated railroad. . . . Single-legged railways are again proposed, with the car slung over a single central rail reaching well up into their interior." The Dr. does not seem to like it. Mr. Yerkes, who is probably as good a judge in such matters, believes that the Adams "L" scheme is "the best elevated system" that he has examined.

R. T. White's inventions have attracted much attention. Several companies are seriouly inclined to adopt his system right away. His cable road is likely to be constructed in Boston, to begin with; and a model thereof will soon be exhibited in New York and Chicago, besides that now shown at Boston. A model of Mr. White's "L" road, which was described in the Gazette some time ago, is now exhibited at the New York office (39 Broadway, room 3). For other addresses, see advertisement.

Mr. Knight, mechanical engineer for the Bentley-Knight company, says that the company is using the Reliable Sand Box on all their cars on their new road, Allegheny City, Pa., with the best possible results; that they have proved by actual test that they are able to show fully one-hundred per cent. more speed on the very heavy grades they are operating, with the aid of these boxes, than without them.

Mr. Dutton (Dorner & Dutton), Cleveland, O., has just returned from a business trip South. This concern is making first-class street car wheels, it is claimed, and a journal box which appears to give good satisfaction.

Hail's Combined Fare Box and Change Maker has received additional testimonials, one of which is added in their advertisement, on page 8 of the Directory Supplement.

The St. Louis Car Co., whose card is to be found on page 19 of the Directory, have issued a colored illustration of their street cars, which has a most attractive appearance.

American Street Railways; Their Construction, Equipment and Maintenance, by Mr. Augustine W. Wright, C. E., which has appeared in serial chapters running over volumes I and II of the Street Railway Gazette, is about to appear in a $5 book published by Rand, McNally & Co., Chicago and New York. We have much pleasure in making this announcement, as many enquiries concerning it have been received.

The Street Railway Gazette.

L. III. CHICAGO APRIL, 1888. NEW YORK No. 4

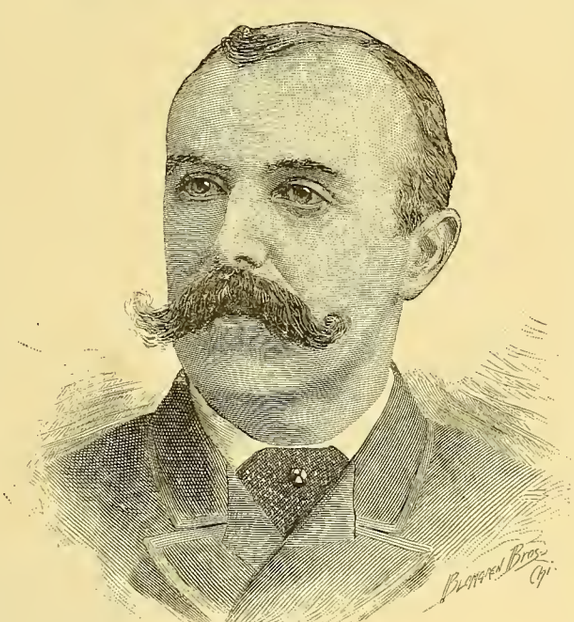
Daniel Frank Longstreet, Esq.

N. MANAGER WEST END ST. RY. CO., BOSTON.

The new general manager of Boston's exten- consolidated street railways is an out and Yankee, and a good specimen of New Eng- l manhood. We should explain, perhaps, we call him Yankee in the sense that Dr. l. Gordon (in his History of the American r of Independence) gives to the word. He it was a popular word in Cambridge, Mass., arly as 1713, and that it meant *excellent*, used superlative adjective and with a "lower case" is, a yankee good horse, yankee good cider, In that sense, Mr. Longstreet is a yankee d street railway manager. He is a na- of the "Nutmeg State," having been at Killingly, Connecticut, in 1846. is, therefore, a man of forty-two Christ- es.

Ir. Longstreet's native city is situated up on one of the branches of the erican "Thames River;" it is so near little town of Daysville that Rand, Nally & Co.'s map maker has not been to distinguish them, and the name of little circle indicating a city at that it is given as "Daysville or Killingly." city is also called West Killingly, to inguish it from East Killingly. From native city Mr. Longstreet had not e five miles between him and the State Little Rhody," and he migrated, keep- his course direct east, to Providence, ., when about nine years of age. He red the army as drummer boy in the rth Rhode Island Infantry, with which tayed three years, holding various po- ns, and at the close of the war he was lerk in Surgeon General McDonald's e, at City Point. Then he returned, in , to Providence, R. I., and on his 19th hday he took a position as conductor a line of the newly organized Union road Co., Providence. He held that six months, after which he was pro- ed to a clerkship in the company's es. He stuck to his desk until he was ted secretary and treasurer of the com- ; that was in 1870. Two years later he med the general management, in addition to duties as secretary and treasurer. In 1874 relinquished the latter duties and became -president and General Manager, which ble position he held until the beginning of present year.

the meantime, Mr. Longstreet had found that it was not good for man to be alone, he was married in 1867. He has two ghters, charming young ladies, who make life sweet and pleasant. He delights in company, not only at home, but he loves ke his girls with him when he goes away for yment, etc. The Misses Longstreet were their father at the Continental Hotel, Phila- delphia, when the American Street Railway Association met there last October. (In this connection, we venture to suggest, parenthetically, that it might be a great advantage, which would afford an attractive and very pleasant feature, in addition to the regular advantages, if a sociable meeting or general entertainment could be arranged in connection with the annual meetings of the American Street Railway Association, so that the sons and daughters of our street railway presidents and managers, all over the country, may have the privilege and pleasure of just glancing at each other once a year. Hitherto, those who have taken their wives and daughters to the street railway conventions have kept them penned up in their hotels, or left them roving at their own sweet will, while the members have attended the meetings. Ex president Thos. W. Ackley took his daughter with him to the Cincinnati convention; Mrs. and Miss Richardson accompanied the Secretary of the Association to Philadelphia. Several others did likewise. Why not have one little meeting for all, if it were only an entertainment of "penny readings?" But this is a disgression.)



D. F. Longstreet

Mr. D. Frank Longstreet, as already reported in the STREET RAILWAY GAZETTE, has been appointed General Manager of the West End Street Railway Co., Boston. (It is strange to call it "West End" any longer, since it has swallowed up all the street railways of the city. Why not call it, henceforth, The Boston Street Railway Corporation?) The company, by whatever name it may be designated, is to be congratulated on having Mr. Longstreet as their General Manager. He is a self-made man, and has climbed the ladder of street railway management step by step; he is familiar with all the ins and outs. His experience has not been confined to the various positions he has filled in the Union system during the twenty-three years he served that company. He was also Vice-president and General Manager of the Pawtucket (R. I.) Street Railway Co. for some years, and he is considerably interested in several other street railways—one being so far west as Denver (the Denver City Railway), Colorado.

In addition to all that, Mr. Longstreet is the inventor of the Providence Girder Rail —"the most permanent and very best form of railroad construction for public streets." He is also a strong man in a battle of words, as evidenced by his "argument" before the Providence Board of Aldermen last December, when he opposed the ordinance permitting the Providence Cable Tramway Co. to construct and operate a cable road in Providence. He showed that his company should continue to monopolize the street railway business of the city. "Gentlemen," said he, "if it be modesty for these gentlemen to come here and ask you to compel us to build them a $200,000 road up a little hill, or else to let them skim the cream off a business which we have been a quarter of a century in building up; if this be modesty, I say, then the Lord help us and the community when they shall appear before this honorable body and really ask for just what they want."

Mr. Longstreet has been a long while reaching Boston (the highest ambition of every true Yankee), having sojourned in Providence almost as long as the Israelites journeyed in the wilderness, and now that he has got there, we wish him a long, prosperous and brilliant career as General Manager of the greatest street railway combination in the world. The irony of fate has brought him to Boston just in time to superintend the construction of a cable railway there; for present indications point clearly in that direction; and if a cable road should be built in Boston, Mr. Longstreet will be as heartily in its favor, no doubt, as he was opposed to one in Providence.

COMMITTEES from Boston have been to Chicago recently, and also to Kansas City, Mo., examining the cable railways of Mr. Holmes, Mr. Yerkes, Mr. Lawless, etc. The most important was the Massachusetts legislature committee (ten in number), in charge of the sergeant-at-arms, and accompanied by their official stenographer, who were in Chicago, March 24th, and again on their return from Missouri.

Electric and Magnetic Traction.

Three patents on magnetic and electric traction increasing apparatus were issued on the 20th of last month. No. 379,815 on "apparatus for increasing the traction of vehicles and motors," and No. 379,909 on "traction increasing system for electric railways," both to Mr. Elias E. Ries, the well known electrician of Baltimore, and No. 379,816 on "electro magnetic traction increasing apparatus," to Messrs. E. E. Ries and A. H. Henderson jointly. The Ries electric railway system has very interesting features peculiarly its own, and a brief description of the traction increasing apparatus, as recently patented, will be read with much interest, especially at the present time. And the accompanying illustrations will help to understand the invention.

Fig. 1 is a diagrammatical view, showing a skeleton truck of a street car, the helix of wire wound upon each axle, and electrically connected by brushes with a branch circuit from the current collecting wheels, which derive their current from the line, which in turn is arranged below in a conduit, the two helices being in series, as shown, and connected in such a manner as to induce magnetic lines of force to flow in a continuous direction around the magnetic circuit formed by the axles, drive wheels, and track rails.

Fig. 2 is a similar view showing the manner of arranging the helices upon a street car truck where an electric motor is used as the propelling power, there being in this instance four helices instead of two, arranged similarly in series, the energizing current being obtained from a source separate to that of the motor.

For carrying out the invention, a helix of wire permanently wound concentrically around a suitable core is employed, the core being magnetically in circuit or contact with the wheels—say, for example, the axle, which carries a pair of wheels, one on each side. A current of electricity derived from some convenient and constantly available source is passed through the helix, instantaneously energizing the axle and converting its respective extremities (the wheels) into magnetic poles of opposite polarity, and consequently imparting magnetism to the rails upon which said wheels are bearing, the magnetic circuit being completed through the rails intervening between the front and rear car wheels on each side, thus forming a complete magnetic circuit.

In Fig. 1, which shows the arrangement as applied to an underground conduit railway, *1* indicates the car truck, consisting of the flange wheels *2 2*, the axles *3 3*, and the brace rods *4 4*, supporting the cross bars *5 5*, which carry each a pair of metal contact brushes, *6 6*; *7 7* are the slot rails of the conduit, shown broken away underneath the truck 1 for the purpose of exposing to view the ordinary current conducting rails, *8 8*, and *9* designates the current collecting wheels or traveling contacts, which make contact with the rails *8 8* as the car proceeds along the line of way; *10 10* are the helices, wound, respectively, around the axles *3 3*, and having their terminals (not shown) electrically connected, respectively, with the metallic disks *11 11*, which are each insulated from the body of its respective helix *10* and from the axle *3*.

From the circuit which extends from the collectors *9* to the motor a branch or shunt *12 13*, is taken, one wire *12*, leading to the brush *6* on the lower rear side and the other wire *13*, passing to the lever switch *14*, the contact point of which is electrically connected by wire *15* with the corresponding brush *6* on the lower front side of the car; *16* is the wire connecting the two remaining brushes *6 6* with each other. Thus, as the car proceeds, should it be desired to increase the tractive effects between the wheels *2 2* and the rails *17 17*, the motor man adjusts the lever switch *14* upon its contact point, thereby closing the circuit through the helices *10 10*, magnetizing the axles, and converting the wheels *2 2* into enlarged pole pieces of opposite polarity. Commencing at the switch *14*, the current flows over its circuit through the helices in the direction of the arrows. When these helices are thus energized, they induce magnetic lines of force in the iron axles and wheels in the direction of the arrows *a a*, these lines being conducted along the iron rails intervening between the rear and the front axles, forming thereby a complete and unbroken magnetic circuit. It will be fairly apparent that these magnetic lines of force must pass serially and successively through all the wheels *2 2* before the magnetic circuit is complete. Therefore, a powerful attraction or adhesion of the different molecular structures will be produced at the points of contact between the rails and wheels, at which point the degree of magnetic saturation is greater, owing to the relative difference in the mass of magnetic metal and the position of the molecules of iron in the said rails and wheels, which are thus of uniform direction throughout the circuit.

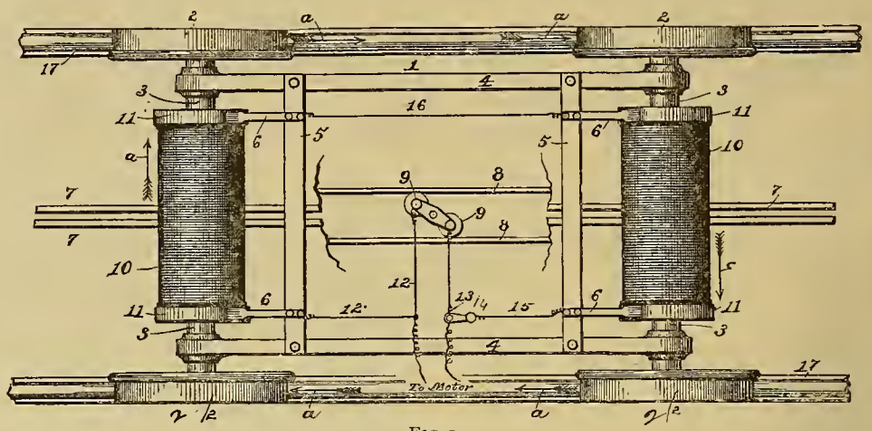


FIG. 1.

Referring to Fig. 2, the arrangement is substantially the same, except that, owing to the construction and gearing of the motor *18*, there must be four helices instead of two—a pair for each axle—the neutral line of magnetism being preferably midway between the two helices on each axle. In order to prevent diffusion of the lines of force from the magnetic circuit in Fig. 2, the motor and its supporting frame are magnetically insulated from the axles. As in Fig. 1, these helices are connected in series, as shown, but are in this instance energized from a separate source from that of the motive current, which source is conventionally shown as a battery, either of the primary or storage type. Again, another difference between these arrangements is that there is shown a regulating switch, *19*, whereby it can be shifted so as to change the direction of the current through the several helices; furthermore, an adjustable resistance, *20*, is intermediately in the circuit from the battery for the obvious purpose of graduating the resistance of the circuit.

The helices *10 10* in Fig. 2 may be either mounted loosely on their axles or may revolve therewith, as in Fig. 1, and may be connected in series or in any other convenient or effective manner, whereby the lines of force will pass serially and successively through all the wheels, rails, and axles, as is well known and obvious to those skilled in this art.

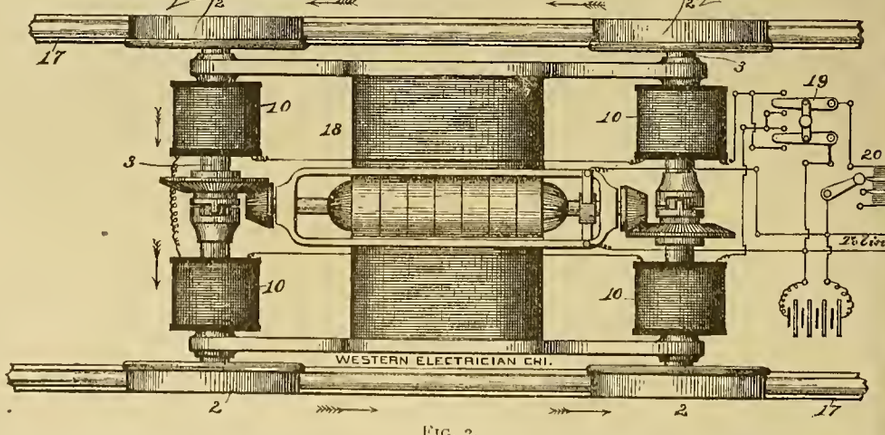


FIG. 2.

Mr. Ries's traction-increasing system for electric railways is based upon the fact that a strong adhesive effect between metallic conductors in contact with each other is produced when an electric current is passed from one to the other. This adhesion increases in proportion to the quantity of current passing between the conductors, and this effect is particularly noticeable when the frictional contact is a rolling one, distinguished from sliding frictional contact, though it is also noticeable in the latter case.

In the operation of electric railways Mr. R found that when the current is supplied to t motors on the cars through the rails upon whi the wheels travel, increased friction is caused the passage of the current from the rails to t wheels, and that this increases the traction of motor; but he has also found that this result, though beneficial in some cases, is detrimenta the operation of the system in other cases, for increased traction will manifest itself at all ti so long as the current passes—*i. e.*, so long the motor is supplied with current and mo The amount of traction in a system of the k indicated is, therefore, not controlled by operator or engineer, but fluctuates with regard to the momentary demands of the syst and in most cases in a manner contrary to th demands. Precisely the same thing has b found to happen in such systems of electrical comotion where the current is supplied to motor through separate conductors and is turned through the wheels and traction rails, as long as current is passing to the motor in manner indicated there will be increased tract due to the increased friction between the wh and rails at their points of contact produced the current. The increased traction will, th fore, be present whether at a given momen may be desirable or not.

"Now, it is the object of my invention," s Mr. Ries, "to utilize the phenomenon of increa friction produced by the passage of an elec current between the wheels of a motor and the rails upon which it travels for increas the traction of the moving vehicle at the wil the operator or engineer, so as to have it enti under control and adjustable according to the mands of the system from moment to mom I accomplish this object in a variety of ways, a which, however, have this in common, that I a myself of the circuit of an electric railway, wh circuit is composed, in part, of conductors ext ing parallel with the track, and that I establi branch from said circuit around the motor of electric locomotive. The current diverted the branch circuit I utilize for increasing tion, either by including two or more wheel the vehicle and the rails extending between same directly into said branch, or by chargi

lf-contained circuit, including such wheels and ils, inductively by the current in the branch rcuit. In both cases the motor-circuit ay be closed or opened, the motor-car or elec- ic locomotive may be propelled fast or slow, may be stopped entirely, without affecting the tegrity of the circuit, which serves the purpose increasing the traction of the vehicle, which rcuit I call the 'traction circuit.' I am thus en- bled, by means of suitable resistance in the action-circuit, to control the traction of an elec- ic locomotive or of a vehicle attached to the me at will."

Cable Railway Practice.

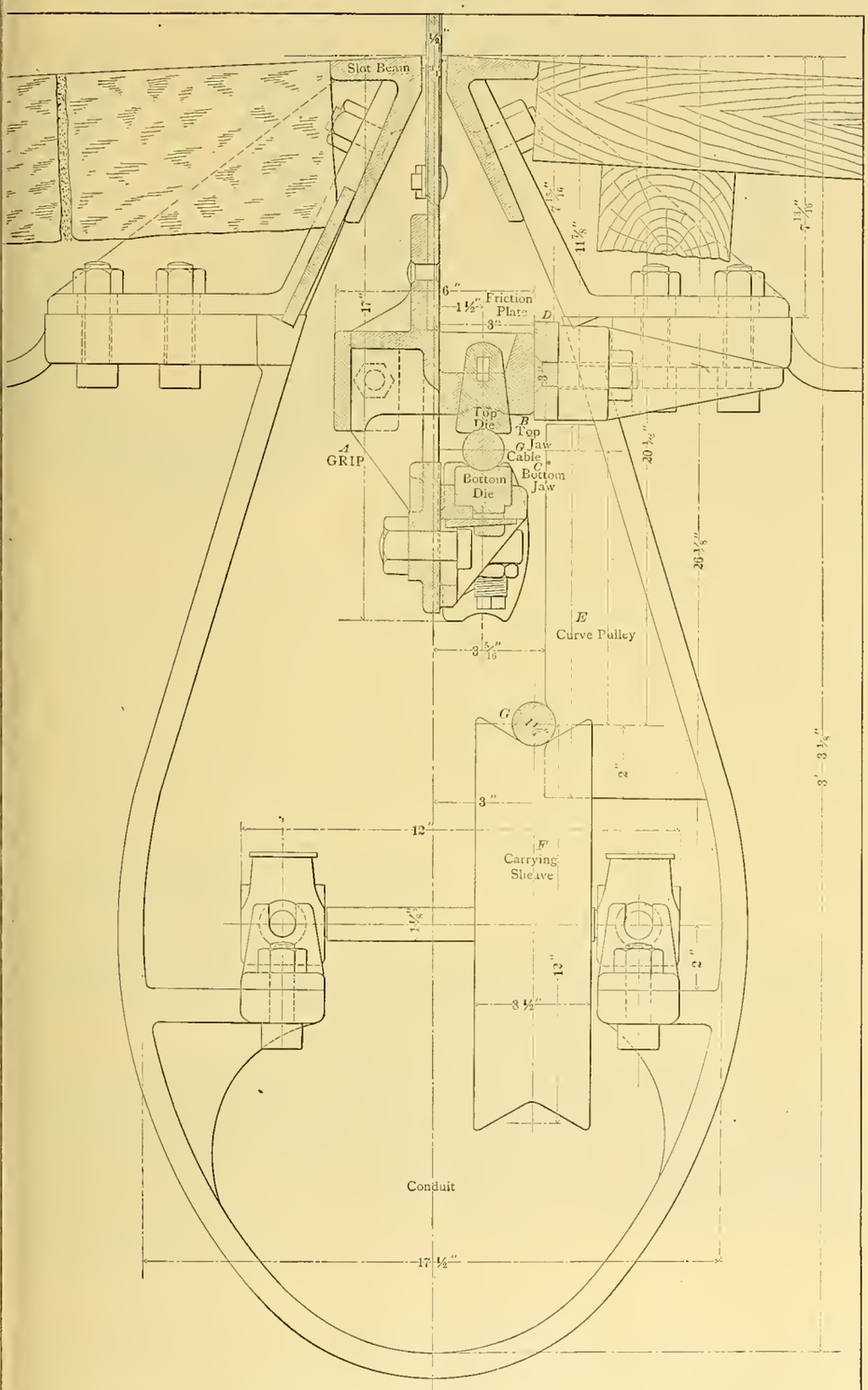
By Edward J. Lawless.

Continued from Page 37.

These hinges must be made very strong, as they necessarily stand a little higher than the track in order to allow the covers to lay flat when open. This last condition is necessary to allow the frame that carries the grip to pass over these covers when obliged to take out a grip.

Article III.

The subject of curves for cable lines is an interesting one, and, although there is room for improvement in their construction, from what is in general use at the present time, yet cable men are realizing more and more every day that they are not such stumbling blocks in the way of cable lines as what was supposed some few years ago. These curves are constructed with a series of wheels of special form set horizontally in frames, and over which is placed the entire length of the curve, what is called a "friction plate." This plate consists of a piece of steel about 4″ wide, and ⅞″ thick, against which the grip bears while passing around the curve. Great care should be taken when adjusting this plate not to allow more than ⅛″ play between it and the curve wheel, also that the face of this plate stands a little beyond the face of the curve wheel. You must also be particular that the lower edge of this plate does not extend below the top die of the grip; the object for this caution being to prevent the cable from chafing against the friction plate when raised by the grip going around the curve, and also to avoid any possibility of the cable working its way in between the curve wheel and friction plate. This plate should extend a few feet beyond the entrance to the curve and slope gently back at that point, so that the grip will not strike it a severe blow when passing. It must be securely fastened, especially at the joints, and see that it does not spring under heavy pressure, otherwise the grips will strike against the curve wheels. The accompanying cut (Fig. K) shows the friction plate before described, and a chilled curve wheel about 22″ in diameter, and 11″ deep, with smooth face and having a slight groove for cable to run in when at its normal height. Between each of these curve wheels is placed a carrying sheave, which is set about one quarter inch below the cable, for the purpose of holding it (the cable) in its place should it get slack. There is also a curve wheel, same size as above, with a flange slightly inclined, so that the cable will not chafe on it, which flange is a substitute for a carrying sheave between these curve wheels. Many claim that there should not be any groove in the curve wheel, as the grip, when raising the cable in the curve, wrenches the cable against the upper edge of the groove of the curve wheel ahead of the grip, causing severe friction on the cable and heavy strain on the wheel. I admit this, if the groove be made too deep; but the cable must have some bearing, other than a perfectly flat surface. If you do not give it a groove it will quickly make one for itself. By making a groove to the radius of the cable, one quarter of an inch deep, the above objection is overcome. These curve wheels should be set in very substantial frames, as the strain from the cable is great. When fastening these wheels to the shafts do not depend alone on set screws; they are bound to work loose or break, and give you no end of trouble and annoyance. They should be either keyed or supported by collars keyed to the shafts, or have the shafts turned with a shoulder on which to rest the wheels. In any event provision should be made that if a curve wheel gets loose on the shaft, it cannot drop more than one-eighth of an inch, and allow the cable to get over it. The principal objections to this style of curve wheel are the friction on the cable, caused by it rubbing against the wheel when the grip lifts it from its normal position at the bottom of the wheel to the top, also the friction on the cable when returning to its regular place after the grip has passed, and the extra weight of the curve wheel on account of its depth. For these reasons I am about to try the experiment of constructing a curve with the position of the friction plate reversed, it being placed at the bottom of the wheels instead of the top, and on a line with the bottom casting of the grip. In this way the cable retains its normal height in the curve, while the grip is passing, and all friction on the wheels avoided. These curve wheels are provided with a flange slightly sloped to prevent the cable from falling off them, and also have a good groove for cable to run in. They have the advantage of being much lighter, yet equally as strong as those shown in the cut. At each end of the curve two cone wheels will be placed, to enable the cable to attain the proper height it is required to run on this construction of curve. Curve wheels should be chilled, otherwise they will cut out rapidly, especially with a new steel cable, which will leave the impression of its strands in the wheels after a twenty-hours' run. Each curve wheel and frame should have a separate iron cover, so they can be easily oiled and examined at any time. As to the radius of a curve, it is advisable not to have it less than fifty feet, although curves of thirty feet radii have been operated successfully. Short curves are, however, particularly hard on cars, unless they are built on pivoted trucks.



K.—Curve; 12th St. Cable Line (Metropolitan St. Railway Co., Kansas City).

The process of transforming the current is an portant feature of the invention, and renders method extremely economical in the amount energy consumed. The electro-motive force he transformed current is from one half to one t. which is entirely safe and harmless, as it is volume of current flowing, and not its pres- e, that determines the amount of tractive ect produced.

In summing up the question of curves, the following essential points, as well as those already discussed, should be remembered in their construction; that a wheel can be changed while the cable is running, without allowing the cable to saw or come in contact with any intermediate point in the tube; facilities afforded to oil or repair the lower boxes while the cable is running, and to tighten or renew the bolts holding the friction plate should they get loose, as well as lubricate this plate.

(To be continued.)

The Listowel (Lartigue) Railway.

"Many forms of railways have been designed and constructed to meet the demands for every kind of service," says Mr. Francis E. Galloupe, M. E., of Boston, in the introduction of a paper on the Lartigue railway, written expressly for the STREET RAILWAY GAZETTE. We regret, however, that we cannot publish it in full, as the Lartigue system "has for its purpose to facilitate transportation as a military, agricultural or manufacturing line; not only for fixed or permanent lines of communication, but where the need may be temporary, as the railway can be shifted from one place to another with little trouble; it is thus made semi portable. The fundamental principle employed is that of a single elevated rail supported upon an A frame, upon which runs vertical grooved wheels supporting the carriage or load, hung on each side, upon the pannier principle."

A line of this kind of railway has been built in Ireland, however, extending from Listowel to Ballybunion, County Kerry, which is about ten miles long, with maximum gradients of 1 in 50. It was formally opened Feb. 29th last, and is designed to carry a general mixed traffic of passengers and goods, like an ordinary steam railroad. "The most ingenious arrangement, perhaps, is that of the cattle trucks," says Blakemore's *Hardware, Metals and Machinery* (March 15). But before proceeding to further describe this new railway in Ireland, it may be well to give a brief history of the Lartigue system. We have kept it among our pile of "deferred matter" hitherto, as it does not seem a kind of railway likely to answer in this country; at least not in connection with urban or suburban passenger transportation. And the *Railway Age* (March 30), to whom we are indebted for the accompanying cut, declares that "it is not likely that the Lartigue system will make much headway in the United States where a full-sized standard gauge road can be built and lightly equipped in level country at less cost than $15,000 per mile"—that being the cost of the Listowel-Ballybunion railway.

The first railway built on this system, says Mr. Galloupe, was that constructed at Algeria, "to develop the Esparto plant business, which required a portable line, since the means of carriage must itself be moved every few months in process of harvesting the crops. This idea is said to have been suggested to M. Lartigue while watching a caravan of camels, on the horizon, following each other in a long line and loaded with thellis, a kind of wallet which hangs down on each side of them, and which suggested to him an elevated rail. To his mental view, it is said, 'the legs of the camels became trestles, their humps were transformed into wheels, and the thellis took shape as a car.' About sixty miles of line have been built here."

Another line, about the same length, has been authorized by the Government of the Bey of Tunis, to be built by the Anglo-French company. A train may be run by an electric motor, a light locomotive or horses.

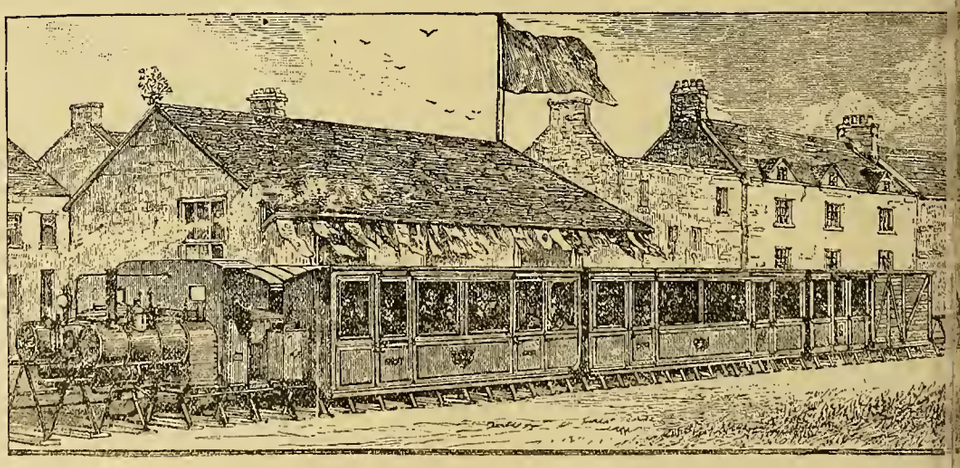
An experimental full-sized line has been built for exhibition at Victoria street, Westminster, London, which was begun May 12, 1886, and finished on the 12th of July following, according to the plans of M. Lartigue; M. A. Mallet designing the locomotive engine used, Mr. F. B. Behr being the managing director. The rail is one metre above the ground; the trestles being three feet three inches apart. Curves, switches and turn-tables are readily applied. The carriages on the Westminster track are short enough to allow their easy passage around curves as small as 30 feet radius, being only nine feet long. The engine, or locomotive, on this experimental line is composed of two vertical boilers, hung one upon each side of the line and connected by a large pipe, with a smaller pipe connecting the boilers at their lower ends, and allowing the water to pass from one boiler to another. The weight of engine in working order is two and one half tons, or a ton and a quarter upon each axle. With steam pressure of 100 lbs., to the square inch, the engine will haul about 70 tons on a level; 18 tons on an incline of 1 in 100; 9 tons on an incline of 2 per cent; and 6 tons on an incline of 3 per cent.; all at a speed of from 5 to 6 miles an hour. Smaller loads at double or treble the speed. The entire iron-work weighs 70 tons per mile, the rail being 23 lbs., to the yard; and each passenger car weights about 18 cwt. The portable line at Tunis, weighs 18 tons per mile, complete.

The line in Ireland has a 2 inch wide top or carrying rail, 3 ft. 6 inches from the ground; there being a guide rail on each side of the trestle 2 ft. from the ground. The travelling wheels are 22 inches in diameter. The rails, trestles, sleepers and connections are of steel; and, as they form substantially the permanent way, it is estimated that the expense of maintainance and renewal will be very much below that of ordinary railways. The crossings are ingeniously constructed, a level crossing being produced by simply placing upon hinges, and thereby converting into a gate, a section of the railway itself.

There are three locomotive engines, with two horizontal boilers each, provided with tenders of novel construction. These tenders are fitted with cylinders and a special gear, which allows the surplus steam of the engines to be used on steep inclines in order to give additional power and adhesion to the engines. This gear is so arranged that it can be instantaneously applied by the engine driver by simply turning a wheel, without in any way interfering with the working of the train, and keeping it in full motion while he is applying the steam to the tender. The engines weigh, when in full working order, 6 ½ tons; the tenders in full working order, weigh about 4¼ tons each. It is calculated that there is sufficient steam in the boilers to use the additional cylinders on the tenders for runs not exceeding one mile. The engines are worked with a maximum steam pressure of 150 lbs. The carriages and goods wagons consist of three first and four third-class passenger carriages, about 16 feet long without the buffers, and about 8 feet wide, and accommodating from twenty to twenty-four passengers. The interior arrangements are of two different kinds, viz., some are made so as to seat passengers with their backs to the rail, and others are made to seat them in the ordinary way, facing each other.

A cattle truck will hold four animals only—two on each side. The trucks, however, can be converted into sheep or pig trucks by an arrangement which more than doubles the superficial space. A moveable floor can be readily fixed into the truck so as to convert it into a two story wagon, the upper story giving a level space of the entire extent of the wagon, which is about the size of the ordinary railway cattle wagon. The goods wagons carry each 4 tons of merchandise. There are also two little platform carriages with steps, to cross over the line, which can be attached midway between the carriages of each train. The guard's vans are also fitted with steps for the same purpose.

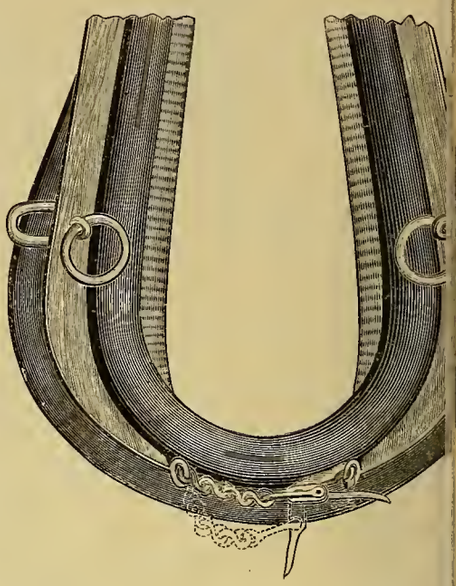
Those who may visit the International Exhibition at Paris, in 1889, will probably have opportunity to see the Lartigue Railway at work there on a more elevated plan—about 20 ft. high.



THE LARTIGUE SINGLE RAIL RAILWAY, AT LISTOWEL, IRELAND.

Martin's Improved Hame Fastener.

Messrs. Rufus Martin & Co. are the exclusive makers of Martin's patent improved hame fastener, shown in the accompanying cut. It



patented January 24th last. "This hame fastener," as the manufacturers' prospectus states, has the following advantages over *all* others:

"1. When fastened, it is securely locked, and cannot become unlocked or loosened except by using the lever.

"2. It is easily and quickly adjusted and will fit the ordinary railroad hame.

"3. Both parts are made of malleable iron and will outwear many hame straps."

Mr. Daniel Barker, superintendent Meriden (Conn.) Horse R. R. Co., writes under date of Feb. 9: "We have used your improved hame fasteners for some months and find them eminently satisfactory. They are a great saving of time and money."

Another important testimony, among others, is from Supt. G. C. Morse, Taunton, (Mass.) Street Railway Co., who says: "Your improved hame fasteners are all you claim for them. We think they are a good thing and a great improvement over the strap."

BRITISH Tramways made but little progress during 1886-7. They added only 21 miles to the 865 miles they had in operation June 30, 1886, in the whole United Kingdom.

White's Cable Railway Construction.

The accompanying cuts show the peculiarities Mr. R. T. White's plan of a cable road. Fig. is a cross section view, showing the tracks, the ıole of the iron framework, the place for the rface concrete or paving, the tube for the cable d the grip slot, also the hollow chambers in ıich can be placed electric wires (for telegraphs telephones), or water pipes, or even pneumatic bes. Fig. 2 is a longitudinal section, and it ows the flanged wheels that carry the cable; ıile Fig. 3 shows an end view of the cable bed, pulley section.

The cross section (Fig. 1) is taken through the ntre of main posts, which are placed about 8 :t apart; the two small posts, shown in the ddle of the cut, support the rails between the)eams. The bed plates, which are of ⅜ or ½

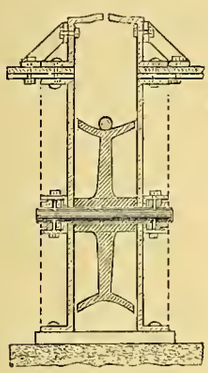


Fig. 3.

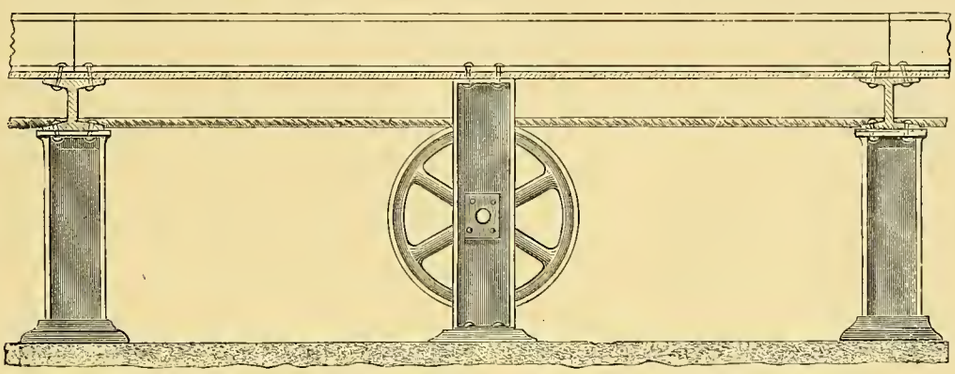


Fig. 2.

h steel, rest on the lower flanges of the rails. :her concrete or paving can be used on the ı of the iron framework.

A very notable feature of this kind of cable dway, is the way the grip slot is braced, and firm way in which every part is stopped. etted, braced, and ribbed. It is to be noticed ɔ how the ends of the I beams set into the top posts, thus making a crushing strain, instead the long leverage strain in yokes as now made, the inventor observes.

The longitudinal section (Fig. 2) is taken at grip slot, and shows the main posts, the I ıms, the wire rope (cable), and the pulley. e standards that hold the pulleys also hold up covering plates between the I beams, as wn in the section through pulley (Fig. 3), ving ample room for grip over pulley.

Models of Mr. White's inventions are exhibited at the Boston office, also at the New York, as well as the Chicago offices.

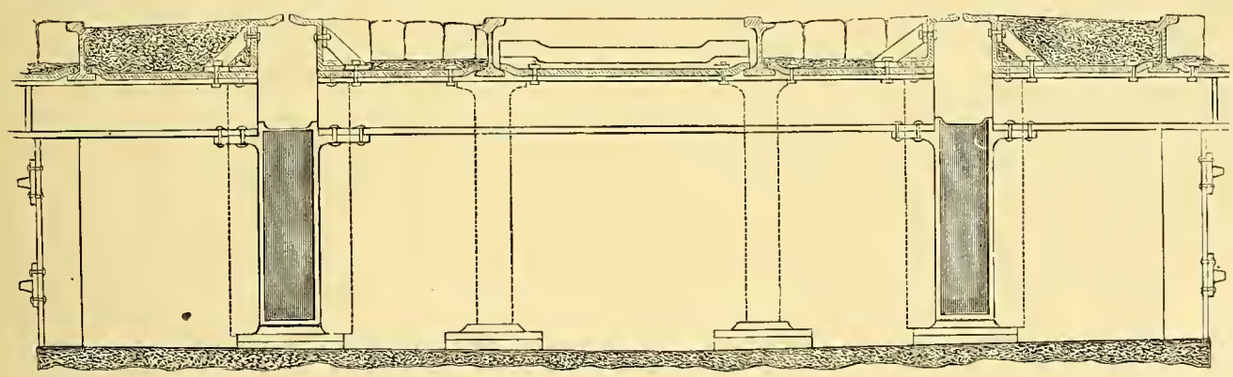


Fig. 1—White's Cable Roadway.

The post foundations are made of stone or :k, the lower ends of posts being covered with ı bed plate, and the bottom is covered with crete. The sides are made of iron, as shown ig. 1; but they may be walled up with brick, referred. Proper connections are made with ers, to carry off any water that may get into conduit; and suitable manholes are provided ;et at the tube, or into the adjacent wire or ɛ chambers.

n our next issue we expect to have cuts wing how the wires and pipes are placed in cavities referred to. Electricians say this is best arrangement hitherto known for placing tric wires underground. And with such a lway as this, Mayor Hewitt would be able to ɛ the streets of the Empire city from being ı up continually for laying or repairing water team pipes; for all these, as well as electric ɛs, etc., could be "housed" in a conveniently "get-at-able" way, in the chambers adjoining the cable tubes. That would be a great blessing to any city, even if it should cost double what the present cable railways have cost; but we are assured that White's cable roadway need not cost more than $100,000 per mile.

We are not yet able to say anything about the grips and driving plant, except that these are entirely different from any now in use. Cuts of these will appear in the May Gazette. In the mean time Mr. White is prepared to furnish any further information desired and to give estimates and take contracts for building cable roads, according to the plan here outlined, in any parts of the United States. And one of the largest iron firms in Pennsylvania is ready to carry out any contracts that Mr. White may take either for his cable or elevated road.

Feeding Draught Horses.

By Chas. Challenger, Bristol, England.

(*Continued from Page 41.*)

Since the first part of my article (published in the March Gazette) was written, I may say that on account of a rise in the price of hay and straw we now issue less bulk of hay and straw, and more corn. Instead of giving 33 lbs., a day per horse, as we had been doing for five years past, we now give 31 lbs. Judging from the appearance of the horses, one scale appears to be as good as the other. The 31 lbs. comprises hay 11 lbs., straw 3 lbs., bran 1 lb., barley 5 lbs., maize 4 lbs., oats 5 lbs., peas or beans 2 lbs. As to peas or beans we buy whichever happens to be cheapest.

Horses vary in size from the small pony of 11 hands to the largest of dray horses, 17 or 18 hands. Where the horses kept by any one firm vary much in size it has been found in practice that they may be provided for in the issuing of food as follows: All above 15 hands are called horses; three above 13 hands and under 15 hands, equal to two horses; two above 11 hands and under 13 hands, equal to one horse.

Anyone owning, say, a single undersized horse may also ascertain its requirements from the above rule.

Cobbett was the first, in the early part of this century, to introduce maize into this country. There is a diversity of opinion as to its merits as a food for horses. In his "Treatise on Cobbett's Corn," paragraph 152, he extols the corn in a manner peculiarly his own. He says: "In America the corn is too valuable to be the sole food, or any part of the food, of farm horses, which are, therefore, in case of hard work, fed with rye, barley, or oats; but if horses be wanted to perform extraordinary work, such as fine gig horses, or wanted to travel far in a day, they are always fed upon corn (maize): in quantity about one-third of what we give in oats. * * * " English horse owners were slow in adopting it.

A letter recently appeared in the *Farm and Home* from a Mr. T. Carter, Byron, Ogle County, Illinois, from which is gleaned the following: "Indian corn (or maize) is our staple crop; average yield from 30 bushels to 50 bushels an acre. * * * My worst crop of wheat 21 bushels per acre, my best 33 bushels. * * Rye is a good crop here. * * * Oats from 35 bushels to 50 bushels per acre. * * * * We raise good barley, but like spring wheat, it is apt to be troubled with chinch bug."

A gentleman from Oregon, which is a maize-growing country, writing lately to the same paper, says: "I think we give too much maize to chicken, as well as to swine and horses. Though it is the best food in the world for fattening, it is utterly unfit for growing or working animals. It furnishes not a thing but fat, while the animals literally perish for want of bone-making material, phosphates, etc. All animals, as well as man, want a variety of food. * * * Rye, barley, oats should be used more—rye for pigs, barley and oats for horses. In southern Spain, Arabia, and Mongolia, where the finest mules and horses are, they have barley. In northern Spain, where they grow little else than Indian corn, horses and mules are as sickly and short-lived as here."

We learn by the above that maize is the staple—or, in other words, the chief grain—produce of Illinois, and, in fact, of the whole of America. It yields the greatest weight per acre, and must be by far the cheapest. Oats produce the same number of bushels per acre, but a bushel of oats contains only 38 lb., a bushel of maize 60 lb.

Tramway managers in America have to enforce wise economy as rigidly as those of this country; and, seeing that tramways have flourished for upwards of fifty years in America (since 1832), and of late years so very extensively—the mileage of lines a year ago being 3340, and the number of horses employed 84,577—valuable suggestions regarding the subject of stable economy may very properly be looked for in that quarter.

(*Continued on page 52.*)

Transmission of Power by Rope.

The transmission of power by wire or hemp rope is in the use of an endless rope running at great speed over a grooved wheel, in place of a leather belt running over a flat faced pulley. The above method of transmitting power long distances, is by no means a new one, though in practice, it may be said that is comparatively new, as its adoption has been of such slow progress as to occupy but little room in the everyday practice of millwrights and engineers.

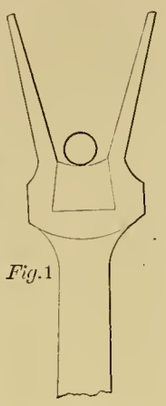


Fig. 1

The principle, however, is rapidly gaining favor, and so many have discovered its great cheapness over other methods, that the future for the transmission of power by rope may be pronounced a very broad one, its application is practically limitless, and is as successful in its operation and durability, in the most trying place as on a straight run, in fact it might be said that rope transmission begins where shafting and belts leave off. Its application ranges anywhere from twenty feet up to over three miles, and in point of first cost can not be approached by any other method, as will be seen later. The method dates back to the year 1850, and is in extensive use all over Europe, but it has in this country but recently come into general use. The variety of methods for applying the use of ropes in transmitting power, are too many to enable us to describe all; a few of the principal points however, will suffice to enable the user to observe the necessary points in its successful manipulation.

In places that are sheltered from the weather, hemp or cotton rope will answer for all purposes. but in transmitting power from one building to another it will be necessary to use wire rope

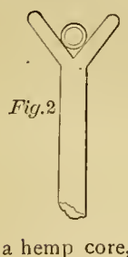


Fig. 2

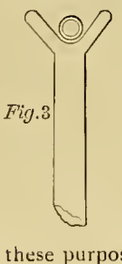


Fig. 3

with a hemp core, for each of these purposes a different kind of pulley or wheel will be required, in the case of the wire rope it is necessary to line the yoke or tread of the wheel with some soft substance to prevent abrasion and slipping, which would very soon result in the entire wearing out of the rope. For this purpose several substances have been used, chief among them being wood, leather and rubber; in order that these or any other material for that purpose may be easilysecured to the wheel, it is necessary that the tread of the wheel shall be cast in the shape of an inverted wedge, as shown in Fig. 1; the pieces of wood are then cut to fit this cavity and are let into it through a square opening, generally made at a point on its edge for that purpose, each piece is driven in after its neighbor until the entire groove is filled up. The chief objection to wood however, is that it is susceptible to moisture and liable to fly out. Leather filling has been found to answer a good purpose, but it has the serious objection of requiring, on a large wheel, several thousand pieces, which have to be stamped out with a punch made for that purpose, and requiring many hours to place them on edge

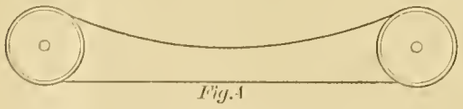


Fig. 4

in the groove of the wheel. Probably the cheapest form of filling will be found in strips of hard rubber, which can be made in lengths and formed to fit the cavity tightly, and driven into place by a wooden hammer, the rubber is impervious to moisture and forms an excellent surface for the rope; Fig. 1 represents a cross section of a sheeve fitted with a soft filling and with a rope in position.

As will be seen by this sketch, considerable room exists between the sides of the rope and the sides of the flange of the wheel, this, with wire rope has been found the best practice, as a closely fitting groove has been found to greatly reduce the longevity of the rope by the consequent friction of the sides in contact, and which does not appear to be of such importance in the use of hemp rope, in the use of which it is best to turn the grooves of the wheel a trifle smaller than the diameter of the new rope.

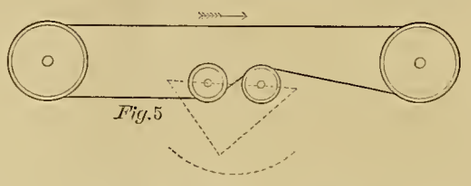


Fig. 5

Many mistakes are sometimes made in this matter, and the system is frequently blamed for what is nothing more than carelessness on the part of the designer or millwright, as will be seen in Fig. 2, which shows a pulley with a plain V in its periphery, which is frequently done without any regard to the size of the rope that is to run over it; it is needless to say that such practices can not help matters any. The rope should fit in the groove in a manner represented in Fig. 3, where one third the circumference of the rope is brought in contact with the face of the grove. It is the practice of some to square the grooves, bringing two sides and a bottom to bear against the sides of the rope, but as this has a tendency to ultimately change the form of the rope, it can not be recommended; the round grove will be found to give the most satisfaction and the least trouble, and is much easier on the splice.

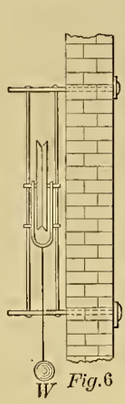


Fig. 6

In transmitting by rope, one important feature must be observed, and that is an arrangement for taking up the slack, which will be found to be considerable with hemp or cotton; in cases where no great distance is to be traversed, and there is plenty of head room, probably no provision may be found necessary, in which case the slack side can be run on top as shown in Fig. 4, as it is necessary in this method to use as large pulleys as possible, the larger the better, the distance between the top and bottom of the pulleys will be found to be sufficient after the slack has been taken out of the rope. It will however be found good practice whether there be a tension wheel or not on the system, to take the slack out of new rope before splicing, as there is so much give to a long length that unless the tension wheel has considerable travel the rope will require taking up before running long, which with a long splice is not always convenient. The easiest method of taking out the slack is to run the rope one or more times according to its length, between two points, and hang a weight in the center, and allow it to remain there as long as possible, and occasionally applying a little weight with the hands. Another way of accomplishing the same result is to bend the rope around the wheels it is to run on and twine the ends together and apply the weight, this however can not always be done, as the wheels may be in motion; either way however will answer the purpose and the remaining slack can then be cared for by tension wheel.

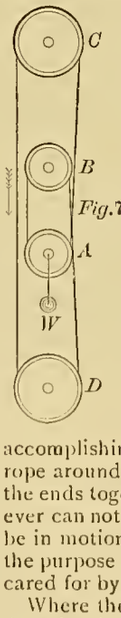


Fig. 7

Where there is a run of seventy-five or a hundred feet it will be found necessary to use a tension wheel of some kind: for such a purpose and for a single line the most simple form in the practice we have known, is shown in Fig. 5, and where the head room will not permit of the pull side being down, the tension wheels can be placed on the bottom.

The sketch represents two small wheels whose diameters should not be less than half the diameter of the driver, the wheels should be swung an iron frame, and hung to swing round ea other, the frame can be operated by a short le placed in the most convenient position, an light tension kept on the end of the lever means of a cast iron weight; of course the r should be put on as tight as possible before wheels are allowed to bear upon it, as it is vantageous that the rope should have as li turn around these wheels as possible. The t sion wheels can be hung in a light wooden fra suspended from the ceiling, or if the pulleys close to a wall, they can be bolted through brickwork to advantage.

The various forms of tension wheels that m be employed are many, and it will not be out place to enumerate a few of the most import which although differing in structure are an bodiment of the same principle; as we have plained, tension wheels are not always necess though it will be seen that in nearly every c they are essential, there are however, some ca as will be seen later on, where they can be pensed with.

All that is necessary in the use of the tens wheel, is to merely take up pay out the amount of elon tion in the rope, consequ upon expansion and contrac by different degrees of mois and the variation by the l therefore any excess of pres above this amount will brin unnecessary strain upon rope, and decrease its lengt life. In cases where the po is to be transmitted vertical will be found that very l will be required above weight of the tension wheel frame, and more espec where the power to be trans ted is light and steady. Fi is a favorite form of ten wheel and frame used in of vertical arrangement, and is shown bolte a brick wall; in this instance it was require transmit ten horse power, from the basemer a building up to the third floor, and this ten wheel was placed on the wall of the first f the ends of the shafts being extended to r the wall of the building, the rope passin through the benches of the workmen, on floor, holes were cut through the floors benches and two inch ferrules were fitte through which the rope passed, at the ben the ferules were extended up about a foo

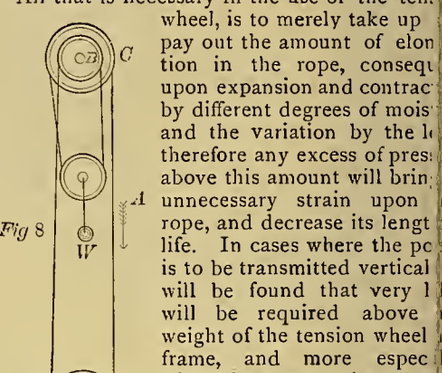


Fig 8

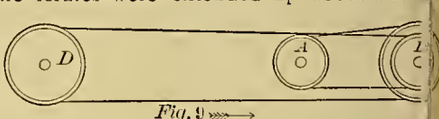


Fig. 9

prevent the workmen from throwing tools, against the rope.

The wheels on the driving and driven s were two feet in diameter, and made 190 per minute; the rope used was one inch i ameter, and was laid over with a long spl feet in length — 3 strands—about two fe stretch was taken out of the rope before spli which brought the top of the tension wheel up to the top of the frame; at the expirati a week the elongation of the rope brough position of the tension wheel about central i frame, as shown in the sketch, where it now smoothly and noiselessly. After the rope spliced and ready to run, it was slightly gr with tallow, or better, painted with boiled o

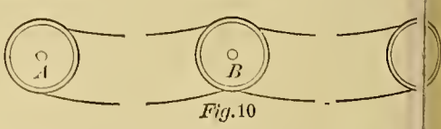


Fig. 10

mineral paint, to allay the absorption of ture.

The method of construction of the te frame in question was as follows: The was fitted to a yoke of 2 x ½" bar iron ⅝" eye bolts tapped in each side, of there were four; these eye bolts were bor ⅞ rod iron, which passed through them to guides, two lengths of ⅞", rod iron was

ken, about six foot long, and securely riveted their ends into two lengths of the same iron at formed the yoke, the ends of these were re-ced to receive a nut and washer, by which ey were secured to the outside of the wall ; W presents a weight of about fifteen pounds which as attached to the bottom of the yoke by a nall rod, which passed through a hole in the wer wall piece and below the center of the oke, the eye bolts in the yoke were drilled to al-w the frame to move up and down the rods eely. The cost of the job, including the wheel as about $12.00, which would of course be no eater if the distance to be transmitted was four nes what it was in this instance.

In cases where it is not convenient to extend e ends of the shafting to the walls, the frame n be suspended from the ceiling, in an out of e way place or down by the side of a post, th the same results as in this case; in arranging e tension wheel, care should be taken that the pe leads off directly from the center of the heel, as at high speed it will jump off very easily allowed to swing from side to side. Fig. 7, is elevation of the arrangement, reduced between nters, in which A is the tension wheel and B the idler, C is the driven and D is the driving heel ; idler B must be bolted to the wall the me as the frame of the tension wheel, except at it is stationary, while the centers of D must ss between those of A and B, in order to allow e rope to pass from one to the other. As ll be seen, this arrangement will permit of an tension vertically to an almost indefinite length, e only necessary change being in a slight in-ease in the diameter of the pulleys, and a cor-sponding increase in the weight W to counter-t the weight of the rope and bring it to bear ainst the face of the lower wheel, which how-er is very slight.

Another method of arriving at the same results above described, is shown in Fig. 8, in which is the driver, C the driven, B the idler and A e tension wheel. In this arrangement it will noticed that the idler is bored out to run on e driven shaft, the inside hubs of the wheels B d C are turned off to a face, the wheel C is yed or set-screwed to the shaft, and the idler is kept up to it by a collar, the shaft forming a rnal ; the tension wheel A, will perform the me office as in Fig. 7, with the exception that will be found necessary to permit of a greater stance between it and the idler, as the distance tween the centers will be greater in this in-nce than in the one previously described ; as ll be noticed, the center of the tension wheel directly under that of the idler, this is not ab-utely necessary, as the opposite sides will have correspond with the opposite sides of wheels and C. The question of lubricating wheel B ll be found to be a matter of little importance, the shaft is traveling in the same direction as e wheel itself, and the number of revolutions is refore only what the difference between the meter of the two wheels may be, in fact, as the ly point for using smaller wheels for idlers and sion is the cost in price, there is no objection the wheels being the same diameter all round, which case the two wheels B and C can be th keyed to the shaft, and no lubrication re-ired except for the tension wheel.

Fig. 9 is the same method employed horizon-ly from one shaft to another, either in the same ilding or from one building to another, across alley or otherwise ; in this case tension wheel can be suspended from the ceiling or joists, d the tension kept upon it by means of a larger ight over a small pulley ; the size of the weight this instance will have to be much greater an in the cases explained above, as the weight elf is all the tension there is on the rope ; in cases of this kind it is the practice of some to ke the tension wheels stationary in the guides, d to take up the slack by means of a screw, s however can not be recommended as the dif-ence in tension must then be taken out of the pe, which consequently suffers, and it is no eaper, as the cost of the screw and attach-nts will be found to more than balance the st of the weight and wheel, over which it runs. this case it is also optional as to whether the e of the idler is as great as that of the driven eel.

We would prefer to make the idler loose on the shaft, as it will be seen that tightening it on the shaft, practically places the arrangement on the same basis as that of two belts running over the same pulley, it is generally accepted that one belt will do more work than the other, no matter how favorable the conditions, or how true the pulleys. Experiments made by us in this direction has led us to conclude that running or driving the same shaft by two belts is bad business, and ought never to be encouraged, this knowledge therefore forces one to conclude that wheel B should be loose on the shaft.

There are many instances where it is necessary to transmit power long distances, for instance, a factory is situated a mile or so from a head of water or running stream, or to transmit steam power from one building to another, across a railroad or river, or other people's property, the use of shafting in either of these cases, although practicable, would incur enormous expense, so much so in fact, as to make many cases an unprofitable investment, if not impossible. In all of these cases rope transmission comes to the rescue, both in point of economy and in application. In either of these cases however, where the distance is not over 250 or 300 feet, it will be necessary to erect what is called intermediate stations, and in the use of wire rope these stations may be placed as far as 400 feet apart, where there is sufficient head room to permit of the sag of rope.

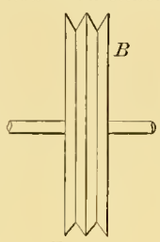


FIG. 11.

As it is only possible as previously explained, to run wire rope in cases where it is exposed to the action of the weather, we will confine our remarks to it and the use of the wheel illustrated in Fig. 1.

Wire rope is as pliable as hemp rope of the same strength, and will therefore run over the same sized wheels as the latter, though it is of special advantage to either to use wheels with as large a diameter as possible, though there is a limit to this, as the wear increases with the velocity, and it may even be found better to increase the load rather than increase the velocity.

Wire rope is made either with a wire or hemp center, the latter is more pliable than the former, and will permit of the use of smaller pulleys, and will wear better where there is short bends to be made. Where a certain amount of power is to be transmitted, say, 800 feet, and there is plenty of room to permit of the sag of the rope, it will be necessary to erect at least one intermediate station, which can be erected either of wood or masonry, according to circumstances : where however there is not sufficient room to allow of the sag of the rope, it will be necessary to take the weight of the rope upon idler wheels, the diameter of which should not be less than a third of the diameter of the driver, more especially at a high rate of speed ; where the distances between centers however is short, much smaller idlers may be used with good results, though a limit will be found in a quarter the diameter of the driver.

Fig. 12

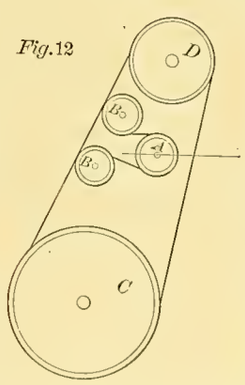


Fig. 10 shows an arrangement above referred to, in which case A and C is the driver and driven wheels, and B the intermediate station, which consists of two wheels mounted upon one shaft and keyed thereto as represented in Fig. 11. In this case it will be found good practice to make the idlers as large as the working pulleys, as they both have to perform the same amount of work as the others; where there is a limited amount of head room station B can be raised much higher than either of the other points, which may be found good practice. Where wire rope is used, it will be found necessary to use a lubricant of some kind, in which case probably the best and cheapest is a mixture of tar and linseed oil, the consistency of which should vary with the seasons, in other words, more tar and less oil in summer and the reverse in winter, as tar alone will be found to be too thick in cold weather.

Galvanized wire rope can not be recommended for the transmission of power, as the friction would soon remove the coating and the process of oxidation would go on faster than ever; steel wire rope can be recommended however for this purpose, not so much however for its tensile strength, as it is not much above iron, but for its wearing qualities, the duration of which is much beyond that of iron wire rope.

Fig. 12 represents the method of connecting an engine to the main shafting with rope in the place of leather, using one continuous length of hemp rope wound round a number of times, and finally making a turn around two idlers and a tension wheel. The driving wheel C may be any where from 8 to 16 feet or even more, and making 5 or 6 thousand feet per minute, or even more ; there is but one splice in this rope and an even tension is kept on all the coils, the number of which will vary with the diameter of the wheel. The largest affair in the way of the use of hemp rope for main driving transmission, that has come under our notice, was a pair of twenty-fours by forty-eights, on one shaft (Corliss), which were turning out in the neighborhood of six hundred horse power between them ; in this case however as many ropes were used as there were grooves in the wheels, which necessitated just that number of splices, and tension was kept on them by one large idler with the same number of grooves as the main pulley. This arrangement however can not be recommended as it is almost impossible to get an even tension on all of the ropes, and there is also a splice for each rope.

As will be noticed in Fig. 12, but one turn passes around the tension wheel, which controls the tension of the entire number of coils, no matter how many there may be, A being the tension wheel, will necessitate an arrangement as described in Fig. 9 and on about the same scale. The advantages of connecting up large engines in this manner can not be too highly recommended; in the first place the expense of leather is enormous, $500.00 is no unusual sum for an engine of three or four hundred horse power, and the pulleys do not have to be very far between centers at that either ; in the second place the noise at high pressure is terrific, and is the worst feature about our otherwise best plants ; thirdly, their weight is quite a factor; fourth, they require attention that a rope does not; fifth, it requires a man in the business to put one on right, and sometimes they don't always do it right; sixth, any deviation out of line of the shafting affects the belt, while it has no effect on a rope; seventh the rope requires less room, and will pass through a round hole little larger than its own diameter. The above points, to say nothing of the first cost, which would be about one thirtieth part of leather, are enough to banish the leather belt for main driving, into everlasting oblivion, especially in the minds of those that have had experience with large leather belts. The fact alone, that by raising the tension wheel the engine can be turned around by hand for repair or adjustment, is enough to indorse it in the minds of those who have had to do a little pulling on a fly wheel, with the entire shop hitched on. E.

Salt on Street Car Tracks.

A general impression prevails that the use of salt on street car tracks is injurious to horses' feet, says the *Drug Clerks' Journal;* and in some cities — Philadelphia, for example — the practice is forbidden under severe penalties. The veterinary surgeon of the Chicago Humane Society says, however, that salt in such cases is not injurious, and cites the fact that street car horses suffer less from diseases of the feet and legs than many animals which never come in contact with the salted ice and snow.

A writer in "Dixie," suggests that scientists search for or investigate the "Negative Force," that enables birds to fly. He suggests a very simple experiment, that will attach fine wires to a flock of pigeons, and then connect with a galvanometer, or some other device in the domain of galvanism, and hints that something might be learned that would lead to a solution of that serious problem of flying.

The
Street Railway
Gazette.

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Articles and papers on subjects relating to intermural transit always appreciated; the GAZETTE's columns are open for the expression of independent opinions, and the discussion of all matters connected with street railways—on the surface, elevated or underground. A special column is devoted to the publication of trade notes and items from manufacturers and dealers.

BOSTON municipal committees visited Chicago twice in March, and again April 7, to inspect its cable railways, bridges, etc.

MR. PRITCHARD, one of the engineers who have superintended the construction of the Birmingham cable tramway, says: "I consider Mr. Lawless one of the best authorities on cable railroad traction. I am much indebted to him for valuable information which he has both verbally and by letter given me. In fact, I was treated in a most splendid manner when in the States in 1886, and long to return and see my friends." We hope to meet Mr. Pritchard at the Washington convention next October.

THE Edinburgh cable railway is now "O. K." Mr. Pritchard, engineer of the Birmingham cable tramway, says it is at present in full operation, "and is, I believe doing well. They had a most stupid accident last month, by which the steel cable was severed, but no further damage. I made an inspection and reported thereon to the Birmingham company. The accident was preventible, and solely due to inexperience in working."

STREET CAR WHEELS have received some of the notice they deserve. As Mr. Stephenson observes, these essential parts of street cars are but little understood. The perspicuous letter of the original street car builder, in another part of this number, opens our eyes to many points not hitherto thought of; and our readers will readily see that the work and life of a street car wheel depend upon many things; and the letters we have the privilege of publishing may lead the way to extended knowledge and better understanding thereof. Mr. Brill furnishes the information that steel tires are no good for street cars: that will be a surprise to many. Mr. Baker's statement is also news to us, that every street railway has a grinding department. And it would be interesting if Mr. Kirk's proposition were put to the test, that is to furnish wheels at 5 cents per car per day (the worn-out wheels to be the property of the maker), their service guaranteed for 15 months.

COL. NICKERSON'S "Urban Rapid Transit" is unavoidably held over again, as well as further correspondence on "Street Car wheels."

UNDERGROUND railways have been strongly urged by the New York Papers since the terrible blizzard: had the proposed underground lines been actually in operation passenger transportation at least would not have been paralyzed. That is good wisdom—after the event.

INFORMATION has reached the STREET RAILWAY GAZETTE to the effect that no effort will be spared to make the seventh annual meeting of the American Street Railway Association, at Washington, next October, a splendid success. The Secretary of the Association (Mr. Wm. J. Richardson), in company with ex-president Thos. W. Ackley (who arranged matters so admirably at the Philadelphia Convention), have visited Washington recently to see how the ground lays, etc. We understand that proper arrangements for exhibits will be made this time.

DEACON HOWARD, by which name John Tasker Howard, of Brooklyn, has been popularly known, died of apoplexy, March 22. He was in his 80th year; was a near relative of Mrs. Richardson, wife of the secretary of the American Street Railway Association; and the popular journalist Joseph Howard is his son. It was in Deacon Howard's house that Plymouth Church was organized, and it was at his house that Henry Ward Beecher made his last call in the flesh. Mr. Howard took active interest in the Broadway Arcade Railroad. A very wide circle of friends mourn his death.

"MUCH ignorance regarding the subject of horse feeding always exists," as tersely stated at the opening of Mr. Challenger's essay on the subject in last month's GAZETTE. The remarkable snow storm the beginning of March caused thousands of horses to be kept in their stables several days in New York and other eastern cities. No change was made in their feed, however, and consequently their digestive apparatus became clogged. Or, as the veterinary surgeons are pleased to say, a terrible disease broke out causing the death of about 40 out of every 100 draught horses. Dr. Johnson (chief veterinary surgeon of the New York Society for the Prevention of Cruelty to Animals) calls the malady "Azoturea," while Dr. Knatz (president of the German Veterinary Society) says the disease is scientifically known as "Haimoglobinamy," and that it is not a disease of the blood but of the muscles. It would, no doubt, be more correct to say that the sudden change in the conditions of the lives of the horses, without changing the food to suit the new circumstances, upsets the animal's whole system—muscles blood, respiration, and everything. Laxative food, or medicine, should be given at the onset; then no trouble need be feared, and no disease will break out under the name of Azoturea, Haimoglobinamy, nor any other designation. The whole life-supporting apparatus should be cleansed, and food supplied suitable to the reduced quantity of oxygen and the animals continued inactivity.

Feeding Draught Horses.

(*Continued from page* 49.)

The American Street Tramway Managers' Association hold an annual meeting, at which papers upon various subjects on tramways, prepared by committees of practical men, are read. They look upon the subject of the care and management of horses as being by far the most important, requiring great forethought, judgment, and experience. At the meeting in 1884, an exhaustive and eminently practical paper was read on "Stables and Care of Horses," from which the following are extracts, selected principally on account of the light which they throw upon the question as to the value, in the American tramway managers' point of view, of maize (or Indian corn) as a food for hard-worked draught horses, tramway horses being decidedly of this class. The maize is spoken of as cornmeal, which indicates that it is not given to the horses whole, nor crushed, as is done in this country, but as meal, ground finely in a mill. The ma[n]agers are no doubt fully alive to the fact that [t]outer covering of the kernel or corn is very ha[r]more difficult for the horses to crush than bea[n]or peas, and, unless thoroughly masticated [i]fore passing into the stomach, is likely to ca[u]disorder in the shape of colic and inflammation [o]the bowels. Feeders in this country are sa[t]fied with treating maize in the same way as tl[e] do beans and peas, by simply kibbling or cru[s]ing.

The committee said: "It is generally admit[t]that cut hay and cornmeal are the cheapest [i]first cost of any feed in use; but experience [h]shown that this feed is too hearty and fatteni[n]and that horses fed upon it for several ye[a]without change become more subject to erupt[i]diseases, and also to colic, inflammation of [t]stomach, and indigestion. It is calculated t[o] at least 5 cents (2½d.) per day can be savec[d] this feed on each horse over the cost of feed[i]oats and long hay, and that the extra loss [i]horses fed with meal only will not amount to [t]sum saved at the end of the five or six ye[a]service of a tramway horse." So it is taken [f]granted that horses are more liable to die fr[o]disorder when fed with maize. But it is not c[l]the extra deaths that must be taken into acco[u]What has been pointed out by the writer in [p]vious pages, which his experience and close [o]servation had taught him long before he read [t]opinions of the Americans—namely, greater [h]durance and longer service when *not* fed [m]maize or corn meal, are to be taken into acco[u]as will also appear further on.

The committee continue: "To the credi[t]tramway managers, it is found that this con[c]sion is not accepted generally; and that, w[e]some are found to strictly adhere to wha[t]termed the natural food of the horse—oats [a]long hay—very many compromise the ques[t]by giving one such feed daily, or, at least, ligl[t]up the corn meal by mixing bran or wheat [m]lings in proportion of about half-and-half [b]measure. * * * They should be wate[d] frequently and fed regularly."

As a conclusion to the committee's report, [t]personal experiences of two of the members [a]given, and their statements, being so thorou[g]practical, much valuable information would [b]lost by not inserting selections which apper[t]to the subject of feeding and watering.

Mr. J. E. Brown, superintendent Tramw[a]Co., Troy, N. Y., said: "The hay is eaten f[r]the floor. Water is so freely distributed thro[u]the stables that horses can not go out or com[e]without passing it. Every horse is allowec[d]the water he wants, whether he is heated or [n]The company own 425 horses. Each h[o]makes from fourteen to sixteen miles a da[y]an average speed of six miles an hour. [T]horses stand in the stall twenty hours ou[t]twenty-four, bedded with straw at all times. [T]feed consists of 12 lb. hay and 14 lb. grain, m[a]up of five-eighths of Western cornmeal [a]three-eighths of wheat midlings (*i. e.*, 9 lb. m[i]5 lb. wheat)." Speaking with special refer[e]to the watering of horses when working, he s[a]"I have had thirty-five years' experience [i]horses, fourteen of which I was running a st[a]coach line, and twenty-one with this comp[a]and I have always freely watered horses, reg[a]less of the weather or the condition of [t]horse, and the practice has been most satis[f]tory, never having had a horse foundered [o]sickened by drinking too much water. [T]average period of usefulness of the horse [i]this company is found to be from six and a [h]to seven years."

Mr. J. H. Robillard, superintendent of M[o]treal Tramways, said: "In my opinion stree[t]horses should not be purchased younger than [f]and not older than seven, years. Horses bo[u]at these ages will last here on an average a[b]eight years. They travel about fourteen mi[l]a day, at about six miles an hour, which is [s]enough. 30 lb. of feed daily is little enough [f]car horses. The horses weigh from 9¼ cw[t]to 10¼ cwt.

"Although there is a saving in cut and bru[i]feed, the extra expenses will counter-bala[n]ce. Of course, we use no corn (maize). I be[l]ve there is a saving in horse flesh by excluding [c]rn from their feed. I find that by confining [o]ur

ed to hay and oats the average life of our orses is much longer than the life of those here corn is used."

Two reasons may be given for not chaffing ieir hay and crushing their oats. All kinds of rain is cheap and labor is dear. The price of ost things in America is much above that of is country, and wages are nearly double those f this country. With this ratio, if a horse costs ere 10s. a week in food, 18s. would not be considered high there; yet the Troy Company's orse-keep average for the year 34½ cents each er day—1s. 5¼d. a day, or 10s. 1d. per week. rain is, probably, the lowest priced article in ommon use in America.

Mr. C. B. Holmes, President and Superintendent of Chicago City Tramways, owners of everal thousands of horses, was asked, in December last, by me for his experience of the use f maize or corn as horse-feed. He replied: This company has been for many years feeding s horses in the summer time with 14lb. to 17lb. f ground feed, composed of two bushels of oats one bushel of corn, and mixed with 7lb. of hay, it short. In the winter the proportions of feed e two-thirds corn and one-third oats."

"Stage-coach horses," says Stewart, "are usuly fed from one to two hours before starting on a journey, and hay is withheld after corn." an American were to read that statement he ould conclude, unless he had been previously formed, that the stage-coach horses of this untry were really fed upon Indian corn; but its only are meant. Few stage-coach horses in is country ever tasted Indian corn. When ose horses paced the length and breadth of this untry, before the locomotive engines had taken eir place, going back to the year 1830, when the st railway was opened (Liverpool to Manchesr), the price of maize at Mark-lane was 45s. the arter; to-day it is 21s. Besides, it was then ite unknown in this country as a horse food.

In America and, probably, in all countries here maize is grown, as well as in the Bible He that withholdeth corn, the people shall rse him," Prov. xi., 26), when corn is spoken , Indian corn or maize is meant, other kinds of rn being each distinguished by its name—rley, oats, wheat, peas, locust beans, beans—less several kinds are classed or mixed together, nen such may be called grain

"Have you given the horse its corn?" we say nen speaking to grooms who feed carriage rses and hacks and others, which do but little ork, upon the old-established principle with ts alone besides hay; but in stables where rd-worked horses are kept, where we should pect the horses to be fed, for the sake of onomy and to give greater strength, upon veral kinds of grain, we should, probably, call the mixture of corn; and where the grain was xed with the chaffed hay, some would ask Has the horse received its forage?" and ners would mention "food," or "Has the rse been fed?" Such are the peculiarities of ible nomenclature.

Professor Bruckmuller, says the *Railway and amway Express**, who some time ago conted a six months' trial of feeding 5,200 horses, rtly on maize, "found that it could be used with vantage only with those that are not required to ve out of a walk — in fact, horses whose reration is not hurried. * * * Although rses readily eat maize, and on it get fat and w a glossy coat, they invariably, when given solely, show a marked deficiency in vigor and mina."

Oats are too well known as a safe horse food, en by the novice in horse keeping, to require y eulogistic comments at this stage. Beans ed no praise, for their merits have been echoed and wide; and the pea, being twin brother the bean as regards nutritive value, need only mentioned to point out its affinity to the bean, l it will be readily conceded that, when great ertion is demanded, it claims a place as part of diet of horses.

(To be continued.)

'Women can do anything that men can, if y go about it rightly," said Mrs. Dow, the sident of the Dover Horse Railroad, at the men's congress in Washington.

*This paper has ceased to exist, since the STREET RAILWAY ETTE found its way to the British and European tramway offices.

Street Car Wheels.

Since the discussion on car wheels was opened, in the GAZETTE, the Hon. H. W. Leman has "loaned" us a *confidential* pamphlet on the Miltimore metal dressing machine and process, which leaves the surface of cast-iron wheels "as smooth as glass, and so dense as to be impregnable to the bite of the hardest file. This is done by exposing the surface of the metal to be operated on to the action of a soft steel disk, running at the great velocity of from 3,000 to 5,000 revolutions per minute. The superficial metal is at once melted off, and, whether by some occult action of electricity or by the rapid cooling of the new surface, or both, a skin of diamond hardness is left, which, however, seems to be perfectly homogeneous with the body of the metal."

New York, March 26, 1888.

Editor STREET RAILWAY GAZETTE:

Dear Sir:—I have your inquiry regarding tram car wheels.

Life service is difficult to ascertain, because mileage is seldom recorded with accuracy and because the tram rail differs in conditions on various roads. Our experience is confined to new cars furnished by us. The daily mileage varies from about 60 to 120 miles per day (and night), our city roads usually run about 80 miles, and wheels on such will average about 18 months on a service of about 25,000 miles per annum, or 37,500 miles life service of a good wheel. Some wheels will last longer, but more fail before the time named.

Manufacturers differ in quality; the needs are light weight, with strength of metal, correctness of form and accuracy of fitting up.

Light weight. Aside from good metal, depends upon a skillful formation of the wheel pattern, because the periphery of the wheel is fixed immediately upon the fluid metal contracting with the iron chill, while other parts of the fluid metal continue to cool and shrink slowly tending to shorten the diameter of the wheel and causing tension of the spokes producing fracture in their weakest places. The skill of the foundry man can not be disregarded.

Strength of metal can not be had at small price, but price may not assure the quality needed, which requires also intelligent admixture of ores proved by continuous mechanical tests. The skill of the foundry man (molder) should not be overlooked, for he can pervert results though all other elements of success exist.

Correctness of form. It is said to be impossible to produce an absolutely round cast iron wheel, because the fluid metal in the flask can not at the same instant contact with all parts of the wheel chill, or fill up all the avenues of the mold, nor are all members of the wheel of the same area in all parts. These different sizes and conditions cause irregularity in shrinkage and the outcome is a deformed wheel. Manufacturers find it necessary to calliper diameters and measure circumferences and match, as nearly as possible, the two wheels to be on the same axle. Here is put to trial the conscience of the operator, i. e., how much a wheel may be eccentric or out of shape before he would reject it; for many wheels, though sound castings, must be rejected because of their ill form. We find in practice much difference in the standards of excellence.

Fitting up. But with all these requisites regarded, the wheel fitter may spoil the job. The wheel in the boring lathe may have the core hole a little eccentric, or the metal may have hard spots at one side and the boring tool be dull and the workman, thinking to hurry his work, will take larger cut than would be proper for the special conditions. Thus the cutting tool will spring or glance and the hole is not exactly central to the periphery of the wheel; such wheel cannot run true on its axle; but, admitting all right thus far, the desired results may be frustrated by the way the wheel is put on its axle. Some careful manufacturers face off the back of the wheel hubs to a gauged distance from the face of the wheel flange, making them all alike, for when wheels are cold, some will have dished more than others, and facing off the back of the hubs to a gauged distance from the plane of the flange faces will or may correct discrepancy, and in wheels thus prepared, when put on an axle which has the wheel seat shoulder correctly located from the axle centre, may be sure to have the gauge of wheels correct. There is objection to the shoulder on the axle because it is the weak spot where axles are apt to break. Some mechanics make no definite shoulder on the axle, but after having turned the wheel seat to the desired length, gradually withdraw the turning tool and thus taper off the shoulder. A third method is to reduce the axle only enough to convert the unround axle bar into a perfect cylinder, so far as the wheel seat goes, and then run out the tool gradually with what little cutting is to be done. This is a good practice.

Pressing on Wheels. The job is not yet out of danger, for the wheels need to be forced on the axles by powerful hydraulic presses, and here harm is frequently done, for a wheel may be on the axle nearly home, and will go no farther; its mate may, where there is no shoulder, be forced beyond its proper location so as to bring it to gauge, thus the gauge may be right but the wheels are eccentric on the axle and consequently the car behaves badly. Again, the first wheel may come home to its shoulder all right, but the second wheel stops a little short of the proper place, the operator does not like to pull the wheel off and ease the axle to permit the wheel home, but he concludes to apply more force of the press and in so doing the axle is bent, he thinks it will not be observed and he lets it go. With such an axle the car when in motion is twitched from side to side with every revolution of the wheel. The effect of these discrepancies is to make the car twitch, hop and teeter to the discomfort of passengers who sometimes become affected with nausea. The foregoing evils have often been charged to car springs, but the cause is as here specified, i. e. in the wheels.

Grinding Wheels, as may have been perceived, would correct much of these faults, but whether it will pay there is not testimony enough at hand to make a decision. Mr. Lake, formerly of the "West Division," Chicago, said that "grinding was advantageous." That Company so practiced.

It is possible to have wheels and axles made and fitted up right, and some manufacturers so do.

I have written on this subject more lengthily than desirable, but availed of any opportunity to call attention to the matter, which is but little understood. Respectfully,

JOHN STEPHENSON.

Fulton Junction, Baltimore, Md., U. S. A., March 26, 1888.

My Dear Sir: Your favor of the 22d received and noted. No chill wheels are absolutely round or true, but with care in manufacture can be made very nearly perfect.

With high speeds and heavy loads, perfect mechanism, as well as true and balanced wheels, is desirable. This, however, is not so important with street car service, as no serious trouble will arise from a slightly untrue form. The absolute requirements to give a cheap and effective service, is deep chill and material in the structure that will carry such chill and not break down.

By turning or grinding, chilled wheels can be made round, but experience does not show that their life or service is increased thereby. Every street railway has a grinding department, and wheels are subjected to the grinding process as soon as they are put into service. The brake lubricated with sand does this work effectually in a very short time, and with unequal chill soon wears the wheel out of round, be it ever so true when placed in service.

Properly made street car wheels give a service of from two to four years, or 40,000 to 80,000 miles, depending nearly entirely upon the condition of the streets as to grades and cleanliness. (Roads being properly built and kept to gauge.)

Thirty-inch street car wheels are made to weigh 140, 160, 180 and 200 pounds respectively, with chills from ⅜" to ⅞". Their proportion, weight and chill vary with weight of cars, and their life in the service for which they are designed should be about the same under similar conditions. Yours respectfully,

WM. S. G. BAKER,

President Baltimore Car Wheel Company.

Philadelphia, March 26th, 1888.

Dear Sir: We are in receipt of your valued favor of the 22nd inst. In reply would state that it is a very difficult matter to answer your question definitely and satisfactorily, in regard to how long a wheel should last in various services. With average grades and service a street car wheel should last about 18 months, or about 36,000 to 40,000 miles. We can see no particular advantage in grinding wheels for street car service, as they are not so apt to wear flat as they are in the steam car service, where new wheels are some times worn flat, caused by the failure of the brakeman to release the brake. When a street car wheel becomes flat, in spots, the life is about out of it.

Apropos of the street car wheels, it may be interesting for your readers to know that in a series of experiments, made by us, we found that no steel tired wheel of 2" depth of tire would run longer than eight to ten months, with a mileage not over 20,000 miles. Our experiments proved to us that good chilled car wheels for street railway service, owing to the peculiar conditions under which they are operated, such as dirt, mud, etc., on the track, are infinitely better than wheels with steel tires. Yours truly,

JNO. A. BRILL.

Cleveland, O., March 26, 1888.

Dear Sir: Yours of the 22nd to hand and noted. I read what there was said of grinding wheels, etc. All I can say is this, that if a wheel has worn flat because of the thin chill, it would be a waste of money and time to grind it, as it would wear flat at the same spot again. If a wheel was worn flat from being slid, it might pay to grind it, but it would depend on the condition of the wheel at the time. It would also depend on how much the street railway co. paid for new wheels, and what they got for old ones. I have no means of knowing what it costs to grind wheels, and therefore cannot speak more positively.

Very truly yours, S. M. CARPENTER.
Proprietor Fulton Foundry.

Philadelphia, 3, 27, 88.

Mr. Editor: In spite of the pessimistic views of Mr. Peckham upon the subject of cast iron wheels, it is very doubtful if their economic value for street car use is ever exceeded until new revelations in metal working are developed. Wheel makers of long experience in working with chilling irons cannot but admit that as good iron is obtained to-day as ever, for character of chill, tensile and transverse strength; and every proper indication satisfactorily attests the fact. The quality of the iron has not deteriorated. It is the *conditions under which its manufactured products are used that have greatly changed*, and it can be demonstrated (at other time and place) that the severity of service now exacted of cast iron car wheels would have justly been deemed absurd not many years ago when, it is alleged, iron was of better character. The best example of this assertion is in the cast iron 33 inch freight car wheel, which at a weight of 500 pounds did good and sufficient service under a "ten ton" car for many years. To-day we run at a far greater speed our freight cars of sixty thousand capacity on 33 inch wheels stipulated to weigh about 550 pounds! Is it reasonable to say that iron has deteriorated in quality?

So in street car service, the cars are larger, the loads are heavier, the routes longer, and the speed greater, but the same weight wheel as in the beginning is, in general, expected to be as good as ever. Then again, the admitted greater strength of costlier material, such as steel and wrought iron, when combined in car wheels tends to imposition on the cast-iron wheel in exacting too much of it, just as the electric light has required us to burn more gas, waste our oil and snuff our candle oftener, that we may "see better." These facts, fostered by the "greed of gain," have required of the cast-iron wheel an unreasonable service in almost every city outside of Philadelphia. It is our experience that the average wheel as used elsewhere under street cars is too light for the service; or, to be more definite, that a car used to carry thirty to eighty adult passengers at any time over long routes should have 30 inch wheels, of 2 inch tread, weighing not less than 220 pounds each. If this is a possible excess of from eighty to one hundred and sixty pounds *per car*, over what some may favor, it may always be justified by the *fact* that no objection is ever made to a dozen twelve stone passengers clambering on an overcrowded car—just when strong heavy wheels are needed.

Now, it is fair to suppose that the maker of the wheel would know best the qualifications of his product for certain service. But, in general, his judgment is neither permitted nor expected, the wheel going to car builders and companies who aim only at light dead weight and alleged easy running cars.

The economy of using cast iron wheels can never be excelled. The matter of grinding, when partly worn, for further service, is of doubtful benefit in street car use, although advantageous on steam road wheels, but can only be shown by the records of those that practice it. The comparative merits of different makes should be demonstrated by tests of like weights, in similar service, at same first cost. This brings us to where we can realize the economy of cast iron wheels for street car use in the following proposition:—

Street car wheels, 30-inch diameter, 2-inch tread, 220 pounds each, can be supplied, ready bored to press on axles, to any road in Chicago, at *five cents per car per day*, the worn-out wheel to be the maker's property. The iron to be of best selected cold blast charcoal, and service guaranteed for fifteen months. It may be seen that any energetic conductor, having the interest of his company at heart, can pay for the wheels by simply crowding "one more" fare daily on his car. Respectfully, GEO. H. KIRK.

Cleveland, O., March 23, 1888.

Sir: Yours of the 22d inst. received, and in reply to your inquiries will answer, first, that street car wheels will last from 3 to 5 years; it depends on the construction of the wheel; if they are properly chilled and annealed they will last much longer; it depends also much on the condition of the road; tracks that are kept swept and scraped off, removing the mud and sand and dust from the rails, will add great efficiency to the wearing of the wheels.

We think it would pay to grind the wheels off, making the outer surface perfectly round and true to the center of axle bearing; this will test the quality and deepness of the chilled surface, making them perfectly round; and this will make the car run much smoother, and we think will add much to the length of time a wheel will last. We should like to have this subject discussed in the GAZETTE. Yours respectfully,

STREET RAILWAY SUPPLY CO.

The Birmingham, Eng., Cable Tramway.

This important trans-Atlantic cable tramway was opened for regular traffic ("ply for hire") March 24, after an official Board of Trade inspection by Major-General Hutchinson, R. E. At the luncheon, the chairman, in responding to the "Success to the Birmingham cable tramway," said: Practically this was the first application of the principle of cable traction in the suburbs of a great English town. How severe had been the strain of anxiety which the directors of the company had suffered in this matter he could scarcely express, but it was indeed satisfactory to consider that they had now to lean upon a calmer judgment and a wider experience than their own; and the approval of Major-General Hutchinson convinced them that, unless difficulties should arise which no foresight could have prevented, the future of the Birmingham cable tramways would be a prosperous and a certain one. For that result he tendered the thanks of the company to the engineers, viz., Mr. E. Pritchard, M. Inst. C. E., and Mr. Joseph Kincaid, M. Inst. C. E.

The present length of single line is 2½ miles. The indicated horsepower, taken in the preliminary tests, was as follows: Consumed in engine and winding machinery for 7 miles of rope, 15 hp.; driving 2½ miles of cable (but no cars), 50 hp.; total, 65 hp. The line is to be extended to Handsworth.

THE Sub-Tropical Exposition is pronounced a grand success. "The people of Florida themselves are surprised at the variety and magnitude of their own resources," says a correspondent in *Farm and Fireside*.

Cable Railways in Chicago.

Monday, March 26th, is a day which emphatically marks a new starting point in the progress of rapid transit facilities in Chicago; and the enthusiasm which was quickened on that day, in the engine house of the North Chicago Street Railroad company, will probably bring the cable system of operating street cars into increased favor in all the principal cities of America, and, perhaps, Europe. Mr. Longstreet, now general manager of the Boston street railways, told the Board of Aldermen of Providence, R. I., last December, that cable railways were fast growing out of favor, and that electricity is "the coming power." In another part of this number of the GAZETTE (under St. Louis), Col. Flad echoes the wave of prejudicial opinion against "the hideous" cable system that has swept over the country. The tide has turned, with a dash, in Chicago. The change is remarkable. It came about in this way:

As our readers are aware, and as everybody that read the news are well aware, as for the matter of that, Mr. Charles T. Yerkes, president of the North Chicago Street Railroad company and representative of the rich street railway men popularly known as the "Philadelphia syndidate," has fought hard, against many odds (Storey's eccentric proceedings, numerous other ridiculous claims for damages, charges of infringements, and an extraordinary lease claim etc., etc.,) and at last he has won a most brilliant victory, and gained a strong tide of public opinion in his favor. His purchase of the extensive West Division street railways, five or six months ago, aroused much jealousy against the progressive "Philadelphians," numerous elevated railways and other schemes of "real rapid transit" were rapidly hatched; the newspapers, with remarkable unanimity, scouted the "selfish Philadelphian," and everything was done to "create" public opinion against "the syndicate." But, with the coolest perseverance, Mr. Yerkes and those who co-operate with him went ahead steadily, and their opponents (press and all) have been vanquished, so that the people of Chicago will not listen any more to any tale of "rapid transit" beside that of the cable. And from other cities deputations and committees of investigation come and go frequently, especially from Boston, to see how Mr. Holmes' great cable railway works on the South Side, and Mr. Yerkes "latest improvements" on the North Side.

THE NORTH SIDE MAIN CABLE MACHINERY comprises four horizontal Corliss engines, built by Robert Wetherill & Co., Chester, Pa., in an apartment measuring 170 feet by 150 feet on Clark street (corner Elm street). One engine carries the Clark street cable between Elm and Illinois streets, which is nearly a mile long; another works the cable on the northern part of Clark street, which is about two miles long; the third engine operates the Wells street cable. The remaining engine is ready to operate a cable to be laid on North State Street, as soon as the city council will grant permission therefor. Each engine is of 500 h. p. The cylinders are 2[illegible] inches in diameter and the piston stroke is 6[illegible] inches. The fly-wheels are 20 feet in diameter and each one weighs 45,000 pounds. The engines are built for maximum speed of sixty revolutions per minute, though in actual use it is expected that the service will not demand more than fifty-five or fifty-seven. They are so arranged as to be worked in pairs or singly, and each one of the two can interchange labor with the other. The object of this is to furnish sufficient power to meet any extraordinary rush of travel, such as happens holidays and occasions like the visit of President Cleveland last October. If an engine breaks down it is but the work of a minute to change the load from one to the other. The main shafts do not directly operate the cable drums. There is an intermediate gearing, the effect of which is to give the drum one revolution while the engine makes two and one-half. The cable-drums are twelve feet in diameter and are built in two sections. Each has three grooves, in which is carried the cable, and each works independent on the shaft, a pinion movement with double gearing carrying the two portions along as the shaft revolves. Each drum has its corresponding "idler" of the same diameter and constructed in muc[illegible]

ıe same way. One half is fixed to its shaft, while ıe other revolves around it in a bushing. The ıble passes around the drum and its idler six mes, and is then carried to the tension runway, hich extends to the rear for a distance of eighty :et. The tension-wheel is ten feet in diameter, ıd this is firmly braced to a moveable platform ınning backwards and forwards on a narrow-auge track. To this platform is attached a ıain cable heavy enough to anchor a lake pro-eller, and this, after passing through a combina-on pulley, is weighted with counterweights to ıe extent of two tons. In addition to this an-ther similar chain is attached to the carriage y means of a ten-ton tension spring. If any-ıing should snap the tension spring is bound to ıtch up the strain, and thus prevent a wreck.

Steam is furnished by two batteries of four oilers, each of 125 horse-power. Each boiler 18 feet long and 6 feet in diameter. They are ıpplied with steam-operated, coal-feeders and rate-shakers. The smokestack is 200 feet high om the grate bars. Under the boiler room oor is an iron tank of a capacity of 20,000 gal-ns. This will always be kept filled in case any ıishap should occur to the City Water Works. ll the waste steam is used to heat the water-ed before it enters the boilers.

A perfect system of electric communication ısed on the fire-alarm principle has been ar-ıged. The wires run through the cable con-uit, and at each street-crossing there is a numb-ed box. Should anything happen all that the onductor has to do is to pull the ring attached o the box. Four signals are used, each one of hich instructs the engineer what to do in the nergency. The box gives its number when ıng, thus immediately notifying the engineer here the mishap may have taken place.

There are many peculiarities connected with ıis latest cable system that deserve special and xtended notice, which we hope to furnish forthcoming issues; and it is expected that etween this and May the engineers of the road ay have solved the problem that puzzles them the crossing near the North Side entrance to e La Salle street tunnel; hitherto the gripmen ten fail to carry their cars over that knotty oss-curve without the aid of horses. Super-tendent Threedy maintains that want of ex-erience on the part of the gripmen is the only ult.

THE FORMAL OPENING took place on the day entioned (March 26) with great eclat. This is ow the report thereof is introduced by the *ribune* which has done its "little utmost" to ıwart Mr. Yerkes' progress: "It was a gala ccasion on the North Side. It meant rapid ansit, and that is a good deal. There were peeches, music, enthusiasm, and a crowd, not to ention bunting, flags, and flowers. The crowd as perhaps the most important feature of the ccasion, for that produced enthusiasm."

The hour announced for the opening was 11 clock. Long before then a great concourse of eople had gathered in the vicinity of the power ation. The decorations on the outside con-sted solely of evergreens festooned over the orway. Within, the decorations were much ore elaborate. The brass rail that incloses the ıgines was festooned with evergreen and pro-sely decorated with American flags. Indeed, erything was most patriotic. Above the large en space at the side of the north tension run-ay—where the crowd stood to hear the speeches were draped two large American flags. But it as within the inclosed space that the floral de-rations were the most profuse. Just opposite e entrance was a large number of tropical ants artistically arranged to brighten the ap-arance of the huge building with its huge en-nes, and from either side of this artificial gar-n extended rows of plants in pots. On the her side of the engines just in front of the open ace where the crowd was assembled, was the eaker's table, and around it was a semicircle of ıairs for the distinguished guests of the occa-on. The table was decorated with a bouquet of ses and lilies, and around this numerous pots tiger lilies and gladioli, all in full bloom. hey presented a most attractive appearance.

Johnny Hand and his band struck up, about ·50, "Das Is'n Weiner Schon," after which ey played the overture "Belle of the Village." Among those present in the audience were numerous merchants, judges, lawyers, aldermen, city officials and clergymen, among them being Mr. John B. Parsons, general manager of the West Chicago Street R.R. Co., and Mrs. Parsons; Mr. H. H. Windsor, secretary of the Chicago City Ry. Co., and a deputation from the railroad committee of the Massachusetts legislature.

At 11:15, President Yerkes, escorting Mayor Roche, and followed by Messrs. C. B Holmes (President of the Chicago City Railway Co.), S. B. Cobb, Col. W. H. Thompson, B. H Campbell, F. S. Winston, Charles Henrotin, Edward Koch, Gen. Stockton, Robert Rae, Prof. David Swing, William Hughes (Editor of the STREET RAILWAY GAZETTE), and the representatives of the daily press (in full force), entered the space reserved for the orators of the day. The appearance of Mr. Yerkes and the Mayor was greeted with a burst of applause, and the orchestra played a dozen bars or so of a stirring march. At its conclusion the Mayor rapped for order, and proceeded with his speech as follows:

"*Ladies and Gentlemen:*—I suppose many of you are as much surprised as I am at the appearances that we have here. We have all looked forward to the time when the cable cars would be running on the North Side, and it now appears as if the time had arrived for a more rapid transit than was enjoyed in the past. They have here the power that will move the cable-cars from the business portion of the city to all sections of the North Side. On the other side of the city—the South Side—there is another plant somewhat like this, that is moving cable trains from the center of the city to the residence districts half a dozen miles away. On the West Side we have anxiously hoped the time would come when we would have the same facilities. I trust the time is not far distant when the authorities and the parties projecting the cable system there will come to satisfactory terms, and enable the people of that division of the city to enjoy the same benefits as do the people of the North and South Sides. [Applause.] We need additional facilities. We are in favor of not only the cable-cars but also an elevated road."

The Mayor's voice faltered as he mentioned elevated roads, and he had no breath remaining to say anything about underground railways.

Col. Wm. H. Thompson followed with an interesting account of the "Improvements of Chicago" —from the begining until now. He concluded as follows:

"A new organization of Eastern business-men have purchased the North Chicago Railway company and leased for ninety-nine years the West Division Railway company. They come here to make great improvements in the developing of this great city, and it is the duty of every property-owner and every business man who has at heart the improvement and the development of this city to render to this organization every honorable means in his power to enable them to make these great improvements intended and now laid out, and by so doing you will encourage them to go on and on and still make greater improvements than they had originally intended.

"It is the duty of this organization to give the people in return quicker transit, more commodious cars, well heated in cold weather, and a seat for every passenger, man, woman, or child. Then everybody will be their friend, and will assist them in their great improvements and developments. Men may come and men may go, but the improvements in this great city will go on until Chicago shall be the greatest and grandest city that the sun ever shone on."

The orchestra played lively airs (including Yankee Doodle, followed by God Save the Queen) between the various speeches.

Mr. Yerkes said: "I have much pleasure now in calling upon Mr. C. B. Holmes who can tell you all about the pleasure, or rather trials and tribulations, incidental to building and operating a cable road." [Laughter.]

Mr. Holmes, (who was received with hearty cheers) said: "I am sure that no one derives greater satisfaction from what we see here to-day than myself. It is a profound satisfaction to me to know that the enterprise on the North Side has been completed. I have been through the agony and sweat of carrying through the first cable enterprise in this city, and I know and appreciate all the troubles which have environed the gentlemen who have brought the work here to a successful conclusion. I tender them my heartfelt congratulations and I congratulate the people of the North Side. [Applause.] I much doubt if we would have been here to-day if the experiment of a cable road on the South Side had been a failure. It is not a failure, as you are all aware. If there is anything that affects the welfare of men, women and children it is rapid transit. Just as sunlight comes after the storm, so may success come to our friends who have completed this great work which you see around you." [Loud cheers.]

Mr. E. S. Taylor spoke briefly on behalf of the Lincoln Park Commissioners, who will soon add 97 acres to the present park, to accommodate the increased number of visitors that may avail themselves of the opportunity to get there on the cable cars.

Mr. Yerkes concluded the list of speeches. There was a loud burst of applause as he stepped to the front. He said:

"*Ladies and Gentlemen:* It is now in order, I suppose, for me to say something, but after the speeches which you have heard I find that there is nothing left for me to talk on. The previous speakers got hold of my notes and I am practically left out. I thank the people of the North Side for their patience in waiting for the fulfillment of the promises which we made. They now see the great work upon which we were so long engaged. I thank the city officials for the aid they have given us. I wish to thank the press for their uniform kindness. They have always been on our side. [Loud laughter, and ironical cheers.] I wish to thank our employees for their fidelity, and particularly I wish to thank our engineer-in-chief, Mr. Andrew D. Whitton, for the successful manner in which he has overcome the many difficulties by which we were surrounded. I will now start the cable."

Thereupon Mr. Yerkes touched the electric button, the ponderous wheels revolved fast and then faster, and simultaneously the vast assemblage gave a shout—a tremendous shout.

So overwhelming was the enthusiasm that the daily papers "swallowed the leek" without hesitation, and the city council made every possible haste to pass cable ordinances for the West Side acceptable to Mr. Yerkes in every way. Alderman Campbell introduced the acceptable ordinances on the night of March 26, while the enthusism on the North Side was at its height; and the aldermen did not wait for the next regular meeting (April 2) to pass them, but did so at a special meeting March 29; the reason for that being that the election took place April 3, and the aldermen seeking re-election on the West Side dared not face their constituents without passing acceptable cable ordinances for that part of the city, and they passed them at the special meeting so that there would be ample time for the fact to become generally known. But that did not save the official head of ex-alderman Samuel Kerr; he did his little best to bring up an abortive elevated road scheme, and his close connection with the West Side Rapid Transit Association, who endeavored to villify Mr. Yerkes and all cable roads, could not be forgotten in so short a time. Ex-alderman Wheeler was also thrown out, and the only sin he and Mr. Kerr committed against the public conscience was to load down Mr. Yerkes' rejected cable ordinances.

One of the most remarkable features connected with the operation of the North Side cable lines, thus far, is that not an individual has been injured. And whatever experience the new gripmen may lack, they are able to run the cars with perfect safety.

Ludlow's Electric Railway.

Mr. W. I. Ludlow, Cleveland, O., claims the right to six points in his electric railway invention, which involves an improved construction of the rails used. A T rail is employed, which is composed of two equal vertical sections, joined at a certain distance apart by means of tie bolts and intervening washers. A space is left above the washers and between the two sections for two non-conducting and insulating strips of india-rubber; and in a cavity between these two rubbers, are placed the flat conducting strips of copper.

American Street Railways.

CONSTRUCTION, EQUIPMENT AND MAINTENANCE.

Mr. Augustine W. Wright's book on the above subject is now issued by Rand, McNally & Co., Chicago. (Price $5.) It is strongly and handsomely bound and profusely illustrated; in fact, as stated in the preface, this book is a reproduction of the illustrated articles which appeared from month to month, in the first two volumes of the STREET RAILWAY GAZETTE, for which they were expressly written, and which were highly appreciated by those who anxiously sought information on this subject. The author's "apology for issuing this book is that no one during the past 25 years, has written upon this subject in the United States;" and the publishers announce that it is "the only complete book of the kind in the language." The wish of very many who have been anxious to get Mr. Wright's articles in book form can now be gratified; its contents are tabled in a manner most handy for reference, when information is sought on any particular point, and Dr. Heckel is to be complimented on the care he has bestowed thereon. Mr. Wright has dedicated this book to his esteemed friend, Mr. V. C. Turner, late president of the North Chicago City Railway.

NEW PROJECTS, PASSING EVENTS, &c.

ALABAMA.

Mobile. About half past three o'clock April 1, at the corner of Broad and Delaware streets, a colored boy named Ferdinand Busby was accidently knocked off a street car and run over. His right leg was broken and the left foot badly mashed.

CALIFORNIA.

San Francisco. Five miles of wire rope was threaded through the Jackson and Washington street division of the Ferries and Cliff House Railway, March 18. H. C. Holmes is the engineer of the road; H. H. Lynch being general superintendent, and Messrs. Ballard and Martin managing directors. Mayor Pond and several supervisors, as well as over a thousand spectators looked on, and the work was accomplished without a hitch. The road is now in successful operation.

A horse shoe caused considerable trouble on the Sutter street cable line, recently, and stopped the cars for a considerable time. The mischievous shoe had dropped from the foot of a passing nag's hoof into the grip slot, and the first car that came along was stopped by it with a severe jerk. After the lapse of about half an hour the shoe was pried out of its firmly imbedded position. It was an obstacle they had not met with before.

CONNECTICUT.

New Britain. The N. B. Tramway Co. have elected P. C. Dolan president, and P. H. Dolan secretary and treasurer.

DELAWARE.

Wilmington. The Wilmington City Railway Co., Pres. Wm. Canby informs us, have completed the extension of their system, a mile and a half, into the rural districts. They have adopted the Sprague electric railway system, which has been in fairly successful operation since the beginning of March. In conclusion Mr. Canby says:

"We feel pretty well satisfied that it will be a success. The trolley has been giving us some trouble, owing to the curves and turnouts, but I think the Sprague Co. will overcome the difficulty. We have got a month before we accept the electric motor system."

ILLINOIS.

Chicago. The West Chicago Street R.R. Co. have bought a lot of land between Madison street and Warren avenue, just west of Rockwell street, and will have its power station for the operation of its Madison street cable at that point.

President C. T. Yerkes and the North Chicago Street Railroad company filed an answer in the Federal Court March 29, in the suit begun against them by Henry Root to restrain them from using a device which he claims is covered by his patent on an improved clamp for connecting street cars. The defendants do not deny using the device, but claim that Root's patent is invalid for want of novelty, inasmuch as it is antedated by thirteen different patents of a similiar kind in this country, three in Great Britain and one in France.

The Y. M. C. A. gathered a number of street car conductors and drivers together in Farwell Hall, March 29. They were addressed by President C. B. Holmes and others. "A great many people appear to think," Mr. Holmes said, "that the aim of all street car companies is to provide a safety valve for the ill-humor of the population. Gentlemen who are pinks of propriety at their offices and in their homes, and ladies who everywhere else are as sweet and patient and lovable as possible, no sooner take passage on a street car than their shattered nerves give way and the innocent conductors and drivers catch it on all sides." Mr. Holmes said he could not imagine a more graceful act on the part of the Young Men's Christian Association than this of entertaining men whose whole lives were given up to the convenience of the public. "Responbility develops manhood," said he, "and the patient endurance of abuse begets self-control. You have come into that high philosophy—that's what it is, high philosophy—which teaches one to patiently endure and accept all things for the best." Mr. Yerkes, who was expected to arrive late in the evening, sent a message that he had been suddenly called to New York and could not be present. Austin J. Doyle and Luke Coyne, who were on the list of speakers, sent letters of regret pleading previous engagements.

Photographers were busy on the opening day of the North Side cable system. Messrs. Brown & Kahl have sent us a cabinet photograph of "the first cable car on the North Side," which was taken under great disadvantages because of the great crowd.

An "L" road ordinance has actually been passed in Chicago, on a novel plan too. The proposed road is to be a continuation of the Hyde Park elevated road into the city. (The law has decided that the village of Hyde Park is not to be annexed to Chicago—not yet, anyway.) The project is backed by a syndicate of New York capitalists with $20,000,000 at command, it is said. It is entitled, The Chicago and South Side Rapid Transit Railroad company; and they are going to purchase their right of way. Herein they will encounter insurmountable difficulties, it is generally believed, to say nothing of other obstacles. The company is represented by Col. A. F. Wolcott.

WISE JURIES.

Juries are becoming less prejudiced against street railway companies. In Chicago, at all events, they are becoming quite sensible. The suit of one Charles Seeleman against the Chicago City Ry. Co. was concluded in favor of the railway company, March 20, after several days trial. Seeleman is a wealthy manufacturer of hat-racks, hall-trees, etc., and claimed $10,000 damages for an alleged injury to a muscle in the calf of his leg, received while endeavoring to board a grip-car. He declared that he was thrown down and dragged a long distance, owing to the carelessness of the grip-man. The jury thought the man fell through his own fault, and doubted that he had been seriously hurt. At all events, they refused to award any damages.

In another suit, against the same company, in which Solomon Rice, a traveling salesman, claimed $10,000 damages, the jury disagreed — eight being for the company, and four for the plaintiff — and were discharged. The man broke his leg in June, 1886, while riding on a grip-car, or rather when he jumped off the car (which he did of his own accord): he feared a collision between the car he was on and a coal wagon which had suddenly turned on the track, and jumped off "to save himself"; but there was no collision, and the majority of the jury failed to see how the company could be held responsible for the man's jump and consequent breakage of his leg.

A third case, was the suit of John R. Peachy, also against the Chicago City Railway Company. Mr. Peachy is the private secretary of Horace L. Tucker, General Freight Agent of the Illinois Central Railroad company. The evening of November 6, 1886, he claimed that he alighted from a grip-car at the intersection of Indiana and Cottage Grove avenues to allov step off the platform. At that mome suddenly started and the lady was thr him with such force that he was kno He testified that he received a cut ju right eye as a result of the accide sustained a severe nervous shock fro did not recover for several weeks. I on cross-examination, however, that did not keep him from his work for a and the jury at once found for the d

THE LAST REJECTED ORDINA

We stated in the March GAZETT Yerkes would not accept the ordina the second time with some modificat city council. Another ordinance (to West Side) has since been passed, a another part of this number, but M refusal is so firm, perspicuous and ma letter to the council is an interesting and well worth recording in our page the communication, dated March 21,

"*Gentlemen:* This company ha from the city clerk a copy of the pro the city council, dated March 1, c text of an ordinance which was pass honorable body, giving the Chicago ion Railway company the right to present horse car tracks on certain those to be operated by cable, but a with such requirements and restrictio impossible for the company to accept When the West Chicago Street Railro obtained a lease of the Chicago We Railway company, the company und was the wish of the city council and desire of the people of the city, and Side in particular, that the company ceed at as early a date as possible t tracks of the West Side road, as far cessary, and also to utilize the street tunnel. With this understandi the company in good faith submitt honorable body an ordinance simil granted to the South and North Side which ordinance has been so amende ous requirements and conditions as most undesirable. The principal not accepting it are:

"1. It would not be proper for t to agree to expend millions of dol provements and at the same time to lessen its income as is required by on the ordinance.

"2. The lease of the old comp new company asserts that the latter sh ing to impair the value of the franch in case of any default on the part of the lessor would receive back its pro way incumbered further than wher took possession of it, nor depreciate It also requires that there will be no dens imposed upon the lessor com those imposed in ordinances of the C cago authorizing the Chicago City R pany and the North Chicago City Ra pany to change from horse to ca The lessee, therefore, would have agree to reduce the rate of fare, said lessee company should be willin

"In conclusion I would say this ever willing to show a liberal spirit improvements which tend to the d of its property and the property gene West Side. Its aim, if permitted by able body, will be to extend its trac territory and give better facilities for t its tracks are now laid. Whatever e are necessary to forward this id promptly and willingly made, and t ment of that part of the city through road runs will be pushed with energy

"Very respectfully, West Chicago road company, Lessee of Chicago We Railway company, by

"CHARLES T. YERKES, P

NEW OFFICES FOR NORTH AND WE

Mr. Yerkes has bought a majority of the company owning the Mercha ing, on the northwest corner of L Washington streets, and the offices o and West Chicago Street Railways w ed in it. The sale was made by

National Bank, which held $153,000 of the $300,000 stock, and the price paid was 60, making the amount of money paid $91,800. The company does not own the lot, but only the building and a leasehold running for forty-two years at $15,000 a year, the Tuttle King estate being the lessor. Of the $153,000 stock owned by the bank $147,000 was collateral on a loan defaulted by J. B. Lyon and the rest was purchased in order to have control of the property. The income on the building has been materially increased since the First National came into possession, but it is not the sort of property a bank likes to carry.

RING PRESENTED TO MR. DEWITT C. CREGIER.

The Street Railway Employees' Benevolent association made a present of a handsome diamond ring to De Witt C. Cregier, ex-Superintendent of the West Division Railway, recently. The presentation took place at the Palmer House club-room. The ring is a very handsome one, and cost nearly $500. A street car is traced on the back thereof, and the initials of the association are engraved inside. About 300 of the West Side street car employees were present, and they gave their whilom superintendent a very hearty reception. President Luke Coyne, in presenting the ring, referred to the courteous treatment the organization had always received from Mr. Cregier. He said there were never three doors and a vestibule between Mr. Cregier and the employees. No superintendent had ever had more requests made of him, and none had ever been as uniformly courteous. John Goodwin then read the formal presentation address, and at the conclusion of it Mr. Coyne handed the ring to Mr. Cregier. The recipient's reply was in a happy vein. He referred to the numerous visits Coyne and Goodwin had made to him, and said that when a week went by without a call from them it was his custom to make inquiries as to whether they were in good health or not. His remarks were received with great applause, and at their conclusion brief speeches were made by a number of others. The "stormy petrels" seemed to regret that they had been so troublesome while Mr. Cregier was superintendent.

Chillicothe. On March 10, the Secretary of State licensed the People's Street Railroad company, of Peoria; capital, $8,000; to build a street railway in Chillicothe; incorporators, L. S. Hoyt, Thomas Martin, A. C. Thomas and N. S. Courtright.

Peoria. Col. James M. Rice writes to correct an error in our last number. He says: "I notice an item in the March GAZETTE stating that Mr. Kingman and myself have organized a company to build five miles of street railway, with a capital stock of $10,000. It should be $100,000. Fancy, if we could build five miles with ten thousand dollars, that we would be in demand in more cities than Peoria. One hundred thousand dollars is our capital stock, as stated in our license to incorporate. Probably the error referred to is merely typographical." (Of course it is; and we thank Col. Rice for the correction.)

INDIANA.

Evansville. The Evansville Suburban and Newburgh Street Railway, Pres. Lee Howell informs us, will be only ten miles long (and not twelve, as wrongly reported by some papers), and will extend from Evansville to Newburg. $50.000 has been subscribed to the capital stock, and $16,000 has been voted in aid thereof.

New Albany. The well-known lady official (secretary and treasurer) of the New Albany Railway Company is no longer Mrs. L. V. Vredenburgh; she has been married to Mr. C. W. De Pauw. She has sold the road to parties connected with the Kentucky and Indiana Bridge Co., and it will be run in future in connection with the same. Mr. C. W. DePauw is one of the directors.

IOWA.

Sioux City. Mr. A. S. Garretson and others have organized an elevated railroad company. Capital, $1,000,000.

KANSAS.

Arkansas City. The street railway is now completed to the Frisco depot, and cars are running regularly.

Atchison. The Rapid Transit Co.'s engine house caught fire March 21. Loss over $4,000. A motor destroyed was worth $3,500. The building had cost only $500. There is no insurance.

Emporia. Mr. Dan Taylor has obtained a franchise to operate a dummy line.

Topeka. The Belt railway is being "pushed just as rapidly as men and teams can do it." Price & Co. are the contractors.

Six of the Rapid Transit Co.'s engineers struck March 24. The dismissal of one of their comrades was the cause. New men were by degrees put on.

A petition is being circulated among the residents of Potwin Place for the purpose of subscribing a bonus of $2,500 to the Topeka city railway. If this is done, its line will be extended thereto.

The following petition was recently presented to Topeka City Council by Thomas A. Osborne, president of the West Side Circle railway:—

"By the provisions of the ordinance granting a franchise to the West Side Circle railway, the council granted to that company the right to use tracks of the Rapid Transit on Jackson from Ninth to Eleventh, upon terms to be agreed upon by the two companies, or in case of a disagreement by them, the terms and conditions for such use were to be fixed by the mayor and council. This right was reserved also in the franchise granted the Rapid Transit and a temporary agreement for the use of these tracks by the West Side Circle company was made between the two companies in October last and expires April 1, 1888. We therefore petition the council to establish the terms and conditions upon which this company may use said tracks according to the true intent and meaning of the ordinances in that behalf and as may seem just and equitable."

The East Side Railway Co. has closed its subscription list and signed a contract with Col. F. C. Crowley to have the road built as soon as possible. It is to be operated with steam motors. The new company is a very strong one, being composed of well known capitalists, all of whom reside in the capital city. The capital stock of the new company is $100,000. For the first year, the officers are: T. W. Harrison, president; W. I. Curry, vice president; John R. Mulvane, treasurer; S. L. Seabrook, secretary; directors, J. K. Hudson, John R. Mulvane, W. I. Curry, Geo. W. Veale, W. D. Alexander, T. W. Harrison, and S. L. Seabrook.

Wichita. The Wichita and Valley Center Motor Line was completed, amid much rejoicing March 24. The road is thirteen miles long, beginning on the corner of Fourth avenue and Williams street and stopping at the Kansas Midland depot in South Valley Center. The line is provided with one mile of side track. As far north as Thirteenth street on Market the Johnson rail is used. North of Thirteenth, the "T" rail is used, weighing thirty-five pounds per yard, and made at Cleveland, Ohio. The oak ties came from Eureka Springs, Ark.; and are two and one half feet from center to center. The track is standard gauge. The rolling stock at present consists of two motors and four cars. One more motor and five additional cars were ordered some months ago and will be on hand in a few weeks. The company has a capital stock of $100,000, and the present amount of work done on the road has cost $70,000. Improvements has been made which will bring the cost up to $100,000. The directors are: H. D. Heiserman, president; J. A. Doran, secretary; Wm. Mathewson, treasurer; E. R. Powell, general manager; Alex. Steel, J. R. Hallowell, Joe Rich, John Fisher, and Geo. E. Harris.

LOUISIANA.

New Orleans. The petition of the N. O. and Carrollton R. R. Co. for a renewal of their franchise years in advance of the expiration of their present one, has induced numerous protests and petitions following the keynote struck by the *Picayune*, which was quoted in the March GAZETTE. Property owners charge the company with noncompliance with its obligations. City Attorney Attorney W. H. Rogers has sent the following communication to the council:

"The original grant to the City Railroad was made May 6, 1862, under resolution No. 6,053. This was amended in 1865 by ordinance No. 6,322, O. S., and again amended in 1866 by ordinance 67 N. S. It was agreed by the city to at once open Moreau street and institute proceedings for that purpose. Another peculiar condition of the contract was that the work should be commenced within six months after the termination of the war with the United States. The term of the franchise was for twenty years and the price $96,000.

"In July and October, 1866, the city ordered proceedings to open Moreau street. In March, 1867, by ordinance 490, O. S., the time at which the contract was to date was changed so as to fix it from the opening of Moreau street. In May, 1869, ordinance 1,425, N. S., the City Railroad was ordered to change its track to accommodate the trunk railroad of the Claiborne railroad. In July, 1869, in ordinance 1,506, N. S., the city declared its financial condition such that it could not pay the enormous price for opening Moreau street. An extension of five years was granted the City Railroad for running its lines along the levee from Canal street to the Barracks.

"If we consider that the date of term of franchise was to commence under ordinance 490, O.S., from the opening of Moreau street and the city declination to so open the street from financial reasons on July 24, 1869, ordinance 1,506, N. S., as a conclusion of the date, it appears that the term of franchise for the Levee and Barracks route will expire July 24, 1893."

MASSACHUSETTS.

Boston. The South Boston Citizens' association has petitioned for an elevated railway between South Boston and points in the city proper and its vicinity. Mr. Vincent Laforme, president of the association, expressed his convictions that the time had come for an elevated railway on some good system; that cable roads are impracticable on account of the bridges between South Boston and Boston; and that the people of South Boston are practically unanimous for an elevated railway; and united in their opposition to cable roads. Colonel Henry W. Wilson, civil engineer, argued that the horse railways had reached their limit; cable roads in some instances would help matters, but the rapid transit problem could only be solved by elevated railroads.

A correspondent in speaking of "Elevated Transportation," as contemplated by Mr. Bartholomew, representing the Riley system, says that the plan suggested would greatly interfere with the vital interests of merchants and store keepers on Tremont street, where heavy transverse girders would be objectionable, and he suggests a single track down the centre of the street, resting on single pillars, placed along between the car tracks.

The Meigs' system has been again explained by its inventor, Capt. Joe V. Meigs, in a lecture at Tremont Temple.

An account of the legislatorial and municipal committees, from Boston, that have visited the cable railways in Chicago, etc., is given in another part of this number.

MISSOURI.

Kansas City. The Kansas City Cable company has placed Engineer Robert Gillham in charge of the construction of the Washington street line.

The Jackson Avenue Street Railway company have filed articles of incorporation in County Recorder Hinde's office for the purpose of building a horse car line on Jackson avenue, from Fifteenth street to the southern city limits. The capital stock of the company is $77,000, and the projectors of the enterprise are W. B. Sexton, J. J. Green, T. J. Green, H. S. Waugh and W. T. Johnston.

The Metropolitan Street Railway company have made every preparation to carry out, as rapidly as possible, the extensions and improvements for which an increase of $1,600,000 has been made in their capital; they have sent an order for two Corliss engines, 500 hp. each, to the Hooven, Owens & Rentschler company, Hamilton, O., which are to be in position and ready for operation August 1st. The contract for the driving machinery has been awarded to the Walker Manufacturing company, Cleveland, Ohio.

The East Fifth Street Railway company intends to build its road this summer as far as it has a franchise so to do, viz., to the old city limits. It will be a surface road, and is to be operated by horses or steam motors. Property

owners living still farther east are desirous of having the line extended to their property, which the company has promised to do provided they raise a sufficient bonus and obtain a franchise. $4,000 is already subscribed. Mr. Wm. J. Smith is president, and Wm. H. Lucas, secretary.

St. Louis. Captain Robt. McCullough has been to New York to examine the workings of a new street car motor.

ELECTRIC VS. CABLE RAILWAYS.

Mr. H. A. Stoltenberg, C. E., of Chicago, recently asked Col. Henry Flad, C. E., president of the Board of Public Improvements, St. Louis, for his views in reference to electric and cable railways, and the colonel says in reply: "In answer to your request for my views as to whether cable or electricity were preferable for the propulsion of street cars, and that I should give you information as to the experience of St. Louis, I beg leave to state that, although I hailed the introduction of cable railroads as a great step in advance over the old system, and watched with much interest the gradual improvement of the system, I believe that its application will soon be confined to the operation of lines on which heavy gradients occur, and that the electric motor, in combination with the storage battery, will be used almost exclusively for the propulsion of street cars, for the following reasons:

"1. The system does away with the necessity of tearing up the streets and taking up the space which ought to be reserved for the conduits which are now required for conveying water, gas for illuminating purposes, and sewage, for pneumatic pipes and ultimately for electric conduits, and which will be needed to a much greater extent than at present for the accommodation of the pipes to convey fuel gas which, in my opinion, is destined to replace the present crude mode of using coal for manufacturing and household purposes.

"2. It avoids the necessity of having the surface of the street interrupted by the slot, which presents a constant source of danger to horses traveling over the street.

"3. It requires no manholes in the street and no other repairs of the street than those of ordinary horse railroads.

"4. The danger of accidents in consequence of the breaking of cables, or of the engines of a cable road is entirely avoided.

"5. The difficulties arising at crossings of cable roads have not, as far as I am aware, been overcome, and are apt to cause delays and accidents, and do not exist on this kind of electric railroad.

"6. The greatest of all advantages of the system of electric motor in conjunction with a storage battery, however, consists in this, that the breakage of a motor affects only the particular car or train on which it occurs, while on a cable road the breaking of a cable or winding engine, stops the traffic on the whole line. The importance of this advantage, particularly in large cities, and with long lines, cannot be overestimated, and I would recommend the electric motor (with storage batteries) even if a cable road could be constructed and operated at less cost.

"As to first cost, I believe that the saving in cost of conduit will more than pay for the storage batteries, and the cost of operating the electric railroad will not much exceed that of operating a cable road and that it will be less than operating by horses.

"Our St. Louis experience as to street railroads may be stated briefly as follows:

"About three years ago, the first cable railroad was built in this city. Its construction was not first class, and it suffered frequent interruption by breaking of cable and required a large force of men to keep the slot open. Its great length (35,000 feet), and the great amount of dead weight it consequently has to carry, reduces the effective force of traction to 15 per cent or 20 per cent of the power of the engine. This road is to be remodeled by dividing it into two sections, and by improving the construction of the road.

"Within the last year, two of our street railroads have been changed into cable roads. One is not yet quite completed; the other, after starting, met with such serious interruption from breaking of the cable and closing of the slot during the severe weather of the last two months, that it was considered best to wait for milder weather and for the introduction of some improvements in construction, before again commencing operating by cable. It is now operated by horses.

"All our street railroads, however, have been exerting themselves to find some substitute for horse-power, in the operation of their roads, and have been experimenting on different systems. About six months ago the Lindell RR. company put a car, provided with a Julien motor and storage battery, on its line and operated it for a short time, but it did not give very satisfactory results. The storage battery deteriorated rapidly and the motor itself, as well as the gearing by which the power was transferred to the wheels, did not come up to expectations. Yet the company did not relax its efforts, and on the 4th of February placed an electric car on its tracks, which has run regularly since. By an ordinance of the city this company was authorized to change its motive power from horses to cable or electricity, and the privilege of so doing expired on February 11th, unless, by that time, the Board of Public Improvements had given its approval to the motor adopted by the said Lindell RR. company. On Feb. 9th the committee on the Board recommended the approval of the electric motor and car in the following words:

"'The trials which have been made under the present design or plan of motor and car have been sufficiently satisfactory to warrant the expectation that ultimate complete success will be attained. Under the circumstances your committee are of the opinion, that the plans and specifications should be approved.'

"The recommendation of the committee was adopted by the unanimous vote of the Board. The electric car now used consists of a Brush motor in combination with a Julien battery. The motor is attached to and below the floor of the car; the batteries are placed under the seats. The car is about 16 feet in length and of the ordinary width. It weighs about 1,800 lbs.; the two batteries of 126 cells weigh about 4,000 lbs. On one of the trips seventy people were piled on the car. The steepest grade on the line is 3½ feet in 100, the sharpest curve 35 feet radius. The speed on level track is from 7 to 8 miles, and but slightly less on grades. The stops and starts of of the car are very satisfactory. The power is regulated by the conductor so as to use 15, 30, or 45 amperes. It takes eight hours to charge the battery with sufficient electricity to run 35 miles. Each car for a full day's work will require three sets of batteries. As the company has only two sets on hand, the car has generally been run from 5 to 10 hours per day. Snow, sleet, and ice, of which we had plenty, have not in the least interfered with the operation of the car.

"The marked improvements which have lately been made in motor and battery are mainly to be credited to the electrician of the company, Mr. E. J. Bagnall, who is confident that he will be able to introduce still further improvements.

"I believe the electric motor and storage battery have come here to stay and that all our street railroads, unless it is those having grades exceptionally heavy, will be operated by electricity."

NEW YORK.

Brooklyn Bridge. The experts who have been considering a scheme for enlarging the capacity of Brooklyn Bridge, propose to connect the two tracks at each end by a horseshoe curve of 90 feet radius, thus making an unbroken circulating cable system and doing away with the costly, noisy and inconvenient auxiliary locomotive terminal switching service. The change would necessitate a station on the New York side of horseshoe form and 434 feet long by 288 feet wide. The station would terminate in a rotunda bounded on the outside by an iron fence leading to the outgoing platform and continuing parallel with the 900 feet of track in the station. It is proposed to run trains of eighteen cars with side entrances and to have in the fence eighteen ticket wickets, which will be opposite the entrances where the train awaits passengers. There would be terminals for the Manhattan Elevated Railway in the station, and it would improve the appearance of the entrance to the bridge. Land will have to be acquired at an expense of half a million at least and the Brooklyn terminus will have to be provided with similar station. The increase in the bri traffic makes some changes imperative, for railway is wholly inadequate to the dem upon it.

PENNSYLVANIA.

Carbondale. We thank the Carbondale Jermyn (Electric) Street Railway Co. for inv tion to attend their formal opening March This is the third passenger electric railway in State. The "rail coaches" left the station, r ing along to the music of the Mozart Co Band, in charge of Engineer David Mason, presentative of the Sprague Electric Rail and Motor Co. President J. W. Aitken was hand systematizing the movements of the and did much towards getting everything i practical working operation, besides arrang for the evening excursion and the soiree hel the American House. He claims for the Spra system that it has no superior. One of the p cipal advantages over any other now in vogu the limited space the mechanism occupies. motor attachments are made separately to e axle, and are simply suspended from one cen point of the car. In this way they give per freedom to the body of the car and at the s time having the benefit of the traction of wheels. It is claimed that there can be no s page of the wheels no matter how rapid the cline may be.

"The mechanical simplicity of the gearing another of the features of this system," obse the Carbondale *Republican;* and it goes on say that "the other advantages are that in cars there is absolutely no danger of watches ing magnetized, and the buzzing sound that i disagreeable in the Van Depoele system which frightens horses along the line is lack the liability to get out of order is limited, an is simple and easy of operation."

Wilkes-Barre. The electric car experim here are not very successful, we are told. " trouble is with the traveler which runs upon wires communicating the current to the car chinery. This leaves the track with dishear ing regularity every time it strikes the Ma street curve. Indeed, it is highly probable this particular kind of a traveler is unsuited for work and that it will have to be shoved asid give room for something better."

TEXAS.

Austin. New York capitalists have obtain street railway franchise here.

Fort Worth. The North Fort Worth St Railroad company have increased their ca to $200,000.

VIRGINIA.

Richmond. The Sprague electric railway tem is working successfully here, and that ur the most formidable disadvantages.

WASHINGTON TERRITORY.

Seattle. The Jackson Street Cable railwa being constructed by the Pacific Construction of San Francisco. The road is to be comple equipped and in working order by October 1 —(probably 1888 is meant).

Berlin Horse Railways.

The *Grosse Berliner Pferde-Eisenbahn Ac Gesellschaft* issued their report for 1887, on M 27, from which it appears that 94,300,000 pas gers were carried on the horse railways of Be last year. The gross receipts were 11,489, marks, and the expenses 6,099,704 marks (inc ing 336,527 marks paid for repairs). The net ceipts were 5,389,502 marks. A mark is equivalent to nearly 24 cents. They also exp ed 3,363,991 marks for land and 3,886,883 m fornew buildings.

THE CHAPLIN MANUFACTURING CO., ma facturers of the Chaplin anti-friction roller b ings and tramway car boxes, will occupy t new offices in the Manhattan Bank Build Nos. 40 and 42 Wall street, New York, on after April 16. Their factory remains at B more, Md.

RUFUS MARTIN & CO., have issued a illustrated and descriptive pamphlet, in Eng and Spanish, showing Brill and other street and supplies, etc.

Patents.

The following list of patents issued last month lating to Inter-mural traffic is specially reported r THE STREET RAILWAY GAZETTE by Wm. Henderson, solicitor of American and Foreign ıtents, 925 F street, Washington, D. C. A copy any of the following will be furnished by him r 25 cents:

8,992. Automatic car brake—H. Wiedling, New York.
8,980. Electric railway car brake—W. H. Schlesinger, Philadelphia.
9,119. Car motor—P. J. McMahon, New Orleans, La.
9,129. Car motor—O. P. Sanders, Terre Haute, Ind.
8,864. Apparatus for the propulsion of cars by electrical energy—A. H. Bauer, Boston, Mass.
9,015. Friction brake for cable railway cars—L. M. Hosea, Cincinnati.
9,069, and 379,070. Electric railway—W. W. Hopkins, St. Louis.
9,181. Elevated railway, D. D. Reed, Boston.
9,081. Spring jack for electric railways—S. H. Short, Denver.
9,548. Car brake—J. M. Swain, Bloomingdale, Ind.
9,459. Bell cord for cars—W. Glasgow and S. S. Stevens, Chicago, Ill.
9,428. Station indicator for railway cars—J. W. Warhurst, San Francisco, Cal.
9,408. Underground conduit—M. R. Muckle, Jr., Philadelphia, Pa.
9,509. Electric surface railway—J. A. Enos, Boston, Mass.
9,222. Railway rail tie and rail clamp—J. F. Hudec, Cleveland, Ohio.
9,587. Draw gear for street cars—B. McDevitt, Chicago, Ill.
9,681. Elevated railway and car—J. L. Chapman, Haddonfield, N. J.
9,904. Elevated railway and conduit for electric wires, etc—A. C Oehrle, Philadelphia.
9,648 Cable railway—E. V. Johnson, Chicago.
9,721. Cable lever hook—M. E. Pugh, St. Joseph.
9,922. Cable traction railway track—W. H. Young, Chicago.
9,909. Traction increasing system for electric railways—E. E. Ries, Baltimore.
9,786. Railway motor truck—C. W. Hunt, West New Brighton, N. Y.
9,224. Gripper actuated by hydraulic pressure for cable railway cars.—C. L. Snyder, Kansas City, Mo.
9,090. Street and station indicator for railway cars.—J. B. Clot, San Francisco, Cal.
9,103. Conduit for electric railways—S. D. Field, Yonkers, N. Y.
9,993. Gripper for cable railways—A. A. Shobe and W. Embley, Jerseyville, Ill.
9,994. Gripping device for cable railways—A. A. Schobe and W. Embley, Jerseyville, Ill.
9,060. Electric railway. F. M. Speed, San Francisco, Cal.

Patents Described.

The following are brief descriptions of patents ating to street railway interests issued during past month, specially prepared for the REET RAILWAY GAZETTE, by J. C. Higdon, chanical Expert and Solicitor of Patents, oms 55 and 56 Hall building, Kansas y, Mo. A printed copy of any of the following be furnished by him for 25 cents (stamps).

APPLICATION OF ELECTRICITY TO CAR LIGHT-.—C. A. Faure, New York. This patent ers an arrangement of dynamo and storage tery, both mounted upon the car, the dynamo ng driven by connection with the car-axle.

CABLE RAILWAY.—E. V. Johnson, Chicago. is patent covers filling devices between the -rails and track-rails. Burnt clay paving-cks being specified for such purpose.

DUST-GUARD FOR CAR-AXLE BOXES.—P. eeney, New York. The guard is made in sections, an upper section being stationary le the lower section is urged upward against axle by means of a spring.

CABLE RAILWAY CAR.—H. W. McNeill, Oskosa, Ia. This invention relates to mechanfor connecting the car with a moving cable, and it consists in an endless belt which is in permanent contact with the cable, and a brake for checking the movement of said belt.

HORSE GUARD FOR TRAM-CARS.—John Stephenson, New York. The horse-guard consists of a single curved bar of greater length than the width of the platform, and connected at its ends to and braced by the steps.

OPERATING CABLE RAILWAYS AT SWITCHES.—L. M. Clement, Oakland, and G. C. Watriss, San Francisco, Cal. This patent covers a method or process of operating at switches, the same consisting in running the main and branch cables for a given distance in the same direction, then moving the grip over into the line of travel of and into contact with the free cable, whereby said cable is forced from a straight draft, forcing the engaged cable from between and free of the grip-jaws, and finally receiving the free cable between said jaws as it springs back to the straight draft.

RAILWAY CAR STEP.—W. P. Tracy, Grand Rapids, Mich. An extensible step attached to a sliding frame.

CABLE RAILWAY SYSTEM FOR STREET CARS.—A. G. Bierbach, Milwaukee, Wis. This patent covers an arrangement of sheet-metal tubes having struck-up brackets upon their interior, and the sheaves are carried by said brackets.

FRICTION BRAKE FOR CABLE RAILWAY CARS.—Lane & Bodley Co., Cincinnati. An adjustable friction clamp adapted to engage by frictional sliding contact against the upper and lower surfaces of the slot rail.

CABLE RAILWAY.—J. F. Just, Robey, Dak. This patent covers a turn-table. The cable proper is mounted on terminal pullies and a bridge-draw or turn-table is provided at each end with cable pullies and upon which a cable is mounted. A gear wheel is secured to the pulley shaft of the cable proper and a gear-wheel is secured to constantly mesh with this wheel, and also with a gear-wheel secured to the pulley shaft at the draw ends. The wheels are thrown out of gear when the draw is open.

CABLE RAILROAD.—W. S. Phelps, San Francisco, Cal. This patent also covers a turn-table at the terminus of the road, and it is made up of a loose sheave, a clutch, a lever for operating said clutch, a chain-sheave on the table, and a foot-lever for operating the clutch.

SLOT-SWITCH FOR ELECTRICAL AND CABLE RAILWAYS.—S. H. Short, Denver, Col. An automatic turn-out cover pivoted at the point of tangency of the main line with the branch and extending towards the point between the diverging lines of the slots, with its ends coincident with the edge of the straight slot, so as to cover the V-shaped opening, and said cover having a spring and devices for limiting its movement.

TRAM CAR DOOR OPERATOR.—J. Stephenson, New York. The door is adapted to be operated by means of a rock-shaft extending to the forward part of the car, there being a handle connected to the rock-shaft for operating it, and a weighted counter-balance also connected to said rock-shaft, whereby the door may be held open or shut by said counter-balance.

DRAW BAR FOR TRAM CARS.—J. Stephenson, New York, N. Y. A sliding-bar is located in a socket, and has a spring in its tail-end and jaws for receiving the whiffle-tree at front end.

HORSE HEAD PROTECTOR.—H. Zeffert, New York, N. Y. This patent covers a bag containing ice to be placed upon the horse's head.

PATENTS OMITTED IN PREVIOUS ISSUES.

375,480. Cable railway channel—W. Dunham, Igo, Cal.
375,423. Device for preventing the depression of railway rail joints—W. Lyon and J. B. Gorrell, La-Otto, Ind.
375,422. Portable railway system—A. M. Leinwather, Vienna, Austria Hungary.
375,346. Electrically propelled vehicles—S. D. Field, Yonkers, N. Y.

THE THOMSON-HOUSTON ELECTRIC CO. advertise the Thomson and Van Depoele electric railway system in this number of the GAZETTE. The Thomson-Houston company have bought the electric railway patents, manufacturing plant and interests of the Van Depoele company; and henceforth no electric railways will be equipped by the latter firm. The services of Mr. Chas. J. Van Depoele are to be retained by the Thomson-Houston people, it is understood.

Books, Pamphlets Etc.,

THE OHIO STATE TRAMWAY ASSOCIATION proceedings at Springfield (Ohio) last November, have been issued in pamphlet form, containing the papers read, etc.

THE following publications have been received: The *Electrical Engineer Supplement*, which is entirely given to a full report of the Bell telephone decision; the Carnival edition of the St. Paul *Herald;* the Electro-Automatic Transit Co.'s descriptive pamphlet; the Rapport les Tramways Bruxellois, etc.

MESSRS. DORNER & DUTTON, Cleveland, O., have issued a handsome, illustrated descriptive pamphlet showing the leading productions of the street railway department of the Cleveland Foundry, the frontispiece is a view of the building, and prominent among the directory boards are "car wheels."

THE PACIFIC CABLE RAILWAY COMPANY, of San Francisco, jointly with the NATIONAL CABLE RAILWAY COMPANY, of New York, have issued in pamphlet form, a description of the system of wire cable railways for cities and towns, as operated under the various patents belonging to the twin company, which are based upon what is known as the Hallidie system. These companies claim the exclusive ownership of the patents for operating all railways "by a moving endless cable in an underground slotted tube," and give notice that they will prosecute any infringements upon their rights. The Hallidie system seems now to be generally conceded to be the principal and it might perhaps be said the only practical system for constructing cable railways, says the *Railway Age*. One of these pamphlets, supplemented with Mr. Lawless' illustrated articles on "Cable Railway Practice," published in the STREET RAILWAY GAZETTE, furnish all the information obtainable concerning cable railways, until the annual meeting of the American Street Railway Association in Washington, next October.

Business Notes.

THE BROWNELL & WIGHT CAR CO., St. Louis, report fair business. They have recently shipped cars for Cleveland, O., and for the Olive street line, St. Louis, as well as to Astoria, Oregon They are fairly busy with future orders.

THE NEWBURYPORT CAR MANUFACTURING CO., Mass., report themselves full of orders. General Manager Longstreet has placed an order for twenty cars with them, which cars are to be of the best pattern, materials and construction.

KAIL'S COMBINED FARE BOX AND CHANGE MAKER is finding much favor with all who have tried it. There is a peculiarity about it which we have not hitherto noticed, viz., that the box is lighted at night with a brass lantern which gives a brilliant light and will not blow out."

SHREVE'S new rail cleaner is a good device for keeping the rails very clean. During some of the past snow storms a car with brushes sweeping the rails only (Mr. Shreve's device) did better service on the Chicago Passenger Railway than the regular snowplows on other lines. Of course, the plow is absolutely necessary when the snow falls fast and thick, but when it is not so deep as to interfere with the trotting of the horses, all that is necessary is to clear the course of the wheels, and the rail brushes referred to do this most admirably, and polish the rails at all times, so as to make the cars run very smoothly.

THE CONNELLY GAS MOTOR, the "ideal motor" for street railways, is complete within itself; and, as the Connelly Motor Co. say in their advertisement, it is perfectly independent of any "central station" or power plant, and can be applied to all serviceable cars now in use. Their new pamphlet containing history of the gas engine, comparison of methods and cost of operation, is well worth obtaining.

THE BROOKLYN RAILWAY SUPPLY CO., report brisk business, and say: "We are rapidly extending our business in general railway supplies, and will make our headquarters at 90 Chambers street, New York City, after May 1, next. Particular attention will be given to the bringing together of parties wishing to buy or sell street railways or franchises and the furnishing of construction materials."

The Street Railway Gazette.

OL. III. CHICAGO MAY, 1888. NEW YORK No. 5

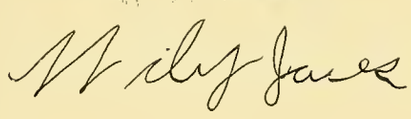
Wiley Jones, of Arkansas.

The subject of this sketch is a prominent citi-
n of the Bear State. He is one of the most
terprising men of the progressive city of Pine
uff, and a most remarkable man of his race.
he is not "the only Jones," he is, we believe,
he only colored man in the world who owns a
lroad." That is the opening sentence of his
ography, as sent to us by one of his neighbors,
d the sketch which this local Boswell has
itten is so interesting in many points that we
ail ourselves of the opportunity to publish this
e link in American history which shows up in
nbre light one of the remarkable evils of
nerican slavery, and at the same time it affords
triking example of how our colored brethren
y better themselves. "What Shall the
lored Man Do?" was the subject of a lec-
e recently delivered in Boston by Mr. Geo.
Cable. The advice he gave was to "make
your friends in the South join the education
ty, and always claim your rights as the
hts of all men, not as the rights of any
ss." We would say, rather, read this bio-
ıphical sketch of Mr. Wiley Jones, and go
l do likewise. His biographer says:

Wiley Jones is a man of great energy and
esight. With a thorough business mind
l almost unparalleled industry, he has
assed a handsome fortune in a few years,
l bids fair to become one of the wealthiest
n in his State. Few men of either race
e succeeded so well in the South. Having
partner in any of his ventures, what he
sesses is truly his own; he does not owe a
lar that has matured for payment, his motto
ng, "Owe no man."

Mr. Jones was born in Madison County,
orgia, July 14th, 1848. His father was
orge Jones, a Georgia planter; his mother's
ıe was Ann, one of George Jones's slaves,
oman far above mediocrity of women of her
e in point of general intelligence, form and
ures. She was the mother of six children
George Jones: (1) Mathew, the eldest, a
ı of fine constructive ability, now superin-
ding the construction of the Wiley Jones
et Car Line, at Pine Bluff, Arkansas; (2),
omas, who died several years ago; (3), Julia,
e of Mr. Ben Reed, one of the most promi-
t colored men in Pine Bluff; (4), Wiley, the
ject of this sketch; (5), Taylor, who was
dered in Johnson County, Ark., for the
ıey on his person, some years ago; and, (6),
ıes, who is manager of Wiley's mercantile
ness—a shrewd business man, who has the
fidence of his fellow citizens, both white and
red.

Wiley was named, by his mother, for the
ily physician, Walter. Being somewhat
chievous and wild, but never vicious, he was
amed Wiley, indicating that he was wild,
ch name he retained, although, as he grew
ıan's estate, he proved to be rather sedate
thoughtful. When five years of age his father moved, by wagons, from Georgia to Jefferson County, Ark., taking with him over forty slaves and his slave wife and her children, settling on the Governor Byrd plantation, twelve miles above Pine Bluff, on the Arkansas river, where he died in 1858. When on his death bed he told Ann he had made provision for the freedom of her and her children. She maintained to the hour of her death that it was Mr. Jones's intention to set her and her children free, but no manumission papers could be found. Ann died with the belief that he had prepared the papers, but if he did, they were destroyed, and she and her children were robbed of their freedom. The family were sold, by the administrator of the estate, to one Peter Finerty, who held them a



short time and sold them to General James Yell, a distinguished lawyer and planter of Pine Bluff. Wiley was sent to the plantation, and drove the gin mules during the cotton ginning season.

When only ten years of age, on the marriage of Pitts, Gen. Yell's only son, Wiley was a marriage gift to the young benedict, who made him his body servant, and treating him kindly. At twelve years of age he drove his mistresses' carriage horses, and was the special trusted servant of Col. Yell and his wife. While in this service he improved himself in every way possible, and laid the foundation of that self-reliance and sound judgment which stamps him now a remarkable man. On the inauguration of the civil war, he attended his master as his camp servant. At the death of Gen. Yell, who fell while leading a charge on a Federal battery, at the battle of Mansfield, La., Wiley at once joined the Yell family, who were refugees at Waco, Texas. There he served as porter in a mercantile house one year. On the expiration of his term as porter, he was hired to drive wagons, loaded with cotton, to San Antonio, Texas.

At the close of the war he returned with Mrs. Yell to her home at Monticello, Ark. Set at liberty by the emancipation act, he was free to take such steps as seemed to him best. Leaving Monticello, he debated in his mind whether he would locate in Pine Bluff or Ft. Smith, Ark. Visiting the latter place, and not being pleased with the outlook there, he returned to Pine Bluff, resolving to cast his lot in that city Being now seventeen years of age, and capable of any manual labor, he hired, at twenty dollars per month, to a mule driver, with whom he worked several months. He then contracted with his old master's son, Col. Yell, to work on his plantation, at twenty dollars per month. In a short time, his superior intelligence and administrative ability warranted Col. Yell in placing Wiley at the head of his planting interest, giving him full control, in which capacity he remained until the crops were marketed.

Tiring of plantation work, and believing a higher destiny awaited him, Wiley moved to Pine Bluff and hired at a saloon, remaining one year. Having made some proficiency as a barber at odd times, he decided to work at that trade, and took a barber's chair in the shop of his brother-in law, Ben Reed, where he worked ten years. During that time he laid the foundation of his fortune, saving every cent of his earnings, paying his board by waiting on the guests at a hotel near by at meal hours. He found a ready market for the loan of his money at the office of a well known broker of Pine Bluff, to whom he loaned the principal and interest, as it accrued, realizing the largest interest the laws allowed.

Mr. Jones is now considered a wealthy man, and, with unbroken success, will amass one of the largest fortunes in the South. He is owner of some of the most valuable real estate in the city; is sole owner of the Wiley Jones Street Car Line, now nearly six miles long. This street railway is laid with new twenty pound steel rails, manufactured by Paddock-Hawley Iron Co., of St. Louis, expressly for the Wiley Jones railway. His cars are all new, and are the very best built by the John Stephenson company, of New York City, and the St. Louis Car company, of St. Louis, who have in course of construction for the Wiley Jones railway five as fine cars as can be found in this or any other country.

Mr. Jones renders his road attractive by securing the best equipment. His car stables and barns are fine and admirably suited to the service. They are located on the periphery of his belt line, at his beautiful park of fifty-five acres south of the city, in which is a half mile racing track,

said to be second to none in the South. Adjoining this park are the Colored People's Fair Grounds, where there is a handsome floral pavilion of octagon shape, and a large, well-constructed amphitheatre, stock stables and stalls, all of which is the property of Mr. Wiley Jones, and not a cent of debt is owing on anything. Mr. Jones is very fond of fine stock, and owns some of the finest in the South, some of which are noted trotters.

Mr. Jones is truly a benefactor to the deserving of his race, aiding with his ample means those who are disposed to help themselves. His example and advice are eagerly sought, and, when followed, have resulted favorably to the party interested. No man is more liberal with his means, where the advancement of his race is the object. There are few men of either race who stand higher with his fellow citizens, both white and colored. He so deports himself towards the white race as to command respect from all classes; he is as polite and courteous to the poor white laborer as he is to the man of wealth. While decided in his political views, he is no politician; he is a Republican in principle, and an earnest worker in any cause that he deems just. He is a believer in the Christian faith, but is not attached to any church as a member; he years ago adopted for his guide through life two words, "*Do right.*" He has always been so engrossed in his business, that he has never given thought to contracting marriage. He has always been an early riser; five o'clock finds him in the saddle, looking after his many and varied interests; he never permits himself to rest until he sees that every branch of his business is moving on properly.

Following is the "peroration" with which our Pine Bluff contributor winds up his narrative: Who will say the Africo-American is not capable of becoming a worthy citizen? Looking back to 1864, and tracing him step by step from an ignorant slave to the position that thousands now occupy, we see almost every avocation in life respectably filled by men of a race who twenty years ago could not boast of even the simplest rudiments of an education. With no means with which to begin his new life, but fair intelligence and bone and muscle, the subject of this sketch is a bright example of what may be accomplished by a proper use of even that limited capital.

Well done! Go on and prosper! That is all the harm we wish our colored brethren. The STREET RAILWAY GAZETTE is open for recording the prosperity of prominent street railway men of all nationalities and all creeds. As Mr. Wiley Jones is the only one of his race, as far as we know, who owns a street railway, it may not be inopportune to add here a summary of progress made by other whilom slaves in various businesses.

WEALTHY NEGROES.

John W. Cromwell, a negro journalist in Philadelphia, has compiled an interesting exhibit of the financial condition of his race in America. He says: The Carolinas take the lead in the number of well-to-do negroes. North Carolina has twenty who are worth from $10,000 to $30,000 each. In South Carolina the negroes own $10,000,000 worth of property. In Charleston fourteen men represent $200,000. Thomas R. Smalls is worth $18,000, and Charles C. Leslie is worth $12,000. The family of Noisettes, truck farmers, are worth $150,000. In the city savings banks the negroes have $124,936.35 on deposit One man has over $5,000. He recently bought a $10,000 plantation, and paid $7,000 in cash.

In Philadelphia John McKee is worth $500,000; he owns 400 houses. Several are worth $100,000 each. The negroes of New York own from $5,000,000 to $6,000,000 worth of real estate. P. A. White, a wholesale druggist, is worth $250,000, and has an annual business of $200,000. Catherine Black is worth $150,000. In New Jersey the negroes own $2,000,000 worth of real estate. Baltimore has more negro homeowners than any other large city. Nineteen men are worth a total of $800,000. John Thomas, the wealthiest, is worth about $150,000. Less than 100 negroes in Washington are worth a total of $1,000,000. In Louisiana the negroes pay taxes on $15,000,000 in New Orleans, and $30,000,000 in the state. Ionie Lafon, a French quadroon, is worth $1,100,000. The Mercer Brothers, clothiers, carry a stock of $300,000. Missouri has twenty-seven citizens worth $1,000,000, in amounts ranging from $20,000 to $250,000.

The richest colored woman of the South, Amanda Eubanks, made so by the will of her white father, is worth $100,000, and lives near Augusta, Ga. Chicago, the home of 18,000 colored people, has three colored firms in business whose proprietors represent $20,000 each, one $15,000, and nine $10,000. The Eastlake Furniture Company is worth $20,000. A. J. Scott has $35,000 invested in the livery business, and is worth $100,000, including a well stocked farm in Michigan. Mrs. John Jones and Richard Grant are worth $70,000 each. A. G. White, of St. Louis, formerly purveyor to the Anchor line of steamers, after financial reverses, has since the age of 45 retrieved his fortunes and accumulated $30,000. Mrs. M. Carpenter, a San Francisco colored woman, has a bank account of $50,000, and Mrs. Mary Pleasants has an income from eight houses in San Francisco, a ranch near San Mateo, and $100,000 in government bonds. In Marysville, Cal., twelve individuals are the owners of ranches valued in the aggregate at from $150,000 to $180,000. One of them, Mrs. Peggy Bredan, has besides a bank account of $40,000. These statistics show that the brother in black is making some headway in the world. He is learning to "tote his own skillet."

Pullman Electric Railway.

A street railway is to be built at Pullman, Ill., commencing at 104th or 114th street. These streets are numbered from the Court House, in Chicago. The line will be from five to six miles long, and will be constructed and equipped by the Pullman Co. Mr. Chas. L. Pullman informs us that work will be commenced at once. The contract has not been awarded yet, however, neither has the system of electric propulsion been finally decided upon, except so far as that the overhead conductor will be used.

This line will possess several interesting features, and will be a model electric railway par excellence. The cars will be most elegant in design; they will be the Pullman company's best.

Kail's Change Maker.

Mr. Hodges, secretary of the Kail Manufacturing Co., has brought us a specimen of their new Change Maker. Kail's Combined Fare Box and Change Maker was described in our February number. Their latest invention is a change maker by itself, with which they will be able to comply with the wishes of those who want to add change makers to the fare-boxes now in use.

Kail's new change maker is a most ingenious invention; the passenger requiring change puts his money in the receptacle provided for it, and rings a bell by so doing; the driver turns around, in response to the bell ringing, and sees what piece the change is wanted for, and then touches certain plainly-marked buttons to make the right change to go to a receptacle on the inside, convenient for the passenger to take it, and then put his fare in the fare-box. This change-maker can be fixed in any part of the car, but, of course, the proper place for it is as near the conductor and the fare-box as convenient.

This change maker is a guarantee against dishonesty, it is claimed. It has three coin compartments; one for 24 half-dollars, one for 24 quarters, and one for 62 nickels (or rather 31 dimes in 5 cents). Thus, if change for a dollar is wanted, the driver touches the half-dollar button once (for 50 cents) and the 10-cents button five times (for 50 cents); the reason five times producing 50 cents is that two 5-cent pieces are thrown out each time. The box has such a system of locks, automatic and otherwise, that fraud is impossible without detection. There is also an arrangement to indicate how many coins are in each compartment all the time. And when one driver takes the place of another, the contents of the box at the time can be ascertained just as easily as the register of a gas meter is recorded; or the box of one may be taken off, and another put in its place, the unfastening and fastening of boxes being done by whoever has the key.

The American and European Street Railway Associations.

M. Nonnenberg, Secretaire General of the Union International Permanente de Tramways, writes, 6th Avril:

"I duly received the March number of the STREET RAILWAY GAZETTE, and I thank you for having been good enough to devote an article in reference to the communication which I have made to the Vienna general assembly.

"I desire, nevertheless, to clear myself of the reproach arising from the misrepresentation which you seemed to make that I 'looked down' upon the progress of electric traction in the United States of America, and that I searched only for Edison's electric tramways.

"The aim of my communication was simply to enable our European colleagues to realize the progress made, from your point of view, of cable, electric and other traction, and to make comparison so as to enable the members of our Union to ascertain how they stand in Europe in comparison with the advanced studies down to the time present (or time being) made by the American Street Railway association. I had to limit my statement to suit the space in the published report of proceedings for setting forth these highest and significant interesting facts.

"I did not quote more than was consistent with the circumstances concerning the numerous electric traction corporations stated in your estimable journal as they are almost too numerous to mention,—because the reports of proceedings of the American Street Railway association stated very much.

"However, I received in good time the serviceable report you rendered of the Philadelphia reunion; and I have pleasure in communicating my colleagues' appreciation of the same; from it they have learned much, and it completed the information I gave at Vienna."

Correspondence.

CINCINNATI, May 7.— This city will very soon have its first electric street railroad. The Mount Adams and Walnut Hills Railway company recently voted $100,000 increase to the capital stock, the money resulting from its sale to be expended in constructing the new electric road and, also, to build a cable extension 1,200 feet in length at the north end of the present line. The new electric road will be on Oak street, and will be about a quarter of a mile in length. It will be equipped with three Daft motors and ten cars. This electric line will be an extension of Mr. Kerper's cable railway, and will give the additional quarter mile ride for its one 5-cent fare.

Talk that the Mount Auburn Cable railway has been sold, is characterized by those on the inside, as absurd.

Ever since the Mount Auburn Cable Railway company started to build its line, its president, Henry Martin, has been annoyed and delayed by interference from the board of public affairs of this city. A few days ago, at a board meeting, Mr. Martin was unmercifully scored for alleged neglect to keep Saunders street, through a portion of which the company runs its cars, in repair. This stirred Mr. Martin up and he indited the following, published by all the papers here:

Cincinnati, May 1, 1888.

Thomas G. Smith, Esq., President of the Board of Public Affairs: — *Dear Sir* — I see by the papers that your board has again attacked me in its usual manner. These attacks are unfair, unjust and uncalled for. You, as spokesman of the board, have been guilty of making the most of them. I have been patiently waiting for you to cite the acts of disobedience you referred to in your last tirade. Are you going to let me have them, or do you hope to evade the issue by delay? These attacks are malicious and unwarranted, and must cease or I will hold you personally accountable.

Now, in reference to Saunders street, our company has put said street in thorough repair, under the inspection of your appointed servant, and we paid him $4 a day for his inspection. If the street needs repairs, it is a part of your official duty to repair it and not to slander over and over again a man who has done more for Cincinnati in a year than you have in a life time. Yours truly,

HENRY MARTIN,
President Mount Auburn Cable Railway company.

It would not be surprising if Mr. Martin was challenged, by Mr. Smith, to fight a duel to a finish, with mule gads, street railroad company's rules to govern.

he Sprague Electric Railway System.

n our February number we mentioned the cessful opening of a very extensive and imtant electric railway using Sprague motors. eport dated May 7 tells us that 11,000 pasgers were carried thereon the previous day. wenty cars are now running ; and ten addi-

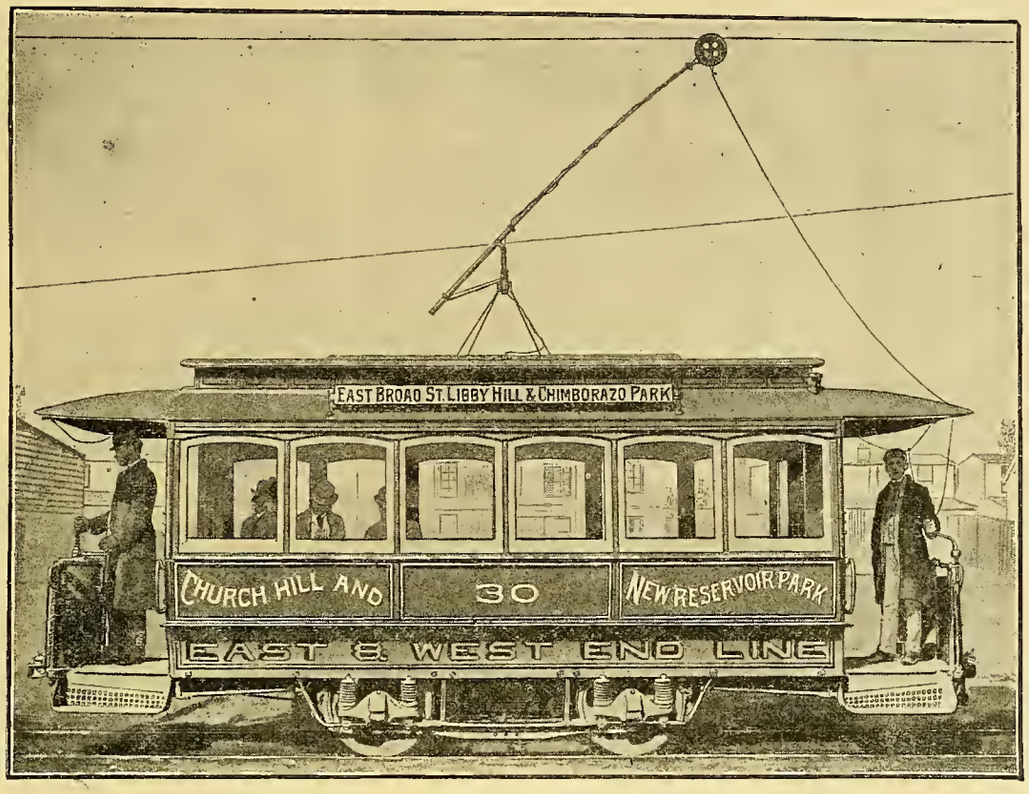


Fig. 1.—Richmond (Va.) Union Passenger Railway.

l cars are being equipped, and will soon be peration." In their advertisement, this h, The Sprague Electric Railway and r company specify very interesting facts erning the operation of this electric road. great obstacles that have been surmounted, the success of this line extremely interest-

cessful operation January 30, at Richmond, Va. The total trackage of the Richmond street railway is about twelve and a half miles. It runs a very irregular course and reaches the principal parts of the city. About nine miles of street are embraced in it. The central section is a double track for a distance over two miles, a part being laid on paved streets and the balance on macadam or unpaved streets, while all the extension and branch lines are on unpaved streets, many of them in clay soil, where it would be almost an impossibility to operate horses. The double track section partly encircles the old State Capitol and presents great difficulties. This part of curves with a track of standard gauge and with a wheel basis of six feet, is much increased by the fact that grades are encountered on the curves as high as 7 per cent., and the lay of the street has required some of the outer rails to be some inches below the inner one. Running eastward from the Capitol, the road descends to a low valley through a series of grades, varying from 3 to 10$\frac{1}{10}$ per cent., and then ascends a series of sharp grades and curves in a new district to one of the car-houses. Going west from the State-house the road rises to nearly the highest point in the city, and then runs through a residential district across the R. F. & P. Road, and,

Fig. 2.—Carbondale and Jermyn (Pa.) Electric Railway.

Of the accompanying illustrations, Fig. 1 ents the kind of cars used on this road. s its success is assured, no doubt further will be of special interest.

Sprague electric railway was put in suc-

the line, in a distance of less than 1,000 feet, has on both east and west-bound tracks, four curves, the inner rails of the west-bound track being about 27, 30, 40, 50-foot radius. The power necessary to turn these sharp after several sharp curves, extends a further distance of two miles to a second car-house beyond the new reservoir. Two branches connect with the main line, one leaving it at the old Market Place, crossing and paralleling the C. & O. R y

and terminating at its machine shops. The other runs into what is properly known as "Africa," a section almost exclusively inhabited by a colored population.

The power house is situated two blocks away from the nearest point of the line, and is almost equi-distant from its extremities. As a distributing point it is, therefore, both theoretically and practically, a "central station." In its construction it was the aim both of the Sprague company and the railroad company to make it as perfect in all its details as money and experience could make it; and it is believed that this end has been attained. The property includes three brick buildings, the main building, in which are located the engines and dynamos, being separated from the other two by a covered drive-way. Wagons entering this drive-way pass on to a pair of scales, leaving the engine-room to the left, the office-building to the right, and farther on to the boiler-room, also to the right. As the station is only 300 feet distant from the depots of three railroads, coal can be obtained almost at the door.

Starting at the source of power, the boiler-room is a one-story bullding, 38 x 71 feet, and 20 feet high, and an engine-room, 77 x 64 feet. The battery consists of three cylindrical return-tubu lar boilers of the latest pattern, equipped with the Jarvis patent furnace, their capacity being 125 horse-power each. Water is supplied to them by two Worthington steam pumps, which take their supply either from the city main or from a well which has been dug in the yard, and which supplies a very clean, soft water. All feed-water connections are of brass pipe. From the pumps the water passes first through the feed-water heater, where it is heated from 150° to 200° Fahrenheit. From there it goes to the filter, a very necessary apparatus in any establishment in Richmond, where one may have to rely upon the city water.

The engines, of which there are at present three, are of the Armington and Sims type of high-speed engines, and develop, when running at full load, 125 horse-power each. The steadiness with which they run can be judged by placing a silver dollar on edge on top of the cylinder, where it will remain without falling while the engine is making 250 revolutions a minute. The engine drives two Edison dynamos of 40,000 Watts capacity each specially wound for 500 volts normal pressure. The dynamos feed into copper "bus" bars, supported on walls by porcelain insulators. Each machine has its independent ampere meter and in addition there is a general ampere meter at the end of the positive "bus" bar. From this bar the current passes to four special snap switches, each switch being connected, through a handsome three-plug safety switch block, to one of the feeders supplying current to the main line wire. These four-feeder-wires tap into the line-wire at four different points thus maintaining the pressure approximately equal all along the line. At the ends of the feeders in the central station pressure-indicators are attached, which indicate the voltage at the junctions of the feeders with the main-current wire.

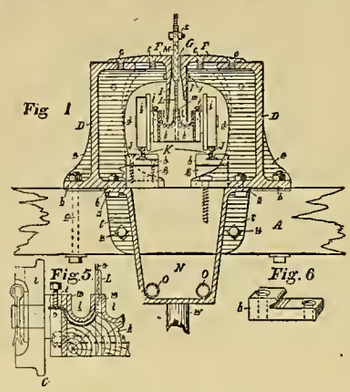
The motors are carried beneath the car body. To get the best results of such a system, it is necessary to have the axles independently driven, and to leave them perfect freedom to follow every variation in the track. To accomplish this, each motor is centred upon its axle, and to allow this required freedom, and at the same time to preserve perfect parallelism in the meshing of the gears, and also for taking part of the motor off the body of the axle, and to throw it on the journals, one end of the motor is supported near the centre of the car by double compression springs, playing upon a loose bolt which is supported from the cross-girder in the bottom of the car. The motors are then, so to speak, weighed or flexibly supported from the car body, and the motion of the armatures being transmitted to the axles through a novel form of spring-gearing of compact form and great strength, whenever the axles are in motion there is a spring touch of the pinions upon the gears. Barring friction, a single pound pressure exerted in either direction would lift or depress the motor a slight amount, and no matter how sudden the strain, whether because of a variation of load or speed, or a reversal of direction of rotation, it is impossible to strip the gears unless the ultimate strain exceeds the strength of the iron, the pressure on the gears always being a progressive one.

Any speed from the slowest crawl to 12 miles an hour is obtainable. The full equipment of this extensive system is to consist of forty cars with eighty motors. And the GAZETTE is promised reports of progress regularly.

Fig. 2 shows a car operated by the Sprague motors at Carbondale, Pa., the opening of which was reported in our April number; and, from later correspondence we learn that the Sprague system gives increased satisfaction there also.

Whipple's Underground Conduit for Electric Railways.

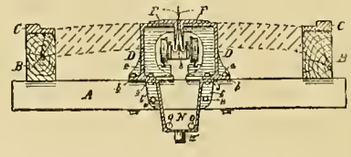
"Be it known that S. Arca Whipple, a citizen of the United States, residing at Detroit, in the county of Wayne and state of Michigan, has invented certain new and useful improvements in underground conduits for electric railways." The invention consists in the construction, arrangement and combination of the parts, whereby provision is made to guard against the contingencies liable to affect the permanency of the



conduit and its operative condition under the influences of climate or weather. It is for cities with paved streets, and it is so constructed that it will bear a load of 48,000 lbs. "The tracks in conduit are so placed that snow, water or ice will not interfere with its working."

In the accompanying electroplates of the drawings, Fig. 1 is a vertical central cross-section showing the construction of the permanent way, and the construction and arrangement of the fixed and traveling conductors. Fig. 2 is a similar cross-section, on a smaller scale, showing the relation of the permanent way to the track and road bed. The letter A represents a railway cross-tie, near the ends of which are supported the longitudinal strings B, upon which the rails C are secured and supported in the usual manner of building railway tracks.

Fig. 2.



The conduit, which forms the subject of the invention, is located midway between the rails, and its object is to receive and protect the electrical conductors, both stationary and traveling, and permit readily of conveying the currents of electricity to the motor of an electric car to which the traveling conductor is secured and carried along with it in the usual manner. To this end the conduit consists of the side sections, D, preferably made of cast iron and of a length equal to the distance from sleeper to sleeper. They are provided on the exterior with strengthening-ribs *a* and with flanges *b* upon their ends, by means of which the sections are supported upon the sleepers, and secured thereto by means of bolts *c*, passing through said sleepers. Upon the interior the sections are provided with inwardly-projecting ribs *d* at suitable distances apart to strengthen the sections sufficiently to sustain the weight of loaded vehicles which may pass over the top, and the sections are cut away on the inner ends upon curved lines, to permit the traveling conductors to pass freely through the entire length of the conduit. These sections ar secured in pairs upon the sleepers at a certai distance apart, so as to leave in the center (o top) a slit or opening, E, the entire length of th conduit, and this slit is further cut away on th top, between the ends of each section, to permi the removal of the traveling conductor from th conduit, after the cover is removed. This cover ing F is also made in sections of the same lengt as the sections D, and is secured on the to thereof by means of suitable screws, *e*, so as t form a continuous slit, G, in the center the entir length of the conduit, and through which th connections between the traveling conductor an the car leave the conduit.

To the under side of the covering-sections are secured the dependent flanges 1, which pro ject some distance downwardly into the interio of the conduit, for the purpose as hereinafte described. If desired, these dependent flange may be made integral with or supported from th cover-sections—for instance, by forming lugs upon the interior ribs, *d*, as shown in Fig 1, fro which these dependent flanges may be detachabl suspended.

The stationary electrical conductor is forme by securing upon the cross-ties within the in terior of the conduit longitudinal sleepers blocks *g*, which are preferably of wood and cre soted or otherwise rendered durable, and upo this the insulating-chairs *h* are secured, whic support the metallic rails J. These insulating chairs *h* are preferably of glass.

The traveling conductor is in the form of four-wheel metallic truck, of which *i* are th wheels, *j* are the metallic sides of the body, an *k* is a central insulated body secured between th sides of the truck, preferably of wood, rendere durable by creosoting or otherwise. On the to of this insulating body are formed longitudin gutters *l*, which extend the entire length there to collect the water and permit it to run off th car. These gutters are lined with insulating m terial impervious to water or moisture, to pr tect the body of the c r from becoming wet ar losing its insulating quality, and this insulatin material is also preferably placed between th metallic sides and the insulating body of th traveler.

In the center of the body and projecting u wardly therefrom is secured a metallic standar L, which projects out through the top of the co duit, and is vertically slotted to receive the co ducting wires *n*, which branch off laterally at th bottom of that standard and laterally connect wi the metallic sides of the traveller, respectively, that one wire forms the supply conductor ar the other the return-conductor from the moto

The inventor is not connected with any electr company, and says he has taken out his pate with an idea of selling part interest in it.

"The Brussels Tramways."

Under this heading the *Electrical Engine* (London), March 23, called attention to the unsu cessful results of the operation of accumulat (storage battery) cars on the tramway betwe the Rue Billiard and the Place Royale, and sul sequently on the tramway along the Rue de Loi Brussels The *Moniteur Industriel*, whi has always been "dead against" the use of a cumulators for traction, regarding it as the mo complicated and costly means of applying ele trical power for the purpose, considers that th result affords conclusive evidence in support of t position it has taken up, and an absolute co demnation of the decision of the special jury at t Antwerp Exhibition to the effect that the syste of working by accumulators is superior to others—a decision which it characterizes *idiotic*. Our contemporary holds, moreover, the up to the present time, the accumulators whi have been employed for traction may indifferen ly be regarded as "not good for much," thou it admits that a type of accumulators susceptib of being economically worked may some day forthcoming. From the report of the Brusse Tramway Co., it appears that the use of electri ity during last year resulted in a loss, for t three cars which have been referred to, of 15,8 francs, or of 5,292f. per car, and that the ma tenance of the accumulators, after deduct general expenses, amounted to 22 centimes p car-kilometer.

The Hazelton Tripod Boiler.

Mr. C. B. Holmes, the pioneer of cable railys in Chicago, a little time ago discovered ecial advantages in the use of Hazelton's pod boiler; and no sooner had he become conced of its superiority than he let others know its merits, and encouraged its manufacture. ne consequence is that this tripod boiler has en adopted by several street railway comnies using steam; some for running cables, d others for generating electric power. A ecimen of the great saving effected by it is reded in this number, under Los Angeles, Cal. We have received letters of inquiry concerning e Hazelton Tripod Boiler; and have much easure in publishing herewith two cuts thereof. g. 1 is a sectional view of the boiler and the three legs, or a tripod, which extend to the outer-edge of brick wall, and down to the level of the foundation. In one of these a manhole is placed to facilitate cleaning when necessary. Two domes are placed at the water line for disintegrating the steam, and in top of central column, a "separator" is placed. The water line is fixed at two-thirds the height of the column; above that is steam space. A 100 horse power boiler would have a column 30″ diameter, and have from 500 to 600 tubes, 24″ long, or giving a heating surface of 1,000 square feet. The column of this size is made up of one-half inch iron.

This boiler requires 9 feet 4 inches diameter ground space, the part below the grate bars forms the mud drum, provided with blow-off

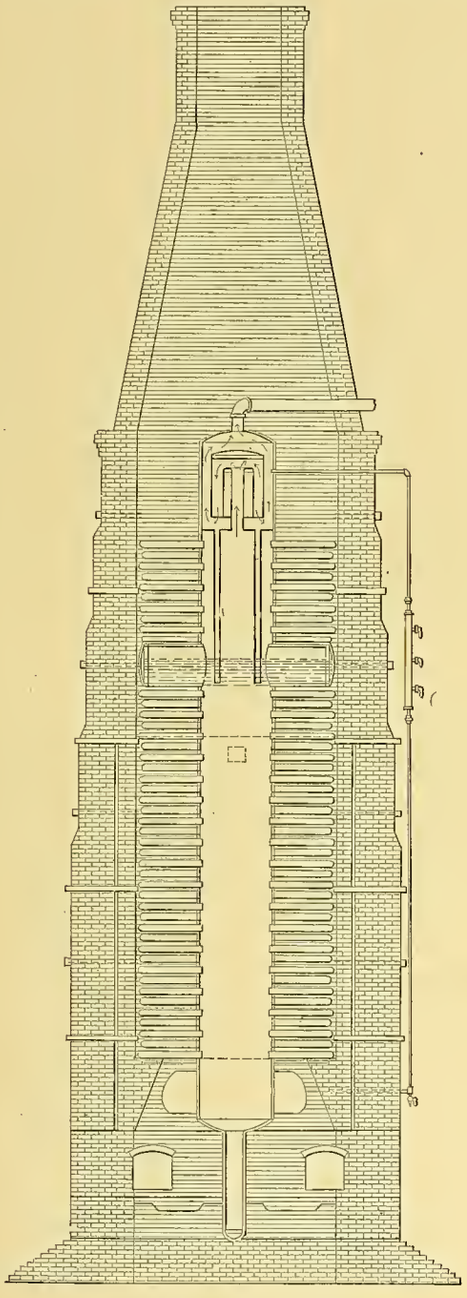


Fig. 1.—Hazelton Tripod Boiler.

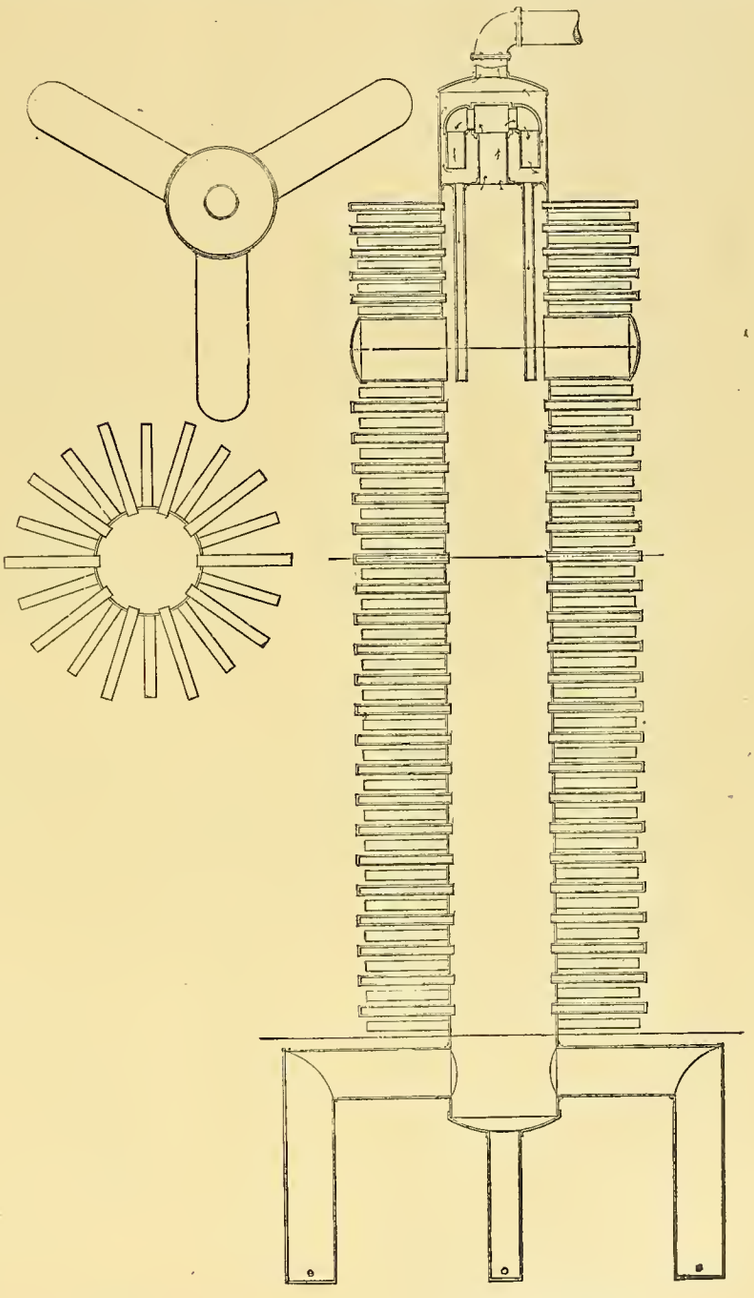


Fig. 2.—Hazelton Tripod Boiler.

ckwork encasing it, when fixed. Fig. 2 gives ectional view of the naked boiler, that is with- its brickwork; the two smaller cuts, attached reto, show plans of the boiler and its tripod— uppermost illustrates the tripod, upon which boiler stands, and which serves the purpose a mud drum; the other shows a plan of the ler with its radial arms, which are from two to ee feet long.

This boiler is a radical departure from most er forms of steam generators, as the *Stationary Engineer* observes; and it has features t deserve the careful attention of all builders users of "boilers for converting heat into k." It consists of a central vertical column, horizontal tubes radiating from all points, n above the fire box to the top. There are pipes. The tubes are set in the central column "staggered," that the flame may impinge upon all. The grate bars are carried entirely around the central column.

It will readily appear that this device is an upright boiler fired externally, and with the flame enveloping it on all sides. This, in addition to the large heating surface afforded by several hundred tubes, entirely surrounding the column, and exposed to the direct action of the flame, cannot fail to give a rapid and powerful steam maker.

It is manufactured by the Hazelton Tripod Boiler Co., 176 Twenty-Second street, Chicago. Those who have tried it pronounce it a great improvement. The Chicago City Railway Co. are using for their cable plants nearly 4,000 horse power capacity of the Hazelton tripod boiler, and that with a very great saving. "The proof of the pudding is in the eating," and having proved its superiority, Mr. C. B. Holmes joined the tripod company. The Hazelton people were glad to have him as one of them, gave him all the shares he desired, and elected him president of the company. Naturally enough the Hazelton tripod boiler is "booming;" and Captain Hallett, consulting engineer and manager of the sales department, finds his hands full.

The Hunter Rail.*

This rail is adapted for use on railways using longitudinal wooden sleepers or stringers, and is intended to overcome the present existing objections: 1st, the necessity of cutting the stringer in applying it; 2nd, the preventing of loose rails which now are so common, due to the wearing off of the spike heads; 3rd, the annoying splash of mud and dirt at street crossings. These features are accomplished by forming the rails similar to what is known as the Philadelphia rail, or the New York rail, with a thin web extending down from one or both of its edges upon the lateral faces of the stringer, and through which spikes are driven, preferably obliquely and downward. The rail is like an inverted U. While the patent (No. 380,575) is dated April 3, 1888, the invention is of long standing, and has already been brought to the notice of railway men.

*Rudolph M. Hunter, patentee, New York and Philadelphia.

The Transmission of Electric Power.

By Herr Coerper, Manager of the Helios Electrical Company at Ehrenfeld, Cologne.

[If Herr Coerper has gained as good control over electricity, in its application to propel street cars, as the proficiency he has attained in writing the English language, his new arrangement is worthy of the greatest confidence; and it is worth while to prove by experiment whether his plan will overcome the awkward difficulties hitherto experienced. We give the following essay in the author's own words and style, not omitting his idiomatic peculiarities. Where we would say a street is "level," he describes it as "perfectly horizontal." And instead of saying "rapidly," he says "quickly-going;" and if that expression be acceptable, is it not as correct to say "slowly-going," as Herr Coerper does, instead of "slow-going?" Dynamo, as herein used by him, is the only word liable to be misunderstood by some of our readers: he says "dynamo" several times where we would say "motor;" but his meaning cannot be mistaken, if the explanation at the end of the second paragraph be borne in mind: "The supply of current to the car shall not be considered here."]

The employment of electrical propulsion for cars is more and more drawing to the front. In America already in twenty towns there are electrical railways being worked. In England extensive trials are being made. On the European continent some lines are in activity a long time since already, and last year the general attention of tramway companies was called to electrical gear, as the most convenient, elegant and cheapest means of locomotion, by an address by M. Mickelet at Brussels.

According as the electrical energy shall be supplied to the car in motion from outside, or be carried along with it in storage batteries, there are three questions to be solved. In the former case these are to be ascertained: the best way of supplying the current, the best construction of the motor and a reliable kind of transmission between motor and car. In the second case these are to be found out, the best accumulator, motor and transmission gear. The supply of current to the car shall not be considered here. I only intend to submit some remarks on the motor kind of transmission and accumulators.

Hitherto, almost exclusively, dynamos of high speed of the most varied construction have been employed as motors. The same are usually fastened to the car frame, and they transmit their power to the axle of the car by means of toothed wheels, friction wheels, belts, chains, wire spirals, worm-wheels, gearing, etc. Immish & Holt fasten the motor to the axle of the car, which is immovable whilst the wheels run upon collar-boxes. The one wheel is connected with a toothed crown wheel, into which the small tooth wheel upon the axle of the dynamo fits. This gearing, however, does not answer, and in consequence a new method shall now be tried. From the search after the best construction of the motors, and the changing variety of ways of transmission, it can easily be recognized that a thoroughly satisfactory solution of these questions has not been found as yet. The reason for this lies in the nature of the matter itself. Only in the rarest cases with electrical tramways an uninterrupted run to a strictly defined distance can be taken into account. In such cases the arrangement as it exists in the line near Schwabing may conveniently be resorted to, where the car at the terminus runs up a rising 18 meters long, is arrested at the top and, when restarting, attains, by running down freely from the higher situated point, a greater velocity before the electro-motor is set at work. Mostly, however, a similar arrangement is impossible because the car is obliged to frequently stop and restart, without any regard to the construction of the line. Then the greatest efforts under the most unfavorable circumstances are asked from the motor. A firm coupling between motor and the axle of the car, for mechanical reasons, appears unavoidable, be it by tooth wheels, belts, worm wheel gearing or similar means.

Trials which were executed upon a line which was in the very best state and perfectly horizontal, have now resulted in proving, that a certain car, which, when in motion, will go over a distance of five meters per second with a traction-force of 120 kilogramme-meter-seconds, requires 345 kilogramme-meter-seconds for starting. With a worse state of the line, with risings, in curves, or when unevenly loaded, this relation becomes considerable and quite out of proportion more unfavorable The electrical motor consequently, in order to comply with the requirements of workings, ought to develop the greatest power when starting. This, however, with all constructions hitherto devised, is not the case. If the current, when the car stops, is made to circulate, the motor, in consequence of its firm coupling with the propelling axle, cannot but start very slowly. The supply of current, although such an excessive one, that the isolation is endangered and the fire upon the commutator becomes rather critical, nevertheless yields to the motor but a small fraction of the power which it develops with the normal number of revolutions and less current. The electrical tramway, as it has hitherto been constructed, therefore starts under the most unfavorable circumstances, and only when a certain speed of the car has been reached, the motor works with little current and greatest power. This, again, however, is just the stage of the working where the least force is necessary.

Furthermore, an inconvenience of the present arrangement arises from the mode of transmission. It is well known how great the loss of power of worm-wheel and tooth-wheel gearing is; not much less is the same with chain and friction gearings. The rapid depreciation of the single parts of such constructions, though made of the hardest and toughest material, sufficiently proves what power is lost thereby. Belts. wire spirals, etc., also show a considerable loss of force This loss becomes the heavier the greater the speed of the motor. The inferior safety of the working offered by the accustomed modes of transmission, is also to be considered. It is known that interruptions are daily occurrences, that the expenses of repairs are very considerable, and that the interruptions of the working consequent upon the failure of the arrangements for transmission are regularly being attributed to the electrical parts generally, and not to the defective mechanical arrangements.

If we resume the practical results of the constructions hitherto used, we find that the motor must work under the most unfavorable circumstances when starting; that it has the least power and requires the most current when it requires the greatest power; that it develops the greatest power when it requires the least; that the mode of transmission entails a considerable loss of force, which happens to be greatest just when the least power is necessary; and that the mode of transmission is not only insecure, but also detrimental and very expensive.

If the propulsion takes place by accumulators, then the frequent damage which they are exposed to is to be taken into account. An accumulator is almost undestroyable, if the same is correctly charged and uncharged. Every possible effort has been made to improve the accumulators, so as to make them fit for being used for tramways. However, with no reason whatever. Every good accumulator is perfectly suitable for this purpose. It is only necessary to not overdo it unreasonably. This, however, as long as the present constructions of motors and transmissions are being employed, always takes place as a matter of course.

Nothing hurts the accumulator more than a short circuit. When starting, however, if the dynamo, as heretofore, is firmly coupled with the propelling axle, the accumulator is in perfectly short circuit because the current which feeds the firmly-fixed dynamo is only moderated by the resistance of the copper, and not by the counter electro motive force, which the dynamo displays when it runs with the normal number of revolutions. It is an easy matter for the present state of the technical science to construct an accumulator for a run of 50 kilometers and to place it upon a car, but it is a thoroughly useless endeavor to improve the accumulator so as to make it stand being exposed to a short circuit, perhaps 50 to 100 times during a 50-kilometer run, as the working requires. Hereby the accumulators simply get disordered, just as well as the dynamo gets overheated and its commutator damaged by the fire on the brushes.

All these circumstances, which under the present arrangements offer the very contrary of wha the electric working of railways needs, point witl unresistible force to a fundamental change of th constructions, if the future shall belong to th electric railway. If there were no electric rail ways existing, the machine-maker would perhap propose the following programme:

1. The motor must, according to the require ments of the working, display its maximal powe when the car shall start.

2. The transmission by means of worm-whee gearing, tooth-wheel gearing, chains, etc., ca not be admitted on account of the great wea and tear, the insecurity of the working, and th loss of force.

3. The accumulator and the motor must nc be exposed to short circuits, because hereby th accumulator is destroyed, and the motor become endangered by overheating and by fire upon th accumulator.

From these points of view, the arrangement a subsequently described here has been cor structed. It can be readily understood by care ful observation of the reference letters on th accompanying cuts.

The magnetic field of the dynamo C, is fixe upon the axle of the car (the propelling axl itself, so that a turning of the magnetic field als involves a turning of the axle of the car. Th armature shaft *d*, with the brake-disk *e*, is place on a ram's-eye *f*, which, by means of colla boxes, easily turnable, is mounted upon the pr pelling axle. The magnetic field bears th grinding-springs *g*, where, as underneath thes grinding-springs (*g*), the commutator *h* is fas ened to the brake-disk, firmly connected with tl armature shaft. Upon the outer ram's-eye of tl brake-disk *e* there are placed two grinding-rin *i*, by which the current is conducted to the arm ture, whilst near the magnetic field C, upon tl propelling axle, there are likewise placed grin ing-rings (*k*), by which the conduct of current and fro the magnetic field takes place. Upc the magnetic-wheel *b* and the brake disk *e* speed-reducing gear, *l* and *m*, is attached, whic by means of a lever *n* is handled by the engine of the car. If the lever (*n*) is turned to the le (I), then, by pushing the brake block *m* again the brake-disk *e*, the brake-disk *e* and the arm ture, connected therewith, is arrested; vice ver if the lever is turned to the right (II), then tl car-wheel *b* becomes arrested, the brake-disk connected with the armature, is completely li erated, allowing the armature to turn perfect freely. According to very accurate trials ma by myself, an electro-motor fitly constructed nc makes, with uniform supply of current and equ display of force, the same number of revolutio no matter whether the magnetic field or the ar ature is made to turn. If armature and magne field are left to run simultaneously, both or make half the number of revolutions, whilst ru ning in opposite directions. If, therefore, t propelling axle (*a*) rests in boxes *o*, one can, arresting the armature *d*, make the propelli power be exercised by the magnetic field *c* alo or one can, by moderating the speed of revol tions of the armature *d*, give to the magne field *c*, and along with it to the propelling axle proportionate velocity.

The effect now of the described arrangeme is as follows: When the car stops, the brake up the car must have been racked. Hereby t brake-disk *e* and the armature *d* are liberate If the current circuit is now closed the armatu will at once attain its normal speed, because can turn perfectly freely. A short circuit of t machine, or the accumulators, is therefore imp sible. If the armature has its normal speed, t dynamo also develops its greatest power w proportionately little consumption of curre Should the car now be started, the engineer m let the car-wheel be free. He therefore tu the brake-lever to the right. Hereby he arre the brake-disks *e*, and with it the armature *d*. the same proportion, however, as the speed the armature *d* is slackened, the magnetic fiel commences to turn, viz., in the opposite dir tion, so that finally when the brake-block *m* co pletely arrests the brake-disk *e*, and with it armature *d*, then the magnetic field *c* alone p pels the car with normal velocity. Should it stopped, the engineer must turn the brake-le to the left (I). Thereby he unties the armatt

id because the same at once tends to take up e normal speed, not having to exercise any ower, the traction force of the magnetic field at ice ceases, and the brake can without hindrance op the car-wheel.

It is clear, that the braking gear can be varied the most manifold manner, also be replaced by nical and other brakes. The predominating ea of this arrangement always remains this: *he firm connection of one of the elements of the achine with the propelling axle and the freely oveable arrangement of the other element of the namo machine, controllable by a special braking ar.* The driving forward and backward is

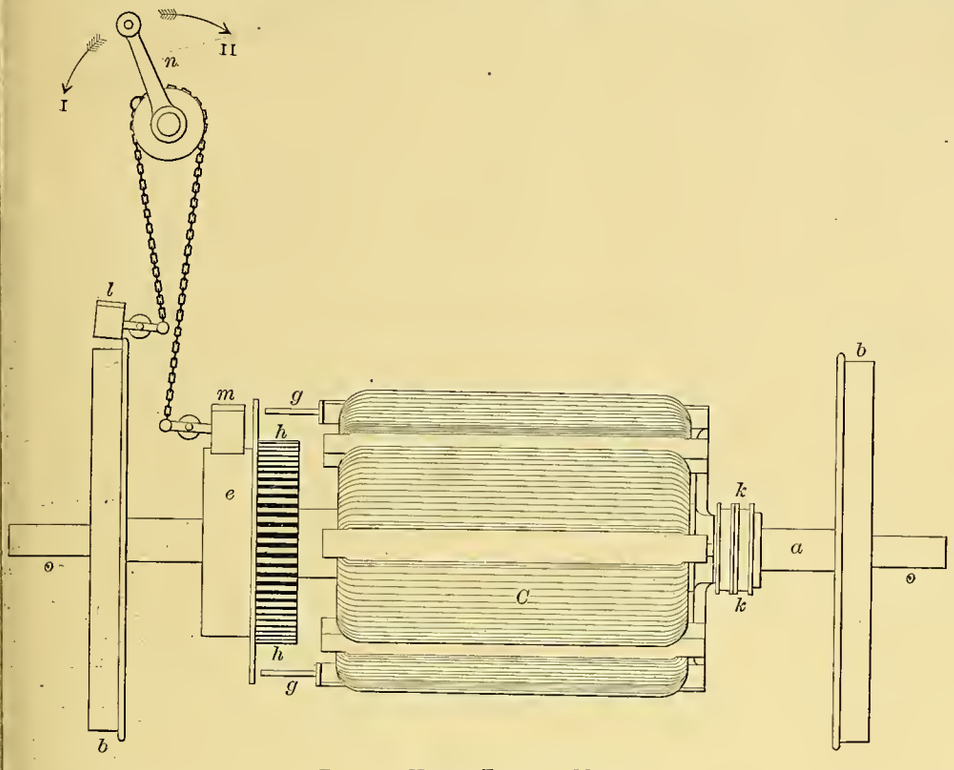


Fig. 1. — Helios Electric Motor.

ected by changing the direction of the current the armature.

If we examine how far the described construcns responds to the programme set up we find: r. The motor obtains when the current is osed, even if the car stops, at once its normal eed. It disposes, therefore, of its maximal wer, at the moment when the car, by pressing

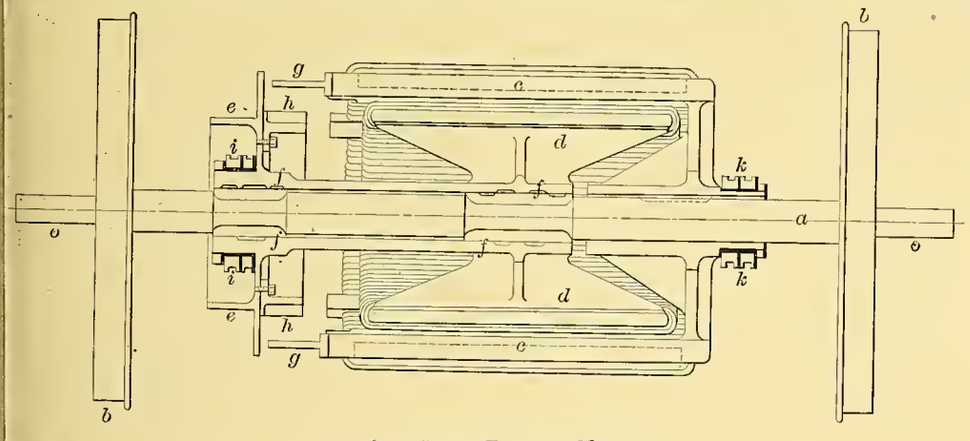


Fig. 2. — Helios Electric Motor.

e brake upon the armature braking disk, shall art.

2. All intermediate gearing for transmission obviated, because the motor is fastened to the r-axle itself and because it has the same velocity the propelling axle.

3. Neither the accumulator nor the motor can exposed to a short circuit when starting, beuse, before being able to do so, the brake on e braking disk of the armature must be opened echanically, and because the armature afterrds is not in any way hampered to at once asme its normal speed.

Against this construction there can be objected at the brushes or gliding springs must turn round along with the magnetic field, and that the dynamo, because fastened to the propelling axle, can have but an inferior velocity, and consequently thereupon have but inferior efficiency. The first objection appears futile, because, whilst the train runs, it would not be possible to attend to the brushes. It does not matter, therefore, whether the same move or are fixed. The second objection leads at once into the syllabus of modern electro-technic, of which one dogma proclaims: "Slow-speed dynamos notoriously have less efficiency than quickly-going ones." I always ask which dynamos? The slowly-going dynamos, built by the Society Helios at Ehrenfelt, Cologne, for 80 to 120 revolutions per minute, according to my construction, all possess an electrical efficiency of more than 90 per cent. When running they hardly get warm. The copper winding is, when exerted maximaliter charged with but about 1 to 1.5 amperes per square millimeter sectional area of copper. The indicator diagrams of the steam engines taken from Helios engine sets (steam engine and dynamo) of 80 and 100 horsepower give a very high number of volt amperes per horsepower indicated, when normally loaded. As, however, there stand considerable difficulties in the way, for indicating the effects, when not loaded, I will desist for the present from giving a precise result of the effective horsepower. Anyhow I maintain, not without reason, that no quickly turning dynamo gives a better commercial result. Measurements taken from 2, 3, etc., little machines, I esteem to be to no purpose. Especially, if cf. i. according to the maker's own publication, the "best and most simple dynamo construction in the market" works with a charge of the copper windings of 8.5 amperes pro. 1 sq. mm. sectional copper area. The philosophizing on lightness of currents, etc., in order to account for cheap and "bad" constructions, I regard as useless. For the present the law of Ohm still rules, and according to that the quantity of currents in all parts of a closed conductor is everywhere the same. According to my own practical tests, a copper wire bobbin of 2,3 mm. wire, when a current of 35 amperes passes it, becomes so hot that it can hardly be touched. It requires, therefore, a strong fidelity of faith, if thus constructed dynamos, which, in addition make 1,200 revolutions, are not only mentioned in one breath with Helios machines, but as regards their efficiency are represented as far superior to the latter. It must always be asked, what machines are referred to? And as no electrician who will boldly state that quickly-going machines are better than slowly-going ones, has as yet taken the trouble to accurately examine one of the numerous practical executions of Helios, I think I have the right to say that the assertion, that high speed generally gives a better commercial efficiency, than a small number of revolutions, belongs to the domain of idle fallacies.

As things are, the objection against the employment of the slowly-going dynamos, mounted upon the propelling axle of a car, can fittingly be brought forward only when a bad construction is concerned. This arrangement is, however, quite unobjectionable when a good machine, fit for the purpose, is being used. In a given case, which is represented in the accompanying drawings generally, the propelling axle of a street tramway is made the object. The diameter of the wheels is 750 mm. the circumference therefore, 2.35 meters. The car shall run 300 meters per minute, from which there results a speed of 125 revolutions per minute. The dynamo for this number of revolutions is calculated as a current originating machine in series of an electrical efficiency of 86 %. I hardly believe that anyone, after examination of the relative circumstance in practice, would maintain that this arrangement, with the slowly-going machine, gives an inferior commercial efficiency to any other (quickly-going) dynamo, the power of which must be transmitted by tooth wheels, worm wheels, chains, etc., from the axle of the armature upon the propelling axle.

I am of opinion that only the plainest views concern the construction of machines can lead to practically good solutions on the field of electro-technics. The chief condition is to furnish good mechanical installations and arrangements. The race and the haggling about fractions of percentages of efficiencies * has little value for practical purposes.

So I believe that the introduction of electrical railways will, notwithstanding right or wrong academical considerations on efficiency, be furthered by the here described simple arrangements, because the same evades, as far as possible, those defects which the constructions hitherto used have shown.

[*The above has been specially written for the* Street Railway Gazette; *exchanges welcome to extract with credit.*]

Enthusiasm seems to be at a low ebb in England. A Birmingham correspondent in the *Electrical Review* (London) says: "The account you give of the reception of the Elieson tram car at Buffalo is very interesting, but it will not convince a tramway manager that secondary batteries are quite ready for him to take up. Here, in prosy Birmingham, we have had many similar scenes of wild enthusiasm on the trial trips of the cable tramway just opened for traffic; we, however, lacked a Buffalo journalist to write them up. The line has now been in use about ten days, and the enthusiasm has pretty nearly all gone." That Buffalo "enthusiasm" has peculiar features: it is indeed strange that a glowing account of the Elieson motor's advent in this country should have been sent to England in all haste, while several American papers were excluded. It would appear that the aim was to "create" enthusiasm in England, relying on the truthfulness of the maxim that "distance lends enchantment to the scene."

* Especially if the consumers are left in the dark as to whether the electrical efficiency is as calculated on paper, or the real commercial efficiency is concerned.

The
Street Railway
Gazette.

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WILLIAM HUGHES, - - - - - - EDITOR.
EDWARD J. LAWLESS, - - - ASSOCIATE EDITOR.

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Articles and papers on subjects relating to intermural transit always appreciated; the GAZETTE's columns are open for the expression of independent opinions, and the discussion of all matters connected with street railways—on the surface, elevated or underground. A special column is devoted to the publication of trade notes and items from manufacturers and dealers.

HELIOS electric propulsion is the latest "evolution" in the application of electricity to propel street cars. Hitherto the greatest difficulty has been, with storage batteries particularly, that when the greatest force is required (such as when starting, or going up grades) then, most provokingly, the electric energy becomes weakest! Herr Coerper claims that he has completely remedied this shortcoming. The STREET RAILWAY GAZETTE has the privilege of being the first to publish an illustrated description of the Helios system, which appears in another part of this number. To give space therefor we are obliged to hold over illustrated descriptions of two new elevated railway inventions, as well as Col. Nickerson's article on "Urban Rapid Transit," together with an important article on the way to win in legal proceedings (which many will be glad to read).

A MOTOR "from New Zealand" is the latest object after which the Chicago newspaper scribes have been diligently searching of late. Word leaked out that Mr. Widener's recent visit to Chicago was to confer with Mr. Yerkes and Mr. Parsons as to whether the "New Zealand motor" would not answer the purpose on the West Side lines better than the cable system. The very fact that the "syndicate's" attention has been drawn to the motor from the way of the South Pole was enough to excite general curiosity. Reporters were sent all over the city to try to find it in a state of experimentation: "Where is it?" they asked. Echo answered, "Where?" Then the news fiends wired to Philadelphia; but all to no purpose. Three editors of the leading dailies called at the sanctum of the STREET RAILWAY GAZETTE, asking if any information could be obtained concerning "the New Zealand motor," one of whom declared that he had received "letters innumerable" enquiring after the unknown motor. All we could say was that Elwell Parker, Wolverhampton, England, had constructed a new kind of motor which was sent to New Zealand the latter part of last year; and no news of any other had reached the GAZETTE. We have reason to believe that the motor in question has found its way to Philadelphia; but we do not expect to hear of its coming into favor in this country.

ELECTRIC locomotives do not gain much favor in England; and, as appears from Mr. Radcliffe Ward's article in another column, tramway managers seem to be waiting for further improvements before venturing to turn off horses to give place to electric motors. And, what is more, further improvements are promised in the near future. In a letter to the STREET RAILWAY GAZETTE, just received, Mr. Ward says; "I have several very important patents for details in this subject, which I have found to be necessary, when practically investigating the subject with electric cars. I am very nearly through with the construction of an electric car for a special kind of traffic. You may have noticed how the papers are stating that the depreciation of accumulators on the Brussels electric cars has been very high. This I have no doubt is largely due to taking off the current in such a way as to make it impossible for any cell, however good, of present make to stand long. I have a patented method of operating which prevents this" Mr. Ward cannot yet publicly inform us of the details, as his important invention has not been patented in the United States nor even published in England.

"BY electric power or by stationary engines," be it observed, is the way that the accepted ordinances for the West Side of Chicago read. The electric provision was first inserted in the overloaded ordinance presented last December. And there has been an idea in the air all along that Mr. Yerkes did not care very much whether the council would grant him a cable franchise or not, and that the "Philadelphia syndicate" were experimenting in the City of Brotherly Love with electricity. And locomotive electricians, the world over, seem astonished that Chicago is so much cabled, and that electric traction has not yet been adopted there. In a letter dated London, April 17, Mr. Radcliffe Ward, who in 1882, ran the first electric car in the United Kingdom, says, "There is no method of traction that will compete with electricity: cables even will not compete; certainly not in such cases as in Chicago. * * * There must be a large amount of electric traction work to be done in Chicago." Just so; but our esteemed correspondent will see from the April and May GAZETTES that cables are the rage in Chicago—cable on the South Side, cable on the North Side; and still the cry is for cable on the West Side. As for the East Side, that is all water. Thus the whole city is being covered with cable railways; and electric traction is getting left altogether, as far as the surface roads are concerned: if the citizens will go in for elevated railways, Mr. Yerkes may wheel around and give them a specimen of the new Adams' elevated railway system, in which case electricity will be adopted. And, of course, if Mr. Ward's great improvement in electric railways (referred to elsewhere) can be perfected in time, electricity may be adopted on the surface roads, or at all events on some of them.

ELEVATED railways for Chicago are well "under way." Lake street is likely to be "adorned" with a Meigs "L" road. The Chicago and South Side Rapid Transit R.R. Co. is ready for work. Another South Side "L" road is close on its heels, seeking a franchise for an elevated road on a parallel line and in close proximity to it. Mr. Holmes and his company have not shown objection to the already enfranchised "L" company; what they will do in reference to the ordinance for a line on State street (along which the main part of the South Side cable runs) remains to be seen. The West Side has three or four other companies seeking permission to build elevated railways. Only those proposing to adopt the Meigs system yet claim to have the requisite consent of property owners. And the chief question which confronts them is "Will Mr. Yerkes let them have a walk over?"

"DISAGREED" juries are becoming the order of the day in Chicago: not only has the Chicago City Railway Co. been saved in several cases recently from paying heavy sums for alleged damages, some of which were evidently put up jobs, but a craze for disagreement has set in.

The "Gazette's" Miscarried Letters.

The general or head office of the STREET RAILWAY GAZETTE is at 9 Lakeside Building, Chicago; our New York office is at 181 Broadway. Letters or papers addressed simply "The STREET RAILWAY GAZETTE, New York," generally reach 181 Broadway in due course; but recently two letters from England so addressed were miscarried, or fell into dishonest hands.

The following letter was somewhat more fortunate in its miscarriage: it was at first addressed "The STREET RAILWAY GAZETTE, New York City, N. Y.," opened by a party not at all connected with the GAZETTE, who was honest enough to send it back to the sender, and then it was addressed, "The STREET RAILWAY GAZETTE, Chicago, Ill." and ultimately arrived where it belongs:

Oficina del Ferro-Carril de Monterey y Santa Catalina.
MONTEREY, MEX., March 27 de 1888.

The Street Railway Gazette,
New York City.

Dear Sirs,—In your Official Directory would be pleased to have you add that we have built four and half miles more track from the city to the celebrated Topo Chico Hot Springs. Also have added six passenger cars to our service, and twenty mules. At our last census our city had forty-five thousand inhabitants, and growing rapidly. The Monterey St. RR. has increased its business considerably in the past twelve months. We may be due you subscription; if so, please notify me. Sam. H. Fisk resigned as superintendent of our road last August, and the writer has had charge of same. We read with interest your valuable work.

Very Respectfully,
JULES A. RANDLE, Superintendent.

When Superintendent Randle received his letter back, he re-directed it to Chicago, with the following note enclosed:

NEW YORK, April 3, 1888.

Jules A. Randle, Supt.
Ferro-Carril de Monterey y Santa Catalina,
Monterey, Mexico.

Dear Sir,—The enclosed letter reaches us this morning, but we are not sure it is intended for us. The only railway paper published in New York is the street railway journal. Yours truly, E. P. Harris, Pres. & G. man

We publish the particulars of this incident in order to show the necessity of giving the full address of our New York office, when writing to that city. But general correspondence had better be addressed to Chicago always.

Heating (Cars, etc.,) by Electricity.

The Baltimore *Sun*, April 24, contains a special dispatch from Washington, which says: Among the patents that will issue from the United States patent office to-morrow, said a prominent official in the patent office to-day, are several that promise to be of great public interest. Five of these will be granted to Mr. Elias E. Ries, of Baltimore, Md., a young electrical engineer and inventor, who is well known here by reason of the originality and importance of a number of his inventions that have recently been passed upon by the electrical examining division. These five patents relate to certain new methods and apparatus for heating by electricity, a matter that has hitherto been considered impracticable by electricians on account of the losses occurring from the employment of the high resistance circuit wires and "heat translating" devices formally found necessary. Mr. Ries, however, operates on a principle radically different from that which has always been considered essential in a system of electric heating, and, according to his specifications, succeeds in producing heat by electricity on a commercially practical scale, and at a cost said to be considerably lower than the same amount of heat can be produced by the crude and wasteful methods now in vogue. The patents referred to not only include the application of the inventions embraced therein to private heating and heating from central stations, but also provide special methods for heating and lighting railway cars by electricity; and patents covering other applications are still pending before the office. The various uses to which a really practical and economical system of electric heating, such as this appears to be, is applicable, are so many and the field is so vast, that if the claims made for this method are verified, it is possible the patents will prove to be of even far greater value than those granted on the electric light and the telephone.

Cable Railway Practice.

By Edward J. Lawless.

Article IV.

he next important item that presents itself in construction of the roadway is crossing an- er cable line, where you have to place your le below that of the other line, and conse- ntly your cars must cross by momentum. uld there be a down grade both ways leading his crossing, of course there is no trouble, as weight of your train will carry you over with e; and even on level ground little difficulty be experienced except when the track is y. And as street crossings are usually level, n if you have to ascend a grade before reach- the crossing there is usually a sufficient tch of level ground over which your train run by momentum until the cable is reached the other side.

he proper size and position of the sheaves at point will make a material difference in the r of the cable. As it is important not to d the cable more than is necessary, the lower le should not be depressed more than two or e inches below the normal line of the upper le; and instead of making it pass under one el, placed between the tracks of the line you ss, it should pass under a series of wheels set n easy curve. Now, if the cable be not raised an elevating sheave, set to one side of the con- , for the purpose of forcing the cable out he grip, and called a "throw sheave", it can eadily understood that the deflection and con- ient wear on the cable will be very slight, but it desirable to dispense with the "throw ave", when you use the side jaw grip, which more general use than any other? I do not k that it is, notwithstanding the increased le made by the cable, for if you dispense the "throw sheave", special attachments, d "trippers", must be put on the grip for the ose of releasing the cable. Now, as you ap- ch the crossing, the cable being depressed assing under the sheaves at that point, and grip raising the cable, causes it (the cable) to e a sharp bend on the front end of the grip, ing the strain so heavy, that the trippers are e to fail in their work, causing more damage e cable by one miss than it would sustain by ing over a throw sheave in months. If, how- , the conditions are such that it is necessary spense with the "throw sheave", or that there nany of these crossings to pass over, then I a change of grip would be desirable. Such p will be discussed in a later paper.

e subject of terminals next presents itself. e are three methods by which cars can re- by switching, by a loop, and by turn-table. re there is a grade at the end of the line, hing is very simple, particularly when the e is such that the cars run back towards the n track. Beyond the switches a large pit is about 25 ft. by 20 ft. in which is placed what lled the "tail sheave", around which the passes on its return. This wheel should be meter not less than the distance from slot t. Twelve feet, however, is the usual size. be fastened on a shaft set in boxes, which s must be securely fastened and braced to and heavy masonry at the bottom, and a braced system of girders at the top; or it e placed in a heavy iron U frame, which e must be secured by a number of long, bolts set in masonry or concrete. On each and a little forward of this wheel, two carry- eaves should be placed to prevent the cable slipping off, should it get slack at any time. large wheel should be keyed to the shaft, as lle to think of holding it in its place with rews, no matter how securely tightened. cial slotted switch will require to be made to switch the grip car without taking out ip, and another switch for the coach. Be- the former switch and the latter, a sufficient ce should be left to stand two coaches. should also be sufficient space left beyond itches to stand a train, should it get out of and allow the others to move while it is repaired.

ave never used the turn-table, but have ed its work closely on other lines, and can y that I am in favor of it. It can be by power supplied from the cable. When lean and in good repair, it works well enough, but in snowy, frosty or wet weather it will give trouble. The principal objection to it, however, is that the gripman is limited to space in which to stop his train; and should the track be slippery, or his calculations wrong, and his train run too far, the result is usually a broken grip, if not a broken car. If you could always have experienced gripmen to depend on, the chances for such an accident would be reduced; but there are always some new men on hand who are liable to cause trouble.

The best way to make the return is by a loop, if you can possibly get it. True, it will cause extra wear on the cable; but its advantages outweigh that objection. It does away with the special construction of large pit wheels, special yokes, frogs, etc., necessary for either turn-table or switches. It will save the time of one train, if not more, by avoiding all the changes made necessary by the other methods. The loop, as well as the turn-table, has also the advantages of saving damage to the cars by careless coupling, of standing in the same position and working his levers in the same direction at all times, which latter fact is very important, especially in cases where promptness and decision are requisite to avoid an accident. When handling heavy loads it is also desirable that the gripman should be able to throw the weight of his body on the end of the lever without having to turn his back to the front end of the car.

(To be continued.)

Electrical Locomotion.*

By Radcliffe Ward.

I observe with pleasure your spirited article on the above subject in your current issue.

You can do no greater service to electrical engineering interests, both commercial and professional (if there be any real distinction), than by pushing to the front what is beyond serious question not only the most promising branch of heavy electric work, but also that branch of engineering which has in it greater immediate possibilities as an *enormous* industry than any other, a bold statement probably, but figures, statistics, and practical inquiry prove it.

I dare say, owing to circumstances, I am more familiar with the commercial aspects as they affect the work, and the way it may be carried out on a large scale, than most. I have in my mind now the phases of negotiations that I have had with several of the largest tramway companies in this country. I will be bold enough to attempt a solution of the question you profess your inability to answer, viz., "How to account for this hesitancy in taking up so promising a concern we know not."

What are the present facts in connection with electrical locomotion, from the manufacturing points of view? They are these: The manufacturer is ready to supply plant, with or without accumulators, at such prices as to undertake the yearly maintenance at such rates for depreciation, that the cost per car mile comes to a very low figure as compared with horses *or steam*, where the number of cars is large. But the manufacturer wants orders; he has not got the capital to lock up in plant; if he had, it is not his proper function. Now where are those orders to come from? It will be a long time before tramway companies generally begin to actively equip their roads with electric appliances, if they use their own capital for the purpose.

In one of the negotiations that I referred to above it was offered to put down the entire plant and equipment for a considerable number of cars free of any capital outlay to the tramway company, and to run the cars for two years at a reduced price on the present cost. Then the tramway company were to purchase the plant after absolute proof of its economy; at the time of the purchase the plant was to be in a state *equal to new*. When the tramway company had purchased the plant they would have saved the yearly profit we should have made on the *reduced* rate we offered them, and including all depreciation, which would have been guaranteed (or taken and contracted for), interest on a somewhat larger capital than used with horses, they would still have saved over £2,000 a year on a comparatively small number of cars.

* From the *Electrical Review* (London) April 6.

You may well ask if a tramway company won't accept an offer like this from a strong contractor (ready to deposit security), what would it accept? In another case a suggestion was made to run a small number of cars at a mileage contract; in this case the company wanted some one else to do the same thing first. Generally speaking, they want "to watch and see what others do."

In the United States of America tramway men see a new and economical power available, and they go ahead and apply it, make a success, and earn their increased dividends, whilst in this country tramway men are devoid, generally speaking, of the initiative and energy necessary to give their shareholders such advantages, and are simply "waiting to see," until one fine day they will all follow in the track of electric traction like sheep; but it won't pay electrical locomotion interests to await that time.

So much for the way tramway companies look at the matter. Now as to outside capitalists. You appeal to a sentiment which I venture to say does not exist in any great force, generally speaking; there are exceptions, but the exceptions can not do all themselves; at all events, exceptions can not carry such an enormous industry as electrical locomotion, must quickly be on their backs. As regards saving to be effected, there is no doubt that on present prices it can be guaranteed, by manufacturers that a large tramway company running over 200 cars could — if it did the work on its own capital rearranged or increased for the purpose — save half the present cost of horses.

Few realize what such statements mean. There is trade for manufacturers, work for large numbers of men of all grades, increased dividends to tramway shareholders, and large and quickly made lumps to stock brokers, which can not help coming from a legitimate rise in the value of tram shares.

One farthing per mile saved means an increase of about 2 per cent dividend to one of the large London tramway companies!

Now for an answer to your question. My belief is that the purely selfish interests of financial men generally have not yet been sufficiently strongly appealed to. We are all selfish, and until financial men generally are shown something that will be an easily saleable commodity in the open market, after they have spent a certain time and capital on it, they will hold aloof. That, however, can be shown them. What we must aim at is to get electrical locomotion undertakings started on a moderate scale, show a dividend, and then go for an increase of capital wherewith to undertake more work.

Capitalists must also be shown that they can work in association with certain advantages, such as patent rights giving points of vantage, manufacturing rights and associations giving also points of vantage, until their trade is firmly built up on a large base.

There must be an intermediate body of contractors and contracting corporations who, on the one hand, will buy their plant and have its maintenance guaranteed by manufacturers; and, on the other hand, will know that they will receive a certain sum per mile from the tramway company over a contract for a reasonable term of years. Between the two figures there is a large profit for those intermediate capitalists who are a necessary link to make electrical locomotion move with sufficient rapidity to be something more than a keenly competed cut-priced business.

"There exist three obstacles to the rapid motion of carriages — terrestrial attraction, the atmosphere, and friction. By no human power can the two former be removed, but the latter can be so far modified as to form little or no opposition. On all common roads, no matter how well they may be constructed, there is a certain degree of roughness which it is impossible to remove, and this causes so great a friction, that to overcome it much of the drawing power is consumed without advancing the carriage. On some roads, the plan of laying down continuous lines of *tramways* of smooth pavement for the wheels to roll over, has been resorted to, but has never been found generally answerable."

So did they write during the period preceding the railway age.

Cable Railway Traction.

From the Parks Hunt Cable Prospectus.

The following brief description of some of the principal features of the The Parks Hunt System of Cable Traction, will convince anyone that it is superior to any now in use, whilst, at the same time, it is the simplest and most economical. *Grip* is strong and durable, being constructed on the principle of a pair of pliers, seizing the cable at the top and sides to move the car, and releasing the same to stop the car, when the cable is allowed to run free and clear of it, preventing rapid wear. *Conduit* is entirely of metal, or may have concrete bottom ; has interior braces, at short intervals, and removable top plates (or slot irons); has rounded bottom (or gutter) connecting with catch pits. By depressing and deflecting, pulleys, divergence of the slot and automatic action of the grip, the *crossings* are effected by positive motion. *Curves* are made so there is but little wear on the cable, and the cars can be stopped and started at any point, equally as well as on a straight line. The toggle-jointed lever *brake* is used. *Air springs* consist of cylinders with pistons or plungers, acting as air cushions, overcoming the shock at starting, and the recoil. *Cleaner* comprises a small non-corrosive wire rope, with either projections, rubber scrapers, or brushes affixed, resting upon the rounded bottom of the conduit, which may be rattled through it at any time by means of a drum in engine house.

In this system (still quoting from the company's prospectus) the formation of the grip is such as to allow for a small and compact conduit, giving great strength, and economy in the cost of construction, one-fourth or less, than any other. The carrying pulleys are placed at short intervals within the channel, sustaining the cable upon an even plane, thus preventing attrition, and consequently prolonging its life. These carrying pulleys may be any size desirable, and the size of the tube made to correspond. Easy access can be had to these pulleys, or any part of the interior of the conduit, as the top plates are removable. One grip has been used in other systems, whilst in this, one or two grips can be used, and the preference is certainly for two—for steep gradients or double track crossings—one in the front of the car, the other in the rear, but both operated from the front platform. In crossing intersecting lines, the divergence of the slot, and the depressing and deflecting of the cable, automatically open the jaws of the grip and release the cable. But on the slot and cable coming to their original position, the jaws of the grip close upon the cable, which can only be accomplished by this system. With the two grips, it will be seen that whilst the front one has thus let go its hold on the cable, the rear one maintains its hold until the same point is reached, by which time the front grip has again taken hold. This being automatic does not depend on the brakesman, and secures positive motion. The toggle-jointed brake has been found to be the most effectual and reliable that can be used on cable roads.

A valuable feature is the air spring to overcome the shock at starting, as well as the recoil, which is proportionate to the speed. Spiral and other metal springs have all been tried, found ineffectual, and been discarded. The introduction of these is very important, not only for the comfort of passengers, but in diminishing the wear by the cable.

The cost of cable haulage by this system may be judged from the following, given in round numbers, say 10 miles circuit, 100 cars, 15 trips, 150 miles per day, 18 hours: Stationary engine, 300 h. p., consuming 5 tons coal per day at $3, $15; 2 engineers, $6; 2 firemen, $4; wear and tear, $20; total, $45. This is estimating the cable to last 2 years, which is only one half its probable life. The other expenses being about the same as horse cars, except that one gripman is enough for two or more cars In the conversion from horse to cable road, the excavation being small, there is no material interference or interruption to the business of the road. The ordinary horse car can be utilized with but little expense.

The Knoxville Electric road is in operation. They have had a great many difficulties to overcome, but may sooner or later "get there."

NEW PROJECTS, PASSING EVENTS, &c.

Alabama.

Birmingham. The East Lake Land company will build their short electric road forthwith.

Dayton. A dummy line will be built soon by W. W. Bruce.

Huntsville. The North Alabama Improvement company, who have about a mile and a quarter of street railway already built, are "talking" of building a "dummy" line to "belt" the city, which will be about fifteen miles long.

The Huntsville correspondent of *The Hot Blast* (April 27) says: "Although it is not settled yet, I think it safe to say that the dummy line from this city to Monte Sano will be built this year. Capitalists are here looking into the matter."

California.

Los Angeles. The Los Angeles Electric Ry. Co. (Daft system) have four miles of road now in operation. One of the Hazelton tripod boilers, has been fixed, and it effects a considerable saving in generating the electric force. The fuel used is oil, which costs four cents a gallon. 280 gallons per day are used to get the necessary power to operate the four miles of road (with the Hazelton Tripod boiler), whereas 400 gallons of oil were used daily previously to operate only two miles of road. Further particulars and cuts of this economic new boiler appear on another page of our present issue.

Redlands. The Redlands Street Railway Co. sends us their report, the particulars of which appear in our Directory Supplement, and they have also favored us with an interesting history of Redlands, which "contains all the grandeur and the picturesqueness of the best of Switzerland, without the sense of smallness which one feels there." The town has been built up, big enough for the successful operation of three miles of street railway, since the beginning of 1887. Sixteen months ago, there was not a single house, whereas now they have two brick blocks with a frontage of 120 feet, three stories high ; two-story brick blocks, with a combined frontage of 580 feet, and 300 feet more are under way. "There have been laid many thousand square feet of solid, durable, broad cement sidewalks. Nearly every branch of trade is represented, and almost all professions."

San Bernardino. This city also has a street railway, whose officials appear in the present issue of our Directory. They will build 2,700 feet of additional track between this and the Fourth of July.

San Diego. The Electric Rapid Transit Street Car Co. contemplate an extension.

Connecticut.

Danbury. Danbury has, at present, an estimated population of 18,000. The Danbury and Bethel Horse R.R. Co. now operate a line about four miles long, of which "about 2¾ miles lie in the borough of Danbury ;" and the company's present charter gives them the right to a couple of miles more tracks in Danbury, but at present no extension is contemplated.

Southington. The Southington and Plantsville street railway is to be operated by electricity.

Delaware.

Wilmington. President Canby states that the little difficulty experienced with the Sprague electric equipment, mentioned in the April Gazette, has been overcome ; and the Wilmington City Ry. Co. are highly pleased with their electric railway, and will accept the Sprague motors.

Georgia.

Augusta will have an electric road, it is said, in the National Exposition grounds, of which Mr. Rychman is the manager.

Mr. J. H. Alexander is also going to build a dummy railway, in conjunction with other extensive improvements.

Illinois.

Bloomington. A street car driver, named Charles Poulton, was almost killed by robbers on the night of May 6 : They wanted his cash box ; but he defended it unto death nearly. Hopes are entertained of his recovery. The city is greatly excited ; and the public await impatiently for him to get well enough to explain who his assailants were if he can.

Chicago. The last quarter's license fees of the three principal street railway companies have been paid as follows: Chicago City Railway Co. (South Side), $3,473.63; West Chicago St. R. R. Co., $3,208.75; North Chicago St. R.R. Co., $1 562.16.

A limited amount of West Chicago St. R.R. Co.'s stock is offered at par, and installment certificates will draw same dividends as full-paid stock in proportion to amounts paid in.

Three cable ordinances were passed March 30, for the West Side: (1) that to the Chicago West Division Ry. Co. (lessor to the West Chicago St. R.R. Co.), "to construct, maintain and operate its various lines of railways, or any of them, or any part thereof, by electric power or by stationary engines not located on the public streets or public places on the streets, and propelled by other than animal power, and to connect its tracts with other street railroads;" (2) that to the Chicago Pass. Ry. Co., exactly the same (in its purpose) as the foregoing; (3) and that to the West Chicago St. R.R. Co. (popularly called the Philadelphia syndicate), "to construct, maintain and operate, for the period of 20 years from and after the passage of this ordinance, a single or double track street railway upon, over and along South Jefferson street, in the City of Chicago, between West Washington street and West Madison street, with the right to connect with other street railroad tracks on said West Washington and West Madison streets." This last ordinance is only for the length of one block, joining the two main thoroughfares of the city running from east to west; it is to be operated by animal power or stationary engines, and it is by that connection that the Madison street cable may find its way to and through the Washington street tunnel. "The tracks hereby authorized shall be completed before the first day of December, A. D. 1888." Section 4 of this 3d ordinance provides that "said company shall operate, when cable cars are run, not to exceed two cars and one grip car attached together with a driver in charge of the grip car and one conductor in charge of each additional car. The cars to be used upon said railways shall be constructed with all the latest improvements for the comfort and convenience of the passengers; and shall be used for no other purpose than for the transportation of passengers. The rate of fare shall not exceed five cents for each passenger for any continuous travel at one ride over the tracks of said company, and the tracks of the Chicago West Div. Ry. Co. or the Chicago Pass. Ry.Co."

The City Clerk (Mr. D. W. Nickerson) presented communications to the council April 23 stating that the various companies concerned had filed in his office their acceptance of the respective ordinances and the requisite bonds.

The Washington Street Tunnel, which has become useless and dangerous, is to be reconstructed, at a cost of $100,000. Mr. Yerkes submitted his plan for the work to Comr. Swift May 7, and it was taken under advisement.

A couple of dishonest conductors, named John Ferguson and Henry Christianson, have been discovered manipulating the "brother-in-law" trick on the West Side lines. The neck register is to be abandoned, as unreliable, and the fixed dial register is to be tried instead. The disgraced conductors, who have disappeared, did not belong to the West Division Conductors and Drivers' Association, and the managers there felt anxious to clear the members of any suspicion, especially as it had been remarked that the two defaulting conductors were not the only ones who defrauded the company. Therefore President Luke Coyne, with Wm. Goodwin and T. Burns, representing the association, had a conference with General Manager Parsons, which terminated very satisfactorily. Mr. Parsons expressed the greatest confidence in the numerous servants of the company whose fidelity has been tried. He also explained why the registering clock has been selected in place of the box punch, and why it has been deemed proper to adopt a new uniform. At the close of the conference Mr. Parsons, in behalf of the company presented the West Division Conductors and Drivers' Assciation with a check for $750 to be applied to the relief fund. At a meeting of the association next night the work of the committee was approved and a hearty vote of thanks was tendered Mr. Parsons.

The Western Construction Company was in-rporated May 3, for the construction of street lways, etc.; capital stock $10,000; incorpora-s, James R. Smith, John S. Gregory, and arles R. Anderson.

THE NORTH SIDE CABLE RAILWAY.

The North Side system of cables have been ning since March 26, and not one killed yet! this matter Mr. Yerkes stands alone in cable lway practice. The nearest approach to fatal- occurred May 1, when a laundry wagon was ashed between two cable trains in the tunnel, l the driver thereof and his horses had a lose shave." The way the matter was intro-ced in the *Tribune* is significant: "The long-pected grip-car accident in the La Salle street nnel materialized yesterday morning, but for-iately was only serious enough to show what night have been." And after giving a pictur-que description of the accident, Chicago's ding daily said: "The *Tribune* has heretofore rned the public that accidents of this kind re liable to occur so long as teams and foot-n will persist in using the tunnel." But the eless wagon driver was not even hurt, and nded without injury in the one of the niches of the ision wall." And the "long expected" fatal cident has not yet happened. This is really nderful, when the tricks of the "mischievous all boy" are considered. Pebbles have been ced in the grip slot; the electric signals have en tampered with, causing considerable delays some instances; but for all that nothing more ious has happened than the breaking of a few ps—the gripmen not being yet sufficiently pert to get over the crossings at the curves on Salle avenue, where the cable turns from nois street towards the La Salle street tunnel. stated in our last number, the cable cars run Clark street and Wells street, two parallel ds two blocks apart running due north. The in engine-house, as before stated, is on Clark eet (near Elm), and one cable (9,500 feet long) is thence down to near Illinois street, which is at right angles with the main cable lines—t is, east to west, while another cable (22,500 t long) runs along Clark street north of the wer house to the city limits. The Wells street ble (22,350 feet long) goes from the same wer house two blocks to the westward, and n up and down Wells street, from Wisconsin eet down to near Illinois street (like the lower rk street cable). Each of these last men-ned cables end within about 100 feet of nois street. Then comes the rub. A rope ets those cables from an engine house on the ss street (Illinois) midway between Clark and lls—that is, on La Salle avenue. Cars ning down Clark drop the cable before turn-round to Illinois, going along the latter eet west by means of "the loop cable" one ck, then turning towards the tunnel, where y cross to the west side of La Salle avenue. e Wells street cars drop the cable also before ning to Illinois street, and pick up the loop le, which pulls them eastward one block to La Salle avenue curve, and these cars also p on the west side of the road to the tunnel. is the traffic of two roads comes to one track r passing the knotty curve, the loop cable ng through the tunnel, a distance equivalent even ordinary blocks, coming to the surface the South Side at Randolph street, continuing th for three blocks, then turning eastward two cks, northward again three blocks, and then ng Randolph (two blocks) back to the tunnel, to the curve at the North Side entrance. Clark street cars keep to the outside track, le those returning to Wells street cross over curve, and that is where the only serious culty (the only trouble, in fact) has been erienced. The Wells street rope going north to be lifted (about nine or ten inches) when cars in that direction pass, but it must be ered (the rope coming from the Clark street ier being still below it, of course) before the come from the Clark street side, else to pieces s the grip. On May day eve a steam aratus was fixed to perform the lifting and ering business, which is a great improvement the previous manual operation thereof.

ELEVATED RAILWAYS.

he Meigs' "L" system is likely to "get there" Lake street, according to latest indications. The Lake St. El. Ry. Co. claim that they have consent of the majority of abutting property owners. They have not yet obtained a franchise; they had an ordinance before the council committee April 27, but they had not filed the property owners' "petition," and so the matter was tabled for the time being.

Articles of incorporation were filed in the office of the Secretary of State May 5, incorporating the West Chicago Elevated Railway Company, to build an elevated railway on some of the principal streets and avenues in Chicago. The capital stock is $5,000,000, and the incorporators are Richard T. Whelpley, Edgar C. Rosa, William F. Conklin, Charles A. Landy and Orlando Ware.

We thought there were enough projects already. A morning paper has given accurate expression to public opinion, the end of April, when it said that "the projectors of elevated railway lines appear to have 'made a dead set' upon Chicago. They are working with a persistency that is hard to resist by the many who have believed that the 'L road' is not a necessity in this city, as in some of the most crowded centres of population at the East. Several schemes are before the public, not less than four being proposed for the West Division, though it must be evident that elevated transit blocked at the river would not be much superior to that by street car. Leading capitalists have expressed themselves as in sympathy with the movement, and more or less of progress has been made towards securing right of way."

The ordinance of the Chicago and South Side Rapid Transit Railroad Co., mentioned in our last number, provides that the road shall be equal in style, strength, finish and architecture to the most modern and improved plans in use in the cities of New York, Brooklyn and Kansas City, and that the said company shall not commence to build and erect said elevated railway system and structure until said plans and specifications are so approved by the Commissioner of Public Works. The company may use locomotives or other engines or motors and cars. But it is stipulated that "the motive power shall be fully equipped with all modern devices calculated to render it practically noiseless and smokeless, and to prevent the discharge of cinders and sparks, and suitable and practical devices shall likewise be placed beneath all stations, buildings and platforms, and at all street crossings to intercept and carry off storm water and drippings from melting snow or other sources, and similar devices shall also be applied to both motive power and rolling stock to intercept and hold all cinders, ashes, oil or anything that may drop from passing trains to the surface of the street beneath the structure." The rights and privileges conferred are upon the further express condition that said elevated railroad shall be "exclusively used for the transportation of passengers and mails."

This "alley line" elevated road enjoyed some degree of public approval until the company advertised for bond and stock subscriptions. "They offered $4,500,000 of the first mortgage bonds and $4,500,000 of the capital stock for subscription for account of the Construction company to build the first portion of the road to 39th street." Then financiers began to calculate; and the old consolidated Rapid Transit and Elevated Railroad company woke up, and applied for an ordinance to build an "L" road on State street; they have been a long time seeking consent of property owners, but without success. The only thing their appearance before the council can do is to divert attention from the "alley way" line. It is claimed, however, that they now have the necessary consent. The papers are busy contrasting the features of these two schemes:

1. The State street road has its right of way. The so-called alley road has no right of way.

2. When the State street ordinance is granted the company can begin to build immediately. The so-called alley road has its ordinance, but cannot build a foot of road.

3. The State street road will be erected in a public street; the alley road can only be erected on private property.

4. The State street road does not ask the people of Chicago for money; the so-called alley road does, and states that it wishes the money to buy right of way with.

5. The State street road is not required to condemn property; the so-called alley road must condemn or purchase every foot of right of way.

"The State street company is not jealous of the so-called alley road," it is said, "or any number of roads having the same sort of franchise as the one granted to that company by the City Council. The power of condemning property is granted to all railroad and elevated railroad companies by the State law, and not by the ordinance of the City Council."

Elevated roads in New York City cost about $500,000 per mile. Is it to be expected that a road in the City of Chicago can pay interest and dividends on five times that cost per mile?

The most promising elevated railway project, on the South Side, is that announced by the Chicago, Rock Island and Pacific R.R. Co. They have been in favor of an elevated track over their road from their depot in the heart of the city to the suburbs through which they pass. But the Lake Shore R.R. Co., who use the Rock Island tracks, refused hitherto to bear half the expense. Now they have been converted in favor of an "L" road, and one will be built within three years.

The construction of such a line will not be expensive, as no right of way will have to be secured. The present track facilities of the road between Van Buren and Sixteenth streets are inadequate for the proper handling of Rock Island trains and those of the Lake Shore. Between Twelfth and Sixteenth streets the right of way is narrow, allowing space for only a few tracks. Elevated tracks for passenger trains would leave the present tracks for the sole use of the freight trains, and would be a great relief to both companies. It will of course greatly facilitate travel along the entire route, and for half a mile or more on either side. In the suburb branches can be thrown off so as to accommodate outlying communities. Of course, if the Rock Island company adopts the elevated road, other companies will have to follow its example in order to retain their suburban travel.

ANOTHER "DISAGREED" JURY.

A peculiar kind of damage suit against the Chicago City Ry. Co., occupied the attention of Judge Gary's Court, several days, the middle of April, and caused much amusement. One report thereof opened thusly: "Samuel H. Kerfoot got mixed up with one of C. B. Holmes' grip-cars the morning of April 2, 1886, and has worn adhesive plasters and linen bandages ever since." Indeed a very serious case was made out against the railway company, and $15,000 was the amount claimed for damages, instead of the usual ten thousand; and it looked "blue," until Lawyer Hardy pricked the bubble with his cross-examination. Mr. Kerfoot, who is a real estate man, said he was 65 years old. On the day stated he boarded a Cottage Grove Avenue grip-car, with a "to-let" board under his arm, and the car he was on struck against another car and "shook" him, but he did not then suppose he was hurt; "kept getting sorer" for a week after the "accident," and as he got up the morning of April 9, he "looked for the first time to see if there were outward signs of injury." Then he discovered that he was "black and blue." When paralysis set in, he did not say; but there was plenty of medical testimony to show that his constitution was ruined, and that it was all on account of the "shaking" on the grip-car that April Fool's morrow the year before last. Other medical experts proved that the old man was shamming. But what weakened his case most of all was the admission, when under cross-examination, that he had fought with General Martin Beem some four months after the accident! He explained that Gen. Beem called him a liar, for which he struck him. Beem struck back and made Kerfoot's nose bleed. "First blood for Beem," remarked the judge. In the end the jury disagreed.

[General Martin Beem, it may just be mentioned, was the attorney of the Arcade Rapid Transit Co. of Illinois, who were going to build an underground railway across Chicago—along Monroe street. The GAZETTE recorded an eloquent speech of his, in favor of the underground scheme, at one of the meetings convened to "create" public opinion in favor of "L" roads on the West side, the latter part of last year. He

was an admirable speaker, only 44 years of age; and we were shocked when informed of his dreadful death, by the following dispatch dated Stanton, Neb., May 2: "Gen. Martin Beem of Chicago committed suicide last night by shooting himself. He was visiting his wife's people on D. Case's ranch. Family trouble is said to be the cause." It should be observed, however, that the Coroner's jury found that he had been shot, but they were not able to say who fired the pistol; they did not believe he shot himself; and his friends are bent on finding out the bottom facts. The question to be decided is whether he committed suicide or was shot by Mrs. Beem. A private memorandum attached to his last will and testament, executed April 27—the day before he left Chicago to go to his wife—shows that he feared murder! It is a striking instance of a coming event casting its shadow before.]

Fernwood. The Fernwood & Lake Calumet Street railway company was incorporated April 30; main office at Chicago; capital stock, $50,000; to built and operate a street railway in Cook county; incorporators, S. Montgomery Smith, Joseph D. Hubbard, and Henry Hudson.

South Chicago. The South Chicago & Blue Island Railroad Company, was incorporated May 7; to construct a line of railway from Hyde Park to the village of Blue Island, Cook county, by way of Western avenue. The capital stock is $100,000, and the incorporators are Edward P. Hilliard of Washington Heights, Joseph R. Putnam of Englewood, and John McClure, David Thrisher, and Stephen A. Hilliard of Chicago.

Indiana.

Indianapolis. Mr. C. B. Holmes, president of the Chicago City Ry. Co., with other Chicago capitalists, purchased the Citizens' Street Railway Co.'s franchise, tracks and equipment all complete, April 24, and paid for same in hard cash (no water). The company has been re-organized under the name of "The Citizens' Street Railroad Company of Indianapolis." The capital stock is $1,000,000, with the privilege to increase it to $3,000,000, when necessary. The preliminary board of directors consists of C. B. Holmes (president), S. W. Allerton, J. J. Mitchell, E. K. Butler, and John C. Shaffer. Mr. Shaffer is superintendent, and has been authorized to purchase thirty-five new summer (open) cars. Mr. A. A. Anderson, secretary of the old company, is secretary and treasurer of the new. The property involved comprises about forty miles of track, including the lines going to Irvington, the insane hospital at Haughville, 100 cars, 625 mules, stables, etc. The road radiates from a central point in various directions, and several extensions are contemplated by the new company. The purchased franchise provides for cable or electric motor. And Mr. Tom L. Johnson, who owned the bulk of the shares in the old company, was glad of the opportunity to receive the value of his existing property and let such a "hustler" as Mr. Holmes come to control the extensive rapid transit improvements which the city greatly needs. It is proposed, for a start, to cable about twelve miles of the road, at an expense of about $1,200,000.

Lafayette. The Sprague Electric Railway and Motor Co. have closed a contract for a three-mile electric road here, with about four miles of track. The overhead conductor will be used. There will be nine cars with twin motors.

Iowa.

Davenport. The Sprague Co. have also a three and a half miles electric road to build and equip in this city, to start with eight cars, each provided with two motors. Six of the cars are to be running by July 1st. The plant will also include an outfit of stationary motors of an aggregate of 100 h. p. for miscellaneous uses.

Kansas.

Arkansas City. The directors of the Arkansas City and Geuda Springs rapid transit company have elected the following officers: C. R. Mitchell, president; F. P. Shiffbauer, vice-president; Dr. G. S. Morris, treasurer; G. R. Westfall, secretary. Major O. M. Wilson has been chosen to be the legal adviser of the company. We are informed that the preliminary survey will be run immediately and the right of way will be looked after in a very short time

Atchison. The dummy line is to be used principally to haul brick to the city from three brickyards. Special cars will be required.

Cottonwood Falls and Strong City. The C. F. & S. C. Street Ry. Co. have decided to build a commodious stable and car house at the switch half way between the two towns, and will also put on summer cars.

Fort Leavenworth. The F. L. Rapid Transit Co. are extending their lines, and will spend at least $25,000. There is also a new company comprised of New York capitalists, applying for a charter to build twenty miles of new track to be run with steam or electricity.

Hutchinson. The Hut. St. Ry Co., which has been in existence just one year since the middle of April, have, we are assured, "displayed the most unadulterated nerve and grit of any enterprise which ever gained a foothold on Hutchinson soil." They contemplate considerable extension and improvement.

Lawrence. Kansas City capitalists are interested in the new street railway projected here.

Leavenworth. The Leavenworth Central Rapid Transit company has been incorporated; directors, Joseph Whitaker, M. L. Hacker, W. A. Morton, S. H. Holmes. P. G. Lowe, Paul E. Havens, John Hannon, A. A. Fenn; capital stock $100,000.

Topeka. An injunction has been issued against the Topeka Belt Ry. Co., ordering them to refrain from further proceeding with the grading, constructing, erecting and building of the proposed or so-called Belt railway, or any other railway by any name whatsoever, upon the line commencing at a point about one-half mile west of West street in the city of Topeka, on Sixth avenue extended, running thence south or southwesterly into and through sections 36, 35 and 34 of township 11 south, of range 15 east, and thence northerly to a point on the line originally fixed as the line of the Topeka Circle railroad, on the lands belonging to J. B. McAfee, thence westerly on the line originally fixed for said circle railroad, to Martin's hill, until a motion of the Topeka Circle Ry. Co., for a temporary injunction therein, can be heard.

Colonel Crowley has been in Chicago purchasing Pullman cars, etc., for the East Side Ry.

The Higgins Park Railway company of Topeka have filed a charter. The purpose of this company is to build a railroad in Shawnee county. The directors are W. W. Gavitt, Hirman Higgins, R. E. Heller, S. W. Wilder and J. E. Gavitt, of Topeka. The capital stock is $100,000.

The Chicago Heights, Potwin Place and South Topeka Electric Motor Railway company has been incorporated; directors, H. D. Booge, J. R. Johnson, H. Taylor, of Topeka; A. H. White, New York; J. F. Booge, Sioux City, Ia.; capital stock, 1,000,000.

Over 200 men are at work on Kansas avenue in North Topeka grading the street preparatory to paving. The street railway will be a double track all the way to Garfield Park.

The Topeka Rapid Transit Street Railway company are yet in unsettled circumstances. The citizens on Eighth street lodged a complaint with the railway commissioners, who communicated with the city council in reference thereto. The city attorney filed a reply April 27, which says that the railroad company has not complied with the city ordinances "in any respect." The reply cites violations of the ordinances of the city regulating excavations upon streets, the construction of railroads upon streets of the city, and the ignoring of a resolution passed requiring all street railways to put the street crossings across their track in good condition. The reply is silent upon the subject of the liability of the city for the grading of the streets, as is claimed by the Rapid Transit company in their reply, further than that it is admitted that the city did grade certain other streets upon which the Rapid Transit company's lines were laid. The reply insists that it is the duty of the road, pending grading, to place the streets in as good condition as before the track was laid upon the streets. It is not contended that the company should grade the street, but that they should level it in such a manner that it will be passable.

The Garfield Park and Northern Heights Street Railway company, of Topeka, have a capital stock of $50,000 (if the report we have received has been filled up correctly), and t
are going to build a line about fifteen miles lo
which is to be operated by steam, soda, elect
cable or horse power, or by such other powe
may be determined.

Wichita. The Wichita City Railway co
pany have completed their line to the Dc
packing house, and the one to the Burton
works. Further extensions are contemplated.

Extensive improvements and changes
being made on the Suburban railroad. N
cars have been ordered, and are daily expec
to arrive. Work was commenced April 8 u
the extension of the line out Williams street
Fourth avenue.

Kentucky.

Dayton. The South Covington & Cincinr
St. Ry. Co. (successor to the Dayton & Newp
St. Ry. Co.) contemplate an extension "fr
present terminus to the eastern boundary line
Dayton, say eight or ten squares." The dista
from the present terminus in Dayton to Newp
is about two and one eighth miles, double tra
with the exception of a stretch of four squa
in the city of Newport which is now being rel
as a double track. The road proceeds the
across the bridge to Fountain Square, Cinc
nati, O.

Louisiana.

New Orleans. The new mayor (Shakespea
and the new council have inherited the str
railway question connected with the Carrol
road. The previous ordinance has been w
drawn, with the intention, it is said, of re-int
ducing it to the present council.

Maine.

Portland. The city of Portland's population
now estimated at 40,000. "There are opera
within the city proper about six and a half m
of horse railroad; (this does not include
double tracking," observes our correspond
parenthetically;) "a branch of the road th
and a half miles long extends into the neight
ing town of Deering." The whole is owned
operated by the Portland R. R. Co. Offici
names appear in our Directory.

Lewiston. The population of Lewiston is r
about 24,000; and that of Auburn 11,000. T
Lewiston & Auburn horse railroad runs in
between the two cities, and the whole track
nearly eight miles long. They contemplate l
ing about two miles more the coming summe

Maryland.

Baltimore. City Commissioner Smyrk s
the city passenger railway companies have
sponded to his call for repairing streets wh
car tracks are run. Gov. Bowie has about th
men out, and the other lines are also repaving

A "storage car" equipped with Spra
motors has been running very successfully
this city during April. It is crowded v
passengers every trip, and the general obse
tion is, "You have found the coming powe
is here at last." There has not been a sir
hitch. This success must be very gratifying
Mr. A. G. Davis, who has held on through
long weary years, since the first Faure cells w
brought here, has worked hard, has spent mo
as liberally as he had it to spend, and has gi
his whole time to the matter. In February, 1
the Electric Storage Company, of Baltimore,
formed, and Mr. James R. Clark, of this city,
made its president. They devoted their att
tion to electric lighting for a long time, but th
ultimately "conceived that the times had not
arrived at which lighting by electricity should t
the place of lighting by gas;" and they furt
"believed that the future of electric storage
in its use for power, to which use none equa
the field of the propulsion of street cars, wh
if it could be accomplished, would do away v
the expense, noise and discomfort atten
upon the present method of drawing the same
horses. This method of locomotion," they
on to say, "is much superior to power by ca
and there is far less likelihood of a failure
working. Experiments, with a view to tryin
on our cars, has been going on for some ti
Those interested in the matter were at one t
ready to give it up as a failure. Mr. Wm.
Donaldson, of the Viaduct company, howe
was convinced that it could be made a suc
and energetically worked at it till it was sh
that it is entirely practicable." The batte

ed are 10 horse power, and are sufficient to n a car 40 miles. They are charged from the nited States Company's Works.

MASSACHUSETTS.

Amesbury. The Amesbury & Newburyport orse Railway company are likely to adopt elec- c motors of the Thomson-Houston type on eir new road from Amesbury to Merrimac, nich is expected to be in operation by July 1. ıe current for this road will probably be fur- shed by the Amesbury Electric Light company, d if the road proves successful they will no ubt equip their entire line to Newburyport. In ing this, the Newburyport company will fur- sh a portion of the current.

Chicopee. Work has been begun by the ringfield Street Railway Co., to extend its cks through the streets of Chicopee; the length track in the latter city will be from four to e miles. Springfield and Chicopee are ad- ning towns, and several of their streets are ntiguous.

Boston. The West End Street Ry. Co., are ing in for cable propulsion. They will nstruct a cable road from Harvard square, mbridge, to the draw on West Boston bridge. ıe power station will be in the vicinity of ırvard square, Cambridge. Cut off engines l be used. They have come to the conclusion ıt " the Chicago (Holmes) system is much tter than the Philadelphia system," and will nstruct as good a road as possible. Still stonians are not satisfied. " The cable road y take the place of horse car service in Boston, t it will never yield the rapid transit which is much desired," says an exhange. The Boston *obe*, May 7, devotes over four columns for ıstrated descriptions of cable, underground d " L " roads, showing the latter to the greatest vantage. Four or five elevated railway ilders are " knocking at the door of the State ›use " for permission to ask the city authorities l railroad commissioners for right of way; but yet make hardly any progress.

The Richards rail is being laid on the new uble track across Malden bridge.

[t is said that the Longstreet rail will be roughly tested by the West End Street Rail- y company.

Framingham. The Framingham Union St. . Co. will have about eight miles of track com- ted and in operation a few months hence.

Gloucester. The Gloucester St. Ry. Co., who ve nearly five miles of track in operation, now ıtemplate laying about three or four miles of am railway (street).

Newburyport. The Black Rock and Salisbury ach street railway has been extended some 3 les along Salisbury Beach to Hampton river, H. Was finished about last of April.

The Newburyport Car M'f'g Co. is receiving merous enquiries and orders. The business ›mises to be a very extensive one in the East.

Quincy. The stockholders of the Quincy rse Railroad company recently held a meeting h the object to effect permanent organization order that immediate steps might be taken to ld the road. Mr. H. M. Federhen presided, l Mr. Fred H. Smith acted as secretary. The lowing are the names of the directors who re elected by ballot : H. M. Federhen, Fred Smith, John E. Drake, Wilson Tisdale, ınk P. Waterhouse, James Garrity and John Merrill. Mr. John R. Graham was elected a ector; but upon his declining, Mr. Fred H. ith was elected in his place. A set of bylaws s adopted, in which the first Thursday of April s fixed upon as the date of the annual meeting, l the bond of the treasurer was placed at ooo. The directors were authorized to secure ›cation for tracks in School street instead of Water street, if they should see fit to do so ; › to proceed immediately with the construc- ı of the road. It was voted to reduce the ›ital stock of the railroad from $40,000 to ,000, owing to the company having decided to use electicity as a motive power, as was at t proposed. At a subsequent meeting of the ectors, the following officers were elected : sident, H. M. Federhen ; vice president, F. P. terhouse ; clerk, F. H. Smith ; treasurer, J. F. rrill. The new road will connect the points, th and West Villages, with each other and with the center of the town, and its completion will be hailed with satisfaction by the citizens.

Revere. The selectmen of Revere gave a hearing in the town hall recently to the Lynn & Boston Railroad company for permission to erect a line of poles on Ocean avenue, Crescent Beach. No one appeared in remonstrance, and the subject was taken under consideration. Rails are now being laid by this company through Ocean avenue to Oak Island, and it is contemplated to run cars by electricity, provided the privilege to erect poles along the route is granted by the selectmen.

MICHIGAN.

Detroit. The Detroit electric railway is not running satisfactorily, we are informed.

Grand Rapids. The one mile of cable road here is working admirably. The cost of operation is said to be only $15 a day. The number of passengers carried therein on Sunday, April 22, was 2,600.

MISSOURI.

Horton. The street railway here is nearly finished.

Kansas City. The $10,000 bonus has been subscribed for a cable line through the East Bottoms. Work of construction, says President Smith, is to commence forthwith.

The Kansas City cable railway company opened bids on the 18th of April for furnishing everything in the cast iron line for their new Washington and Summit street line. The specifications included about 6,000 pulleys, besides yokes, curved rails, bearing boxes, washers, and all special and general castings. The Kansas City Car wheel company, a branch of the Missouri Car and Foundry company, of St. Louis, was lowest bidder. The contract, we are informed, has been let to the lowest bidder, except that for the track rails which has gone to the Johnston Steel Street Rail Co., and the slot rails which has gone to Carnegie, Phipps & Co., Pittsburgh. The amount for the cast iron is $75,000, and for the steel rails $25,000.

The Metropolitan Street Ry. Co., have been trying a street indicator, such as is used in San Francisco. A rod connects the indicator with a system of gearing wheels placed under the car. Attached to this gearing is another rod which strikes a piece of rounded steel screwed onto the slot rail at all the street corners. The lower rod striking this piece of steel sets the machinery in motion, and the indicator, which consists of a revolving drum with flying leaves on which are printed the street names, revolves a point, and the name of the next street is revealed.

The Eighth street extension of the elevated cable railway is now completed. The laying of the cable April 21, attracted a great crowd.

The new cable cars on Twelfth street have not been working very satisfactorily; but they soon will be. Their curve trouble is now overcome, thanks to the ability of Mr. A. T. Wyman, of the Pullman-Car Works.

The Kansas City Cable Ry. Co., President Smith informs us, have secured a ten years' lease of the South Side Park, which they are going to beautify, so as to attract visitors by way of their street cars.

A petition is being signed in favor of a cable railway along Main and Delaware streets.

Another cable train has gone rushing down the incline, coming from Troost avenue, but now without disastrous results. The lever was thrown back with great force and struck J. E. Snow, the gripman, in the left cheek, brusing but not seriously injuring him. The cars were cleared of passengers and started down the incline in order that the crippled grip car might be switched on the other track and be taken to the engine house. The train men relied upon the brakes to prevent disaster, but about half way down the incline they lost control of the train and it went flying down to the bottom, where it struck an Independence avenue train. The cars were but slightly damaged and the train men were not injured, although they were badly shaken up. There were no passengers in the Independence avenue cars. The mishap caused a delay of only a few minutes in the running of trains.

Springfield. The Detroit Electric Works have been granted a franchise for an electric railway for twenty years. The Fisher system will be used. The road will be five miles long, and the whole is to be in operation within a year. Two miles will be built at once. The whole line, with its equipments, is to cost about $50,000.

NEW HAMPSHIRE.

Danbury. The Danbury & Bethel Horse Ry. Co. have about a mile and half of track in East Danbury, and the extension to Lake Kohanza is 3½ miles long. When the latter is finished they will add cars and probably use motor on lake branch.

Nashua. The Nashua Street Railway Co. contemplate an extension of one mile during the coming summer.

NEW JERSEY.

Asbury Park. The Seashore Electric Railroad at Asbury Park, is encountering renewed difficulties in its preparations for extending its line toward Ocean Beach. In order to secure a right of way, a lot of poles were dumped on Main street, but the business men along the route have prevented their being planted until after a hearing before the commissioners.

Atlantic City. The Pennsylvania Railroad Company is also said to be contemplating the substitution of electricity for horses on the Atlantic City railways.

Elizabeth. At the present time the Elizabeth and Newark Horse R.R. Co. is the only street railway in operation here. But the Elizabeth Street Railway Co. have a franchise for about 5½ miles, and the Third and Trumbull Street Railway Co. have a franchise for about a mile and half, both of which, " according to the terms of the ordinances granting the franchises, must be completed and in running order by Nov. 1, 1888."

Jersey City. A recent trial trip of the storage battery car on the Jersey City and Bergen railroad company was not altogether satisfactory. It left the ferry with a number of passengers, but while on Grand street (Jersey City) there was a breakdown, and a consequent loss of some time before the car was able to proceed. As soon as these " petty annoyances " are overcome the company proposes to introduce electric propulsion generally on its lines.

NEW YORK.

New Rochelle. The electric railway will be running next month. There will be five cars to begin with ; the power is to be furnished by the New Rochelle Electric Light Co. They are blocked with an injunction restraining them from running past Mrs. A. Eddy's property.

New York. Cable railways cannot be extended without the aid of the law's strong arm, it seems. On April 18, a peremptory mandamus was issued by Judge Patterson of the supreme court directing the commissioner of public works to grant a permit to the Third Aveuue railroad company, to make excavations along their line for the purpose of laying cables to be used as a motive power for their cars.

After securing an ordinance to use electricity the New York & Harlem R.R. Co, who operate the Fourth Avenue Street railway, they have a provision in their contract with the Julien people guaranteeing the delivery of so much power per car at a certain price, and this price is about forty per cent. below what the same power would cost furnished by horses. Ten cars are equipped with the Julien storage batteries.

The Rapid Transit committee of the Real Estate Exchange reports in favor of electricity, and the cable, and calls for the exclusion of steam locomotives.

Ogdensburgh. The Ogd. St. Ry. Co. contemplate about a mile-and-half extension.

OHIO.

Newark. Judge Altgeld, Chicago, is now sole proprietor of the street railway here. About three years ago Mr. S. G. Clark, of Lake View, Ill., and Judge Altgeld organized three street railways, one in Lansing, Mich., another in Janesville, Wis., and the third in Newark, O. They have now divided the property.

Painsville. Special information to the GAZETTE, April 27, says : " We have no street railway in operation, but a company has been chartered to construct between three and four miles of track ; a small portion, about half a mile, must be finished by August 15 next, in order to hold the grant from the council." Mr. S. H. Stage is interested.

PENNSYLVANIA.

Allegheny. The Observatory Hill Electric road is now running regularly after a number of delays and troubles of various kinds. The road will be extended to Pittsburgh in a short time, the necessary right of way having been obtained from councils.

Philadelphia. The Rapid Transit Electric Co. are going to use certain tracks in the city, not otherwise in operation, to demonstrate the advantages of their system of electrical street railways.

RHODE ISLAND.

Woonsocket. The Thomson-Houston Electric Light and Power company have applied for rights to introduce their system of street car propulsion in this city.

TENNESSEE.

Bristol. An electric railway company has been formed by Messrs. Barker, Reynolds and others, and it will begin work this summer.

Chattanooga. The Highland Park & Chattanooga Railway company may probably use storage battery. Their plans and works are now well advanced.

Nashville. The Lischery Avenue and National Cemetery Railway Co. has been incorporated by E. R. Richardson and others for the purpose of building a dummy railroad.

Shelbyville. Thomas R. Myers and others have incorporated the Shelbyville Street Railroad company.

TEXAS.

Dallas. A company is being organized here, by George D. Harrison and others, for the purpose of building a street railway.

VIRGINIA.

Staunton. An electric railway is to be built here by the local Thomson-Houston Co.

VENEZUELA.

Caracas. The government has granted exclusive right to the La Guayra & Caracas Cable company, represented by T. W. Tyrer, to build and operate a cable railroad between the port of La Guayra and the city of Caracas. The company is to begin the work of construction before September 1st, and to complete the road in three years. It is to have an exclusive right for ninety-nine years, the government agreeing that no company or person shall be allowed to operate a parallel competing line. The company is also to have the right to build stations, warehouses and wharves at La Guayra and to build necessary stations and warehouses at Caracas. It is to have free right of way and a grant of land for terminal buildings at both ends of the line. The maximum fares and rates of freight to be charged are prescribed, and the company is required to carry government freight, soldiers and other passengers on public service at one half the maximum rate.

The construction will involve some difficult engineering. The city of Caracas, which is the capital of Venezuela, is only a few miles distant from La Guayra in a direct line, but is several thousand feet above it, and the journey between the two places involves the crossing of the lofty mountain range. The cable road was considered the only practicable method of overcoming the extremely heavy grades which would be necessary in any line between the two places which did not make a very wide circuit. The building of the line will also involve the construction of several tunnels of considerable length.

ENGLAND.

Chiswick. The Lineff electric railway system, tried on the West Metropolitan Tramway, is not as successful as was expected, it seems.

SCOTLAND.

Paisley. Mr. James Gibson has an electrical tram car in operation here experimentally.

IRELAND.

Dublin. The Dublin City Council have applied to the Board of Trade for a license to supply electricity for all public purposes within the city. They propose to be empowered "to break up the tramways" belonging to the Dublin and Lucan Steam Tramways Co., and those belonging to the Dublin Tramways Co.

AUSTRIA.

Vienna. Some time ago, says the Vienna correspondent of *Industries*, I reported the inauguration of a short experimental electrical tramway line from the Central Station along the Königsgasse and part of the Ringstrasse, the total length being 1.1 kilometres. The service on this line has now for some months been perfect. The generating dynamo is established in a shed near the railway station, and the current is supplied by means of a central channel and a pair of conductors against which slide two contact shuttles. There are at present only two cars in use. These are of the same type as those on the Lichterfelder tramway, near Berlin. The transmission of power from the motor spindle to the car axle is by steel wire spiral cords. The central channel is of masonry throughout, with cast iron chairs for the support of the connectors, and has two steel rails on the top, leaving a slot one and one-fourth inches wide. Messrs. Siemens and Halske, who built this line, are experimenting with various forms of contact shuttle.

TURKEY.

Constantinople. The tunnel of the Metropolitan underground cable railway, from Galata to Pera, is of brickwork.

SYRIA.

Damascus. The metropolis of the Turkish "Pashalic of Damascus," which is probably the oldest city on this earth, is to have a street railway. We lack further information at present. It would be interesting to know if it is to run along the street called Straight? Thirty years ago the population of Damascus was one hundred and fifty thousand. The plain around the city is well watered and extremely pleasant—is "a wilderness of verdure, interspersed with innumerable villas and hamlets, with gardens, fountains and groves." Straight street still bears its old name, and "runs a mile or more through the city from the eastern gate."

Patents.

The following list of patents issued last month relating to Inter-mural traffic is specially reported for THE STREET RAILWAY GAZETTE by Wm. G. Henderson, solicitor of American and Foreign Patents, 925 F street, Washington, D. C. A copy of any of the following will be furnished by him for 25 cents:

380,469. Underground conduit for electric railways—S. A. Whipple, Detroit, Mich.
380,681. Car starter and brake—J. Heimlich, Oak Harbor, Ohio.
380,799. Indicator for street cars—F. Hicks, Buffalo, N. Y.
381,032. Cable railway grip—A. E. Roe, San Francisco, Cal.
381,048. Contact making device for electric railways—F. Wynne, Westminster, England.
381,192. Steam street car motor—W. Vogel, Chicago, Ill.
381,393. Car starter—J. M. Linscott, Worcester, Mass.
381,401. Pneumatic railway system—T. J. Mayall, Reading, Mass.
381,403. Elevated railway—T. J. Mayall, Reading, Mass.
381,405. Combined elevated and surface railway—T. J. Mayall, Reading, Mass.
381,489. Cable road grip gear—M. Toole, St. Louis, Mo.
381,495. Electrical railway—J. C. Love, Philadelphia, Pa.
381,555 & 381,556. Electric railway—R. M. Hunter, Philadelphia, Pa.
381,585. Trap for Electric railway conduits—W. M. Schlesinger, Philadelphia, Pa.
381,602. Car starter—J. Zeliff, Newark, N. J.
381,650. Electric motor for railways—S. H. Short, Denver, Col.
381,862. Suspended cable and electric railway—G. R. Taylor and W. Heckert, Louisville, Ky., and Yonkers, N. Y.
381,881. Device for removing obstructions or preventing accidents on street railways—J. H. Bickford, Salem, Mass.

THERE are 21 bills for electric railways before Congress for the District of Columbia!

Patents Described.

The following are brief descriptions of pater relating to street railway interests issued duri the past month, specially prepared for t STREET RAILWAY GAZETTE, by J. C. Higdo Mechanical Expert and Solicitor of Paten Rooms 55 and 56 Hall building, Kansas Cit Mo. A printed copy of any of the following w be furnished by him for 25 cents (stamps):

SPLIT-HOOF CLAMPS FOR HORSES.—J. I Wiestner, Philadelphia. This device consists a bowed spring having its ends bent to for clips for engaging the hoofs, said spring posses ing such inherent elasticity as to draw the be ends toward each other.

DEVICE FOR REMOVING OBSTRUCTIONS C PREVENTING ACCIDENTS ON STREET RAILWAYS- C. Mahon, Washington, D. C. This pate covers an automatic fender secured to the fro ends of cars, and it consists of a pendent swin ing arm and a pivoted shoe arranged in such r lation to each other as to operate conjointly remove obstructions from the track.

MOTOR FOR STREET RAILWAYS—B. C. Pol Camden, N. J. This patent covers a startir device which is provided with a toothed foot f engaging the ground between the rails.

FRICTION ROLLER FOR CABLE GRIPS—T. Mayall, Reading, Mass. This patent covers roller composed of alternate layers of rubber ar cloth disposed transversely to the gripping su face.

TRACK CLEANER.—J. B. Hoagland, Nashvill Tenn. This patent claims a pivoted fend operated by a lever from the car platform.

CENTER BEARING FOR CAR TRUCKS.—G. V Dithridge, New York. This patent claims a anti-friction ball-bearing between the car an truck frames.

CAR AXLE OILER—E. Housel, Summit, Ohi Covers an arrangement for oiling axles witho stopping cars, and consists of stationary c troughs arranged at the side of track and brush on the axle boxes which dip into said oil box as the car passes by.

STREET RAILWAY.—R. M. Hunter, Philade phia. This patent claims a street railway ra having a base portion and a raised treading po tion, and very thin vertical flanges extending dow from each edge of the rail and having hol through its flanges arranged out of a line, in whic the space bounded by the undersurface of the ra and the flanges is rectangular, and a woode stringer having its upper surface rectangular s as to fit into the rail.

HYDRAULIC GRIP.—C. L. Snyder, Kansas Cit Mo. This patent covers an arrangement c cylinder, plunger and pump for operating th jaws of grip.

Business Notes.

THE LEWIS & FOWLER MFG. CO., who recentl started into the Car Building business, in additio to their already large business in all kinds c street railway supplies, has about completed it new works, and has orders for cars from Wi mington, N. C.; Utica, N. Y.; Ashbury Park an many other points. As this concern is very we known to the street railway fraternity, and a there is considerable difficulty at the present tim in getting cars promptly, in spite of all the ca builders running on full time, and being crowde with orders, we have no doubt that the Lewis Fowler Co. will certainly get its full quota c orders.

THE BROOKLYN RAILWAY SUPPLY CO. has re cently taken up stable furnishings, in addition t its line of snow sweepers, plows and general rai way supplies, and reports business as unusuall brisk all over the country.

THE PECKHAM CAR WHEEL CO. are makin headway, we understand, with Peckham's paten interchangeable street car wheel, which has rubber cushion with interchangeable web an indestructible hub. Supt. Edes' testimony, o one of our advertising pages goes far to sho that Peckham's cushioned is a long way ahea of "ordinary wheels." More is promised concern ing it anon.

THE PARKS-HUNT SYSTEM OF CABLE RAI WAY TRACTION have their office at 524 Walnu street, Philadelphia. Their prospectus, extensiv extracts from which are given in this numbe shows forth their "system" to great advantag

THE SPRAGUE ELECTRIC RAILWAY AND OTOR Co., finding themselves cramped in their l quarters (16 and 18 Broad street) through owth of business, have now moved to much ger offices on the fifth floor. Mr. C. M. Bar-y, their Chicago agent, says they have closed ontract for an electric railway at Davenport, wa; and, on the authority of Mr. H. McL. arding, their general agent, it is declared at the Sprague Co. sold one-sixth as many otors during the past two months, for the var-is applications to which their motors are adapt-, as they have sold since the company was rted. Some Sprague motors have just been pped to Japan, also to the Big Bend mining nt, California.

MR. LOUIS RANSOM, of Akron, Ohio, who has mpleted his steam motor, would be pleased to ve street railway men in general inspect its rits. From personal observation we can most erfully affirm that it works admirably, and it uld appear to us as though there was certainly nty of field for such an invention, especially suburban service.

MESSRS. MCHOSE & LYON are still busy with ble work, and the fact that old customers al-ys come back to them should be, and is, a big ommendation in their favor.

ST. PAUL capitalists offer the following induce-nts to the Indianapolis Car Works to remove ir works to St. Paul: (1) $30,000 for the ildings in Indianapolis, the company to keep property and dispose of it as it may see fit; transportation of stock and machinery to St. ul to be paid; (3) price of fuel to be made ual to natural gas at Indianapolis; (4) build-gs equal to those occupied at Indianapolis to erected on twenty acres of ground and donat-to the company; (5) a certain bonus in cash every employee who accompanies the works l locates in St. Paul; (6) no taxes for ten ars. The works employ about 500 men, and ir removal would undoubtedly be a serious w to the manufacturing interest of Indianap-s.

THE THOMSON-HOUSTON ELECTRIC CO. report great process in electric railways, and this depart-ment of their business has increased so rapidly as to necessitate the taking of additional office room in the John Hancock building on Devon-shire street, Boston. There are at present 150 cars in operation on electric railways using the Thomson-Houston system, and over 60 miles of track. The following local companies are to increase their rolling stock: At Lima, Ohio, they will add four new cars, which brings the total number in operation on the railroad up to nine. At Wheeling, W. Va., they are making the larg-est additions, and will put on, in addition to their present number of seven, seventeen cars, each equipped with fifteen h. p. motors. At Scranton, Pa., they are adding to their original number of seven cars a new lot of eight cars, 30 feet long, and having a seating capacity of 125 passengers each. At Ansonia, Conn., they will have six new 15 h. p. motor cars, and also one 50 h. p. electric locomotive for hauling freight.

THE NEWBURYPORT CAR MANUFACTURING CO.'s works shows signs of great activity. In addition to the twenty cars ordered by General Manager Longstreet, Boston, mentioned in the April GAZETTE, they have orders for ten open (40 passenger) cars for the Lowell railway; three open (40 passenger) cars for Brockton street railway; two close (16 feet) and two open (40 passenger) cars for the Waterville & Fairfield railroad; two close cars for the Newburyport & Amesbury railroad; two open (84 passenger) cars for the Long Beach railroad, Gloucester, Mass. There are also ten cars being rebuilt here for the Lowell railroad. The company intends to keep a stock of cars on hand ready for delivery at the shortest notice. This company was incorporated last year. They have met with marked success. Mr. E. P. Shaw is president, and Mr. Eben Sumner treasurer.

THE BROOKLYN RAILWAY SUPPLY CO. are offering, in the advertising columns of this issue, some second hand cars (bob tails) which are in perfect condition, and can be purchased at a very low figures.

THE VIADUCT FOUNDRY, of Baltimore, Md., having secured the right of handling the Electric Accumulator Company's storage batteries, for the District of Columbia, and the states of Delaware and New Jersey, fitting up a car with the same; and on Friday, April 27th, had a test of the car in Baltimore, for the edification of the citizens of that beautiful city, and especially for that of a number of prominent street railway men who had come up from Washington for the express pur-pose of being present: the car was constructed by the J. G. Brill Co., and was a model of sub-stantial workmanship, comfort and convenience. After running around all day the car was brought up to the Camden station, and boarded by eight or ten gentlemen, including E. V. Cavell, of the STREET RAILWAY GAZETTE, and was run around over several miles of track, through the principal streets of Baltimore, and up some pretty stiff grades, some of which were rated at from 7 to 9 per cent. The trial was eminently successful, and the trip terminated where it begun, at Cam-den station, the inmates of the car being delight-ed with the ease with which it could be con-trolled.

A clever feature of the car was an arrange-ment whereby the batteries were placed in posi-tion (under the seats) from the outside, instead of having to carry them in and out from the car whenever they had to be charged (about once a day). Mr. Davis of the Viaduct Foundry accom-panied the party, and could not but feel delighted at the immense success of a scheme of which he has been an carnest promotor ever since the ship "Labrador" landed on our shores, bringing in its hold the first series of storage batteries ever brought to this country.

THE WAY FOUNDRY, of Philadelphia, contin-ues busy with orders for cable railroad castings, and has made tremendous strides towards getting the bulk of such business since it first took it up.

*** BUSINESS NOTES should always reach the General Office by the end of the month preceding publication.

The Street Railway Gazette.

ɔL. III. CHICAGO JUNE, 1888. NEW YORK No. 6

Wm. J. Smith, Esq.

PRESIDENT, KANSAS CITY CABLE RAILWAY COMPANY.

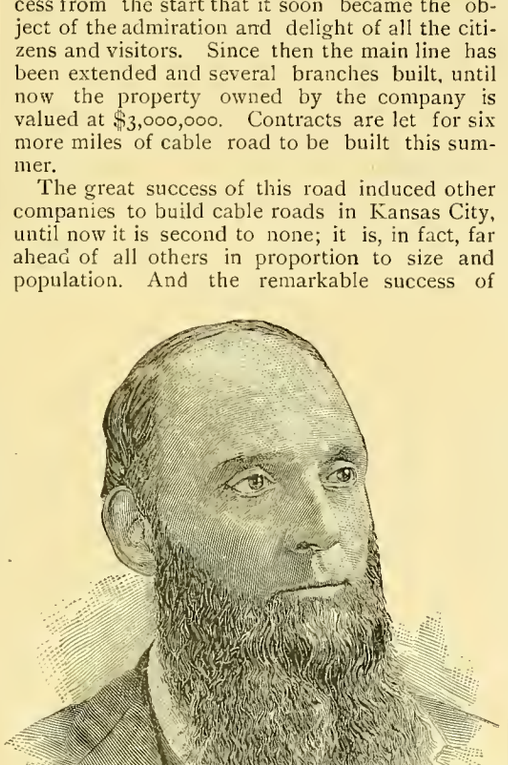
Kansas City—the city of that name on the Pennsylvania" side of the "muddy river"—es much for its marked prosperity to the neer of cable railways there. The popula-n of Kansas City in 1880 was 55,787. Now it ɔver 150,000, and the system of cable propul-n introduced there by the subject of this tch for street-car service has done a great ıl toward improving the city and making it at-ctive to commercial men and others. In an-er part of this number we give an illustrated ıpter on the "cableography" of Kansas City. re we have much pleasure in giving a brief tch of the career of the man who conducted genesis of that interesting cableography:

Villiam J. Smith, the well-known President of Kansas City Cable Railway company, who is ɔ President of the East Fifth Street (Kansas y) Railway Company dummy line, was born Blauveltville, Rockland county, New York, y-one years ago, the year in which the city of cago received its municipal charter—1837. attended the district school for a few years, completed his studies at the Irving Insti-e, Tarrytown, N. Y. Before Horace Greeley's ice, "Go west, young man," had become ular, young William J. emigrated to the state Illinois when seventeen years of age; and e he was engaged in farming for twelve rs—namely, until 1866.

n that year, with a good crop of Illinois wn whiskers, Mr. Smith located in Kansas y, where he immediately established the firm Smith & Keating, afterwards changed to the ith & Keating Implement company, of which was elected president. For years this house l more implements and wagons, it is said, n any other concern in this country, if not in world. It was during the period in which demand was most enormous.

t was in 1884 that Mr. Smith's attention was ed to street railroading. At that time the et-car facilities of Kansas City were very in-quate and miserably poor, being a by-word a reproach in that direction, and a source of oyance and discomfiture to her citizens. Mr. th determined that his adopted city should e the best—not merely as good as any other ,—but the best street-railway facilities of any of similar size in the United States. (And noble aim is already *un fait accompli.*) He mined the cable railways which had been in essful operation in San Francisco and in Chi-ɔ previously, and the cable system he con-red exactly suited for propelling street-cars the heavy grades of the streets in Kansas . But the idea of running street cars up les of 14, 15, and even 18½ per cent. ıed so chimerical that very few capitalists in city could be induced to take any stock in undertaking. Mr. Smith, however, furnished t of the money to build the first two miles of cable road; but this line was such a grand success from the start that it soon became the object of the admiration and delight of all the citizens and visitors. Since then the main line has been extended and several branches built, until now the property owned by the company is valued at $3,000,000. Contracts are let for six more miles of cable road to be built this summer.

The great success of this road induced other companies to build cable roads in Kansas City, until now it is second to none; it is, in fact, far ahead of all others in proportion to size and population. And the remarkable success of



cable railways here has induced the formation of companies to build cable-car lines in Omaha, St. Paul, etc. Even the Philadelphia Traction company seems to have drawn much inspiration and encouragement from the success of cable railways in Kansas City, as well as San Francisco and Chicago.

"Mr. Smith deserves particular credit," says one that was thoroughly acquainted with the difficulties of the beginning of cable railways, and who had every opportunity to see the development of the original Kansas City cable road, "for backing up the enterprise with hard cash in the manner he did." And after giving details, he adds: "It is not very difficult to conceive a project, but it takes nerve to put up many thousands of dollars which a man has been working hard for for years in an enterprise that looked at one time as if it would fall through for want of a little experience."

Mr. Smith and those who co-operate with him are not confined to cable railways. The East Fifth Street Railway company use the steam car, with boiler in front and passengers abaft. The grades of this line permit the use of these cars. This dummy road is only one and one-half miles long; but there is an ordinance now before the city council for an extension of several miles.

The Peckham Interchangeable Street Car Wheel.

In our May issue we called attention to the remarkable success that had attended the experimental use of the Peckham Interchangeable Street Car Wheel, and we have now the pleasure of presenting illustrations which clearly represent its construction.

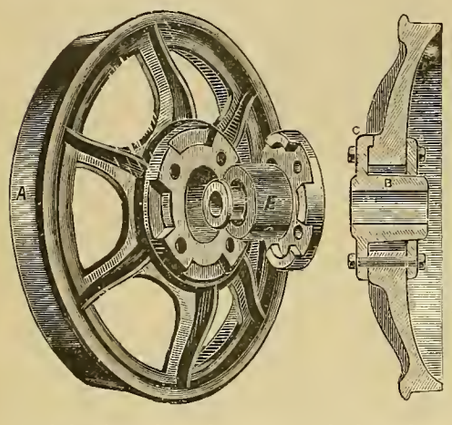
The two fundamental ideas underlying the construction of this wheel are, that the web or tread can be renewed at any street railway stable by unskilled laborers, without the use of hydraulic presses or other expensive machinery, and that the elastic cushion with which it is provided effectually prevents all crystallization of the axle, and thus prolongs its life.

When the wheel is under the car, there is nothing about its appearance to attract the attention of the ordinary observer, and it can be adapted for use with any of the running gears that are now upon the market. Its center is a hub to which the wheel is bolted. This hub is bored out so that it can be pressed upon the axle at the ordinary pressure, and is turned off upon the outside with a tapering seat for the rubber cushion. This rubber is straight upon the outside and is tightly fitted in the hole in the wheel web. The latter consists of the usual wheel tread and spokes, with a hub large enough to bore out and go over the rubber cushion. When these three pieces are in position, a rubber gasket having been placed between the back of the web and the flange on the hub, a light flange is slipped on over the hub and bolted to the face of the wheel. The flange, web and flange of the hub are all drilled accurately to templates, so that the bolt-holes will come true when the web is to be renewed. The latter is also bored true to gauges to fit over the rubber cushion and be thoroughly interchangeable.

When this wheel was first offered to street railways, some doubts were expressed as to the durability of a built-up wheel. The proprietors* therefore decided to give it a severe and exhaustive trial, and make an actual demonstration of its merits. Accordingly, one year ago last February, a car was equipped and placed upon the Houston, West St. and Pavonia Ferry R. R. in New York, a road that, with one exception,

*The Peckham Car Wheel Co., 239 Broadway, New York City.

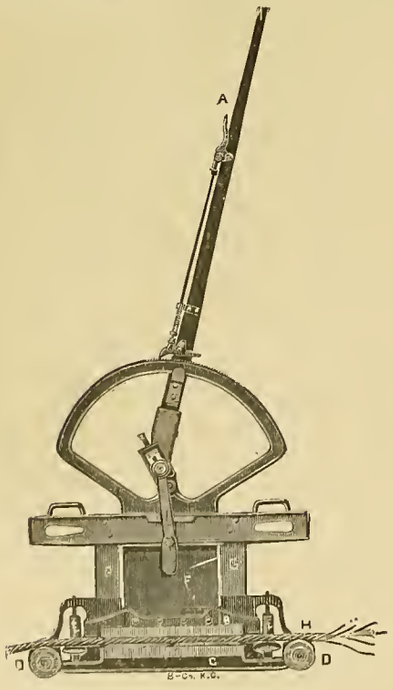
has more crossings and curves than any other in the city. After allowing the car to remain in a service where it was in daily use for fourteen months and where the wheels gave the most perfect satisfaction, as evidenced in the letter from the superintendent published in our May issue, the company have made preparations for their manufacture.



And, having thus demonstrated the value of their wheel, they are already in receipt of orders from some of the most prominent roads in New York and Brooklyn, as well as from Mexico.

Kansas City Cableography.

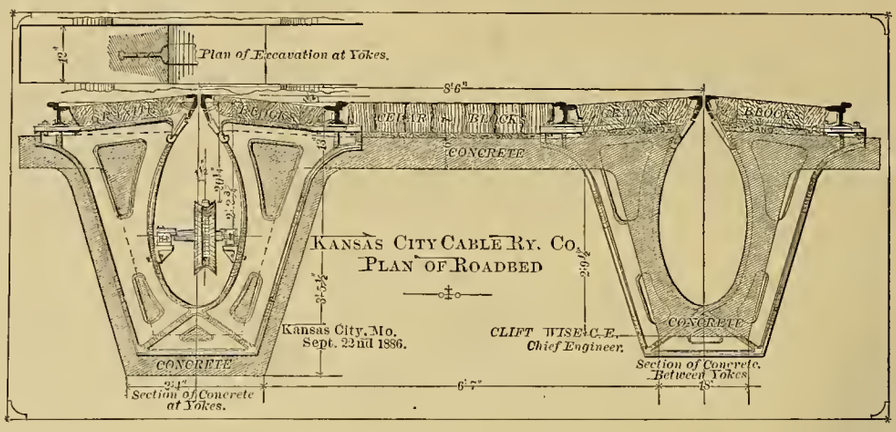
Mr Clift Wise, chief engineer of the Kansas City Cable railway, has favored us with a neat little book of over 60 pages. It begins with the ever new story, with which our readers are familiar, as to the Clay Street Hill road, San Francisco, being the first cable railway in the world. What is most worth noting in this book is the statement that in 1880 there were but sixteen miles of cable in operation altogether. In 1884 there were 34 miles of cable roads in the United States, and one very short one in London, England. At the present time there are "nearly 200 miles of cable roads in the United States alone, with a prospect of an additional 100 miles before next January. Chicago heads the list with 50 miles, San Francisco follows close after with 37 miles, and Kansas City has 32 miles."



THE GRIP.

It will no doubt be interesting, for all interested in cable railways, to know some particulars of the cable lines engineered by Mr. Clift Wise. Mr. Robert Gillham was the first chief engineer of the Kansas City Cable railway; he built the first two miles, and to him is due the credit for the rapid development of cable railways throughout the West. Mr. Clift Wise succeeded in August, 1885, and engineered the balance of the road; and the way the extensive lines of the system are working is a great credit to him. In his "Cableography" Mr. Wise says:

On the 24th day of June, 1885, the Kansas City Cable company ran the first cable train in Kansas City over the first division of its road then completed, and marked the dawn of a new era in the history of Kansas City. Methinks the



vociferous mule would have heaved a gentle sigh of relief had he known that the death blow had been given to his severest vocation. However that may be, it is undisputed that cable roads have, by furnishing rapid transit, contributed more than any other one thing to that unequaled prosperity of which Kansas City is so justly proud; and to-day the cars that are hauled by cable power would require 2,000 mules to haul them on level ground. For all practical purposes the suburbs have been brought near the heart of the city; and real estate has increased immensely in value.

The endless cable of 22,000 ft. was used until July, 1886, when extensions were built, and it is now my object, says Mr. Wise, to give a simple description of the road as operated with the three new extensions of East Ninth street and Independence Avenue, and Troost avenue lines.

We need not quote entensively from the new book before us; those desiring fuller information will no doubt be able to get a copy. The accompanying cuts speak for themselves; the map of the various branches of the system shows the location of the principal sheaves, vaults, curves, tension cars, power stations, and their relative positions. The intervening pieces of roads, some of which are long and some short, are left out as indicated by the irregular lines.

A difficulty hitherto experienced with slot rails has been overcome by a slotted shim patented by Mr. Wise. The rails used are the well-known Johnson girder. The cables are 1¼ in diam, weighing 2½ lbs. to the foot, and composed of six strands laid around a hemp heart being manufactured by John A. Roebling's Sons Co., Trenton, N. J., under the Seal patent which they own.

The strands are each composed of nineteen wires, made of crucible steel. The cable moves at the rate of 648 feet per minute, or about 7 3-10 miles per hour, and runs 147 miles each day. The Troost avenue cable is over six miles long and weighs 80,000 lbs. "Strong as it is, if it we suspended by one end it would break of its ov weight. Experience agrees with theory in mai taining that a longer cable than this can not profitably operated." The power required keep the cable up to speed, without trains, wh it was 22,000 ft. long, was 35 horse power. Wh Independence avenue extension was added w one double curve, making length of rope 29,8 ft. long, 82 horse power. When East 9th stre with one double curve was added (driven by auxiliary cable receiving its speed from fricti drums driven by main cable at 8th and Woo land) making the total length 36,200 ft. it quired 117 horse power. The average load about 275 horse power. The breaking strain cables used is about 40 tons.

The new plant at 8th and Woodland is t largest cable plant it the United States. Th are four sets of driving machinery made by Po & Hunt. They are driven by two Wright engin 400 horse-power each. Only one engine, drivi three sets of machinery, is required at present, l the other is kept in readiness for use on a minut notice. The cables from this plant run 9.92 mi per hour.

The four cables which this station is designat to operate are as follows:

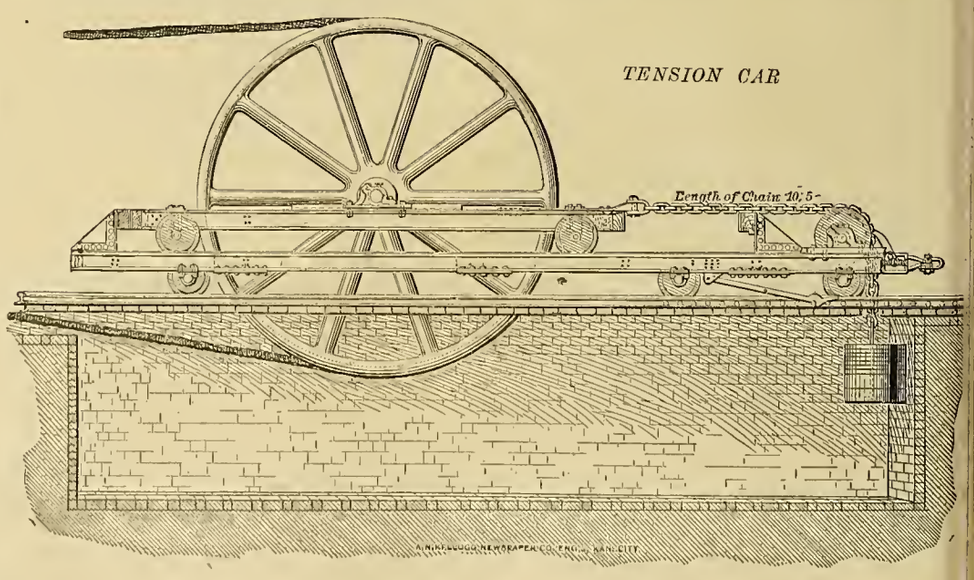
Independence Avenue line cable	8,850 ft.	lc
East 9th street line cable	6,400 ft.	lc
Troost Ave. line cable	34,486 ft.	lc
Proposed cable	25,210 ft.	lc

The old power station operates the m line from Union Depot to 8th and Woodla ave., as over this part of the system the gra and travel are heaviest.

The four sets of driving machinery are gea to the same shaft, by means of a friction clut

A 15-light Thomson-Houston dynamo furnis incandescent lights in the building and arc lig on the street.

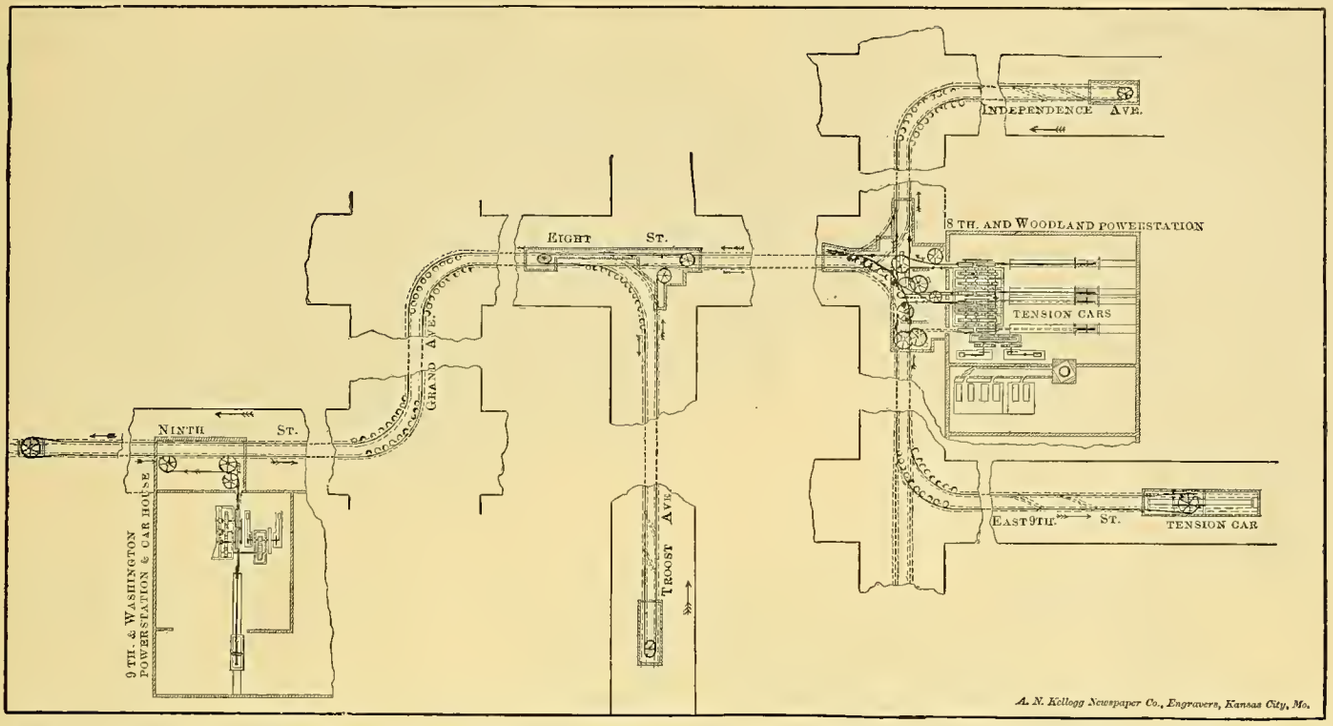
It may be interesting to add what is said ab



fare registers: The use of Edward Bead register on the road, being an almost per check, on collector and passenger, of all fa collected, has given perfect satisfaction, and lost fares have been reduced to almost nothir

Correspondence.

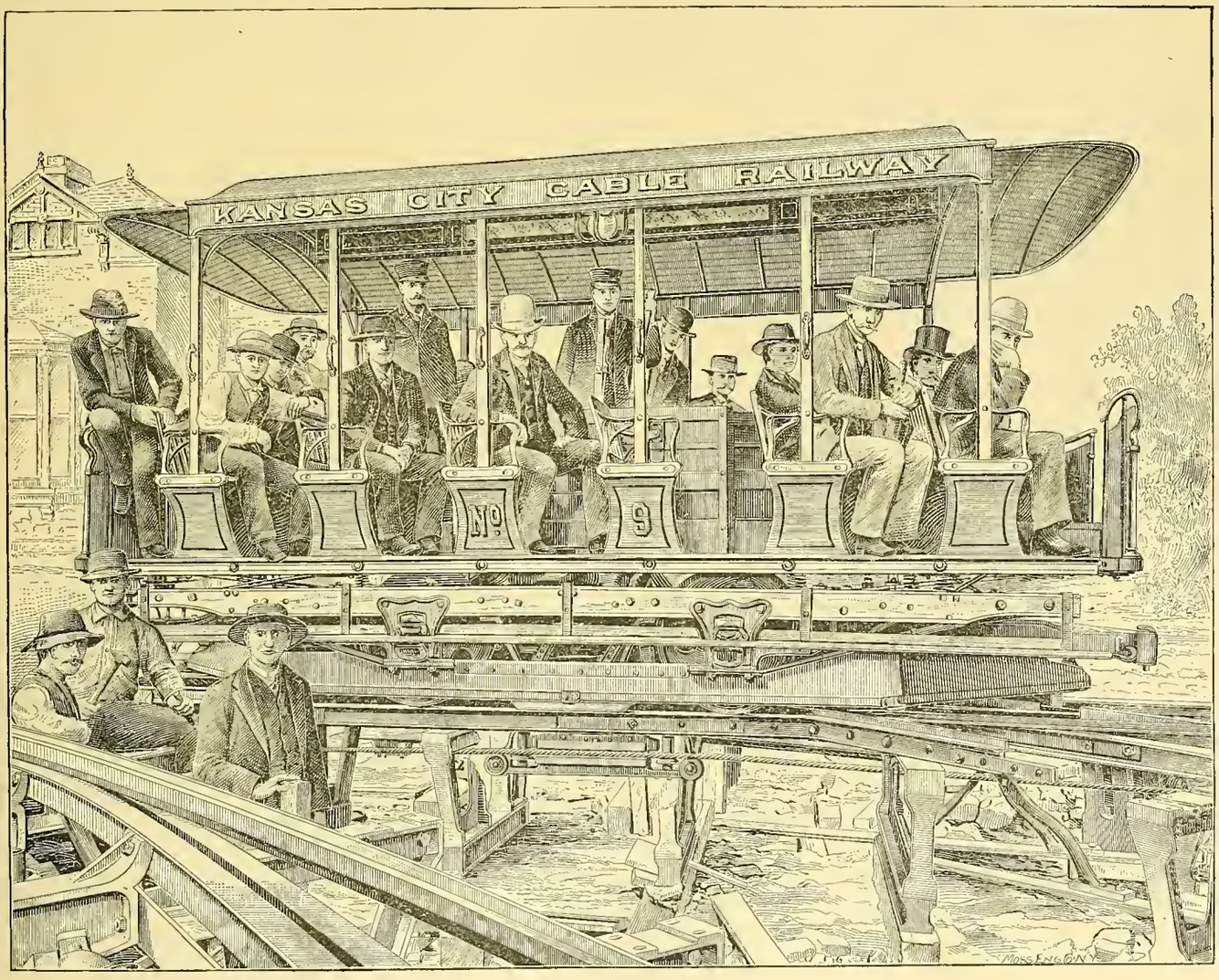
CINCINNATI, May 25.—Henry Martin, president of the Mount Auburn Cable Railway company, has commenced laying the cable on his Avondale Extension. This extension is two



miles and a half in length. It affords access to his suburb by a continuous route at a single fare, whereas now a change of cars is necessary, including a double fare. Mr. Martin is also actively agitating an ordinance, though amid great opposition, for a cable route to the western suburb of Price Hill. Mr. Martin, in view of his inexperience and the great obstacles encountered in local legislative bodies, is greatly elated over his success in constructing a great suburban line, and that over a route hitherto deemed impracticable, because of the steep hills.

Another new suburban line leading out of this city is under consideration. The Board of Public Affairs at its last meeting received bids for the construction of a street railway on the Montgomery Pike. George B. Kerper agrees to construct a road and carry passengers for five cents cash fare, or sell thirty-five tickets for a dollar. Silas Hoffman offered a similar cash fare rate, and thirty tickets for one dollar. The Cincinnati Traction and Construction company made the lowest offer, agreeing to carry passengers for a one-cent cash fare or 102 tickets for a dollar None of the bids were accepted, owing to a previous offer of Henry Martin. The latter, by the way, claims to own the road; and there is a fair prospect of a struggle between Mr Martin and Mr. Kerper to gain possession of this franchise, which will open up a very valuable territory.

Henry Martin has finished laying the cable in his Avondale extension, and the branch will be opened for traffic on an early date.



"The New Electrical Railway."

SHORT'S SERIES SYSTEM.

In connection are shown several illustrations of the Short series system of electrical railways manufactured by Sidney H. Short & Co. of Columbus, O., and which has received practical demonstration in that city.

Either overhead or underground conductors are used with this system, the former being illustrated by Figs. 1 and 6 and the latter by Fig. 2. In Fig. 6 it will be noted that the objection to wooden poles on the street of a city is entirely removed by the use of iron arches, which span the street only at street intersections. Suspended from these arches are steel wire cables parallel with the street, to which the supports for the electrical conductors are attached. These supports are sufficiently close together to form a level track of the wires upon which the current collector travels. The arches support the electric lamps and their supply wires and so remove all necessity for poles on the streets.

Fig. 1 shows a single iron arch which is intended to be used in narrow streets, and on single tracks with turnouts, but it is in many cases used with double tracks. It is constructed in the same manner as the double arch, and is very graceful and ornamental. Should the conductor in the elevated construction in any way be broken, no injury would result from their coming in contact with any person as in this system the moment the break occurs the electric generator at the station automatically stops. Telephone and telegraph wires falling upon these conductors will not interfere with the running of the road. The system is harmless to man and beast.

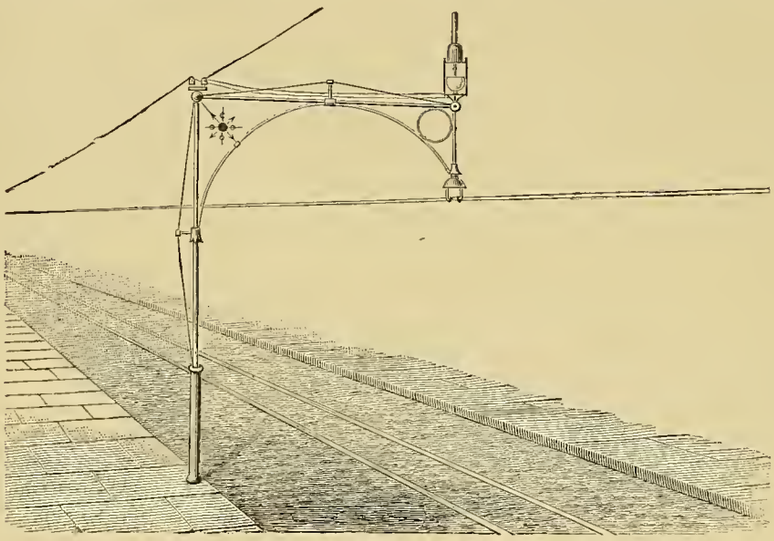


FIG. 1.

The current collector which moves along on the elevated conductors weighs but six pounds and is entirely new in construction, embodying principles which make it impossible for it to leave the wires. The collector receives its power from one wire and transmits it to the motor which returns it to the other wire to be carried on to another motor. The electric energy is not allowed to come in contact with any part of the track or with the earth.

The construction of the conduit used in this system is shown by Fig. 2. The ties, yoke and slot rail are all of steel and firmly riveted together into one structure. The conduit itself is formed of cement and stone. The small size of the conduit—fifteen inches deep—makes it possible to construct it at small cost, and yet have it substantial. The conductors which are placed in this conduit are small copper wires, such as are used on the elevated lines, supported on peculiar porcelain insulating brackets at short intervals. It is not required in this system to use massive conductors to transmit power, for one hundred cars can be run on the current carried by a small wire as well as one car. The current collector travels on these conduit conductors in the same manner as on the elevated conductors.

Fig. 3 is a perspective view of the car preferred for use in this system, a part of the body of the car being removed to show the position of the motor. The front compartments are all prepared to be fastened to the car in place of the front platform and hood and are easily applied to any of the cars now in use. This position removes the motor from the dust and dirt of the street, leaves the gearing all in place, and provides a clean, dry and warm room for the car driver. The front window can be let down in warm weather for better ventilation of the car. The motor is immediately under the eye of the driver, and perfect oiling and attention are insured. Another position is between the axles of the car and entirely concealed by the floor above and a dust tight box around it. This position leaves the entire car and both platforms free for passengers. The motor is controlled from either platform with perfect ease. The third position is in a separate car to be attached to the passenger coaches. In many cases a portion of this motor car is utilized as a smoking car. The cars are lighted with incandescent electric lamps, and electric headlights are attached to the front of the cars.

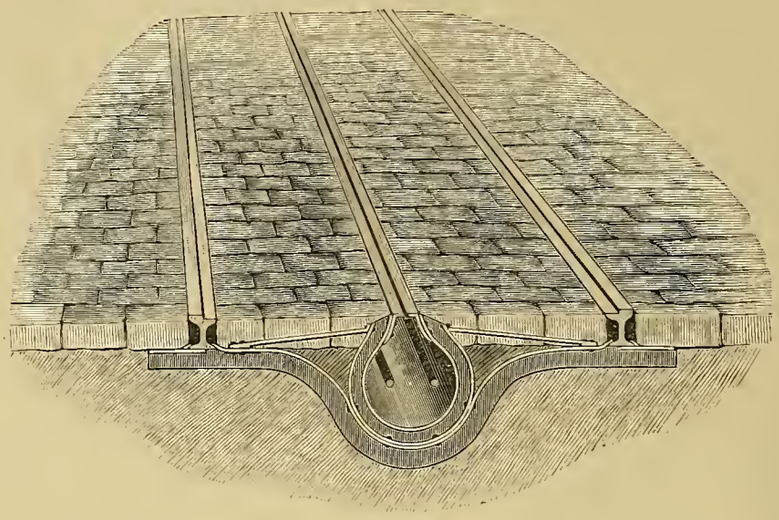


FIG. 2.

It is necessary in the transmission of power from the motor to the car wheels to use the most direct and positive method known to mechanics. Accordingly the company have adopted spur gearing, Fig. 5., as this precludes the possibility of a failure in action and gives the least possible loss in transmitting the power. They use gear wheels of cast steel cut with great precision, and pinions made from rawhide held firmly between plates of steel. The teeth of these pinions are cut to match accurately the teeth in the gear wheels so as to have a train of gears which run at any speed with absolutely no noise.

The motor truck, mounted on the standard car wheels and axles, arranged to receive the car bodies of any make or size, is furnished complete, as shown by Fig. 4, and geared to run at any desired speed. The motor is supported on a steel framework attached to the axles of the car with bearings of the best make and provided with continous feed oilers. This is a strong framed locomotive within itself and is changed from under the box to the open cars with the season. No other appliance than is shown in this cut is used for regulating the speed or direction of motion. No resistance coils, switches or other electrical devices are used in this system of electrical railway.

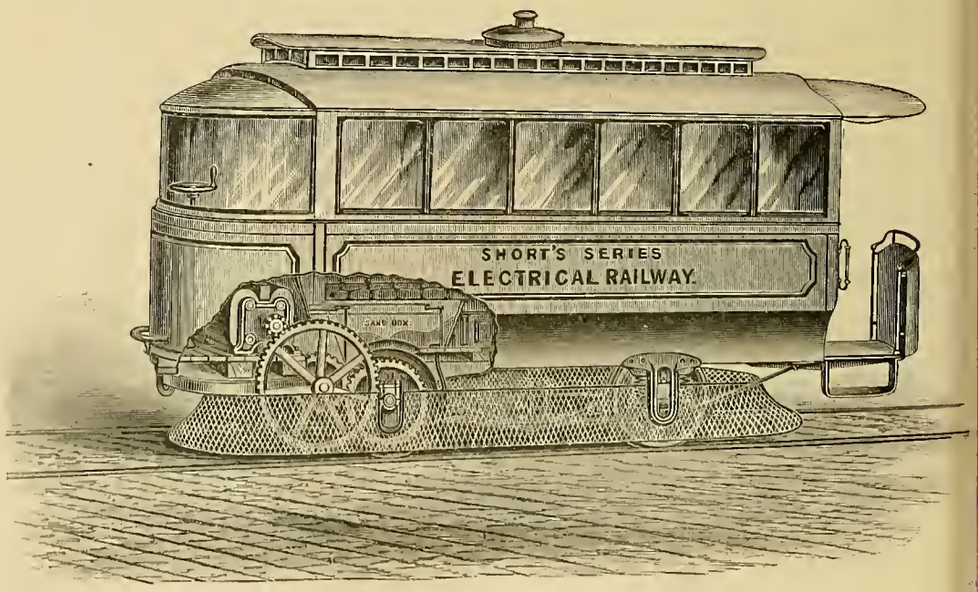


FIG. 3.

The company after considerable experimenting have adopted and recommend the Brush dynamo for a generator.

Past, Present and Future Rapid Transit.

To review the past is more edifying than looking to the future, though both are profitable.

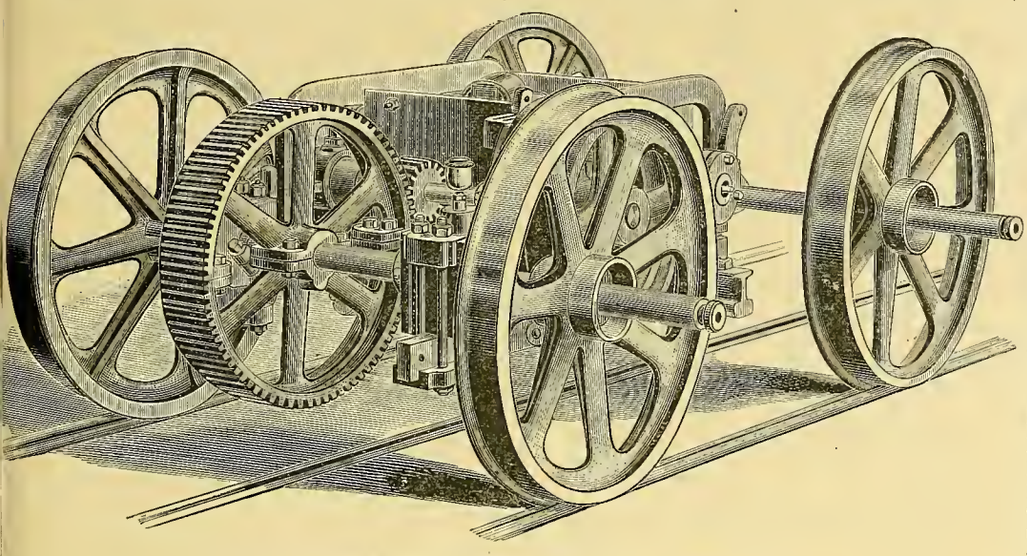


FIG. 4.—THE SHORT SERIES SYSTEM OF ELECTRICAL RAILWAYS.

And it is wonderful how one new scheme after another is born into the world just at the proper time—not too soon, so that it does not improperly interfere with the uses of its predecessors—not too late, but in the fulness of time. So that it makes a right link in the chain of progressive evolution. The whole is regulated by an unseen power, whereby scientists and inventors are held in check.

We have heard of flying machines being invented. Such an apparatus would be very convenient, if small and cheap enough, and easily managed, to carry us from one part of a crowded city to another—to say nothing about going at one bound from Chicago to New York, or thence across the Atlantic ocean. But the probabilities are that the human race must be satisfied, for generations to come, with a number of intermediate developments, leading up thereto, just as we have had to put up with the omnibus, before the horse car came, and with the latter before the invention of cable railways; and the cable cars have kept alive the hope of intermural travelers until the dawn of the era of electric railways. Each system, in its turn, comforted the people of its day with the delusion that they had arrived at perfection.

The omnibus, the immediate forerunner of the horse car—time is too limited in a space like this to go further back than that—the omnibus was invented by the famous Blaise Pascal, the champion of Port Royal and the author of the Provincial Letters; he was also a distinguished inventor and celebrated mathematician. Pascal himself had been used to ride in a carriage and four—until the well-known incident on the bridge at Neuilly, when his horses plunged into the Seine, snapping the traces and leaving him in the carriage on the brink of eternity. It is said that Pascal would never ride alone afterwards; and ultimately he, in conjunction with the Duc de Roanez, ran a number of omnibuses along the streets of Paris. That was about the middle of the 17th century. The date is not accurately known; but Pascal died in 1662, the year in which the first regular newspaper was started.

That popular means of rapid transit was satisfactory until about the middle of the present century. In 1825 a train of cars was drawn by horses, on rails, from Stockton to Darlington (in England); that was the first horse railway. But steam was soon substituted; horse cars were not yet wanted; and steam engines were the only proper means, in the public estimation, to move passenger cars, especially after Stephenson had crossed Chat Moss with his locomotives, and established a service of trains between Manchester and Liverpool.

The first intermural railway was built in New York City, which was operated at first by locomotive engines. Omnibuses were preferable to these on the streets of the city; and these were masters of the situation until horse cars became popular; that was about the beginning of the fifties.

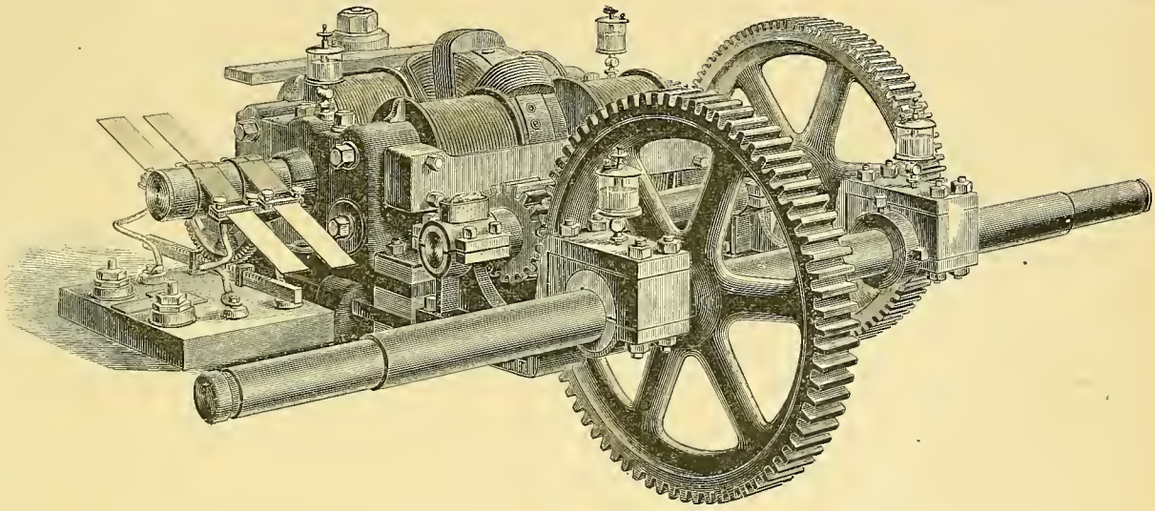


FIG. 5.—THE SHORT SERIES SYSTEM OF ELECTRICAL RAILWAYS.

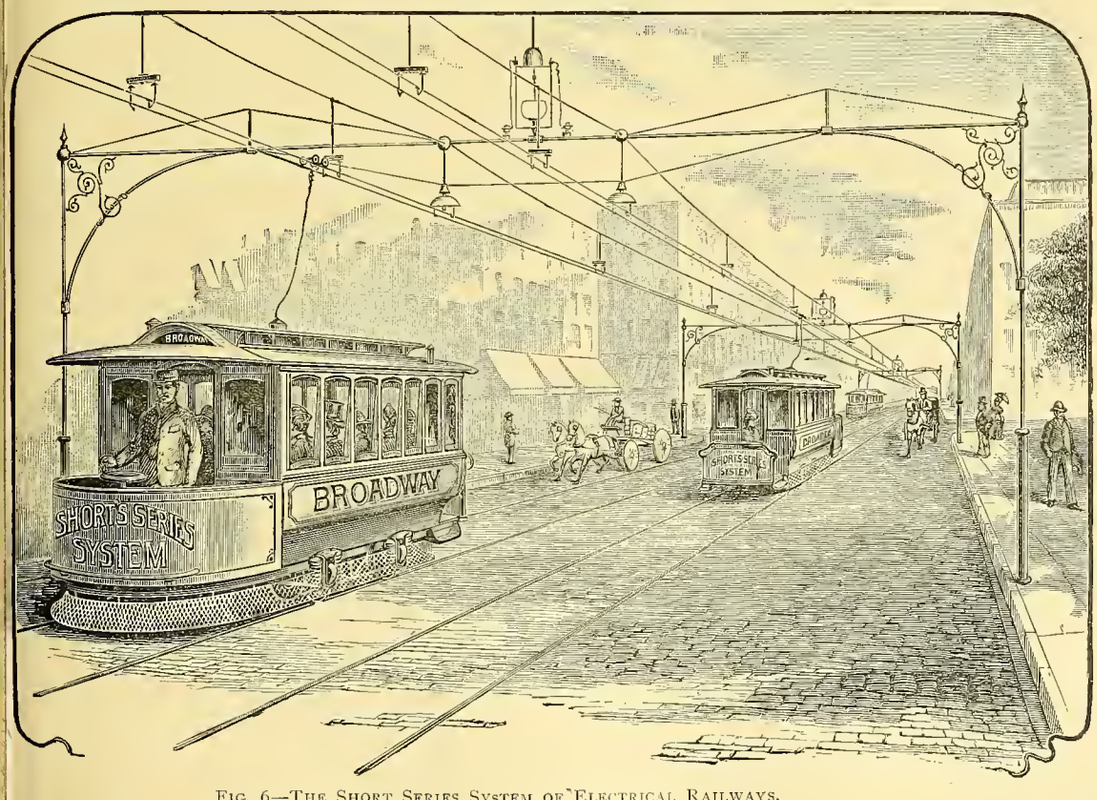


FIG. 6—THE SHORT SERIES SYSTEM OF ELECTRICAL RAILWAYS.

As the larger cities increased, improved means of intermural transportation became imperative. But the period of the popularity of horse cars must be passed over; also the history of the underground railways of London, and the elevated railways of New York. Suffice it to say that the cry is gone up for something better than horses. The steam engine will not do in cities, cable railways are not quite good enough, and electricity, which is supposed to have its headquarters in the clouds, above which the angels dwell, is offered for the urban populations of the earth.

M. Figuier is authority for the statement that accident, pure and simple, was the means of discovering that mechanical energy may be transferred electrically. He relates that, at the International Exhibition of Vienna, in 1873, the Gramme company exhibited two electroplating machines. One of them was in motion, and the other not. A workman, noticing some cables trailing on the ground, and thinking they belonged to the second machine, placed them in its terminals; thus the two machines were unwittingly connected; and to the great astonishment of everybody the machine which had been standing still began to turn, apparently of its own accord. When it was understood that the one machine worked the other, the transmissibility of electrical energy was ascertained.

The
Street Railway
Gazette.

E. V. CAVELL, - - - - - - MANAGER.
WILLIAM HUGHES, - - - - - - EDITOR.
EDWARD J. LAWLESS, - - - ASSOCIATE EDITOR.

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Articles and papers on subjects relating to intermural transit always appreciated; the GAZETTE'S columns are open for the expression of independent opinions, and the discussion of all matters connected with street railways—on the surface, elevated or underground. A special column is devoted to the publication of trade notes and items from manufacturers and dealers.

HORSES, burnt by the scores, as our report from Montreal illustrates, increase the wishes of street railway companies and managers for some substitute for horses to draw street cars.

"UNLESS electric traction, all things considered, becomes cheaper than horse flesh, it will not be used." So says the *Electrical Engineer* (London). In America electricity is there "a long time since already."

ELECTRIC railways are likely to treble in number of lines, motors, cars and lengths of road during the present year. According to what we hear, at all events, negotiations are now going on for the conversion of over a hundred lines to electricity.

THE Tramways Institute of Great Britain and Ireland is too aristocratic, it seems. At all events, a very prominent tramway official in England says, in a recent communication to the editor of the STREET RAILWAY GAZETTE: "Our Tramways Institute is not so popular—or broad—as yours (the Am. St. Ry. Ass'n). It scarcely *looks down* into the ranks of managers for its membership. I hear or read but little of it."

SERIES systems of electric propulsion date back to 1882, when Prof. Fleming Jenkin, Edinburgh University, "clearly foresaw that finally the series system must obtain if the mechanical details could be perfected." A San Francisco inventor has made "an important advance" in the series system. And nearer home, the Short series system, described in our present number, is actually in operation, and has been working satisfactorily for some time.

CABLE transmission of power has been utilized for the driving of machinery in widely-separated parts of a building, by the Union Steamboat Company, Market street, Chicago. The cable used is a manila rope seven-eighths of an inch thick and 750 feet long. The pulleys used are similar to those used by the North Chicago Street R. R. Co. The engine is 40 h. p., about 5 h. p. being taken up by the machinery when moved without doing any work.

STEAM motors are again coming to the front! even those Baldwin steam motors which were turned from the streets of Philadelphia in 1876, are inquired after, and the Baldwin modern motors, Ransom's steamer, etc., are gaining much favor recently. Further improvements in steam motors are reported from various quarters. Col. Crowley says that four new steam motors now are being made at Richmond, Va , for the East Side St. Ry. Co., Topeka, Kan. "They will be different from the motors now in use, that they will have trucks in front; they will also have a revolving broom on each rail to throw snow from the track in winter time."

CABLE railways, observes an exchange, effect much saving of time in many ways. Ladies do not think of standing on the street corners to say the last few words to a friend; neither do they undertake to stop the car a square off and run for it, or more likely take their time to reach it; nor does the conductor wait until the passenger is seated before starting the car, and when the car is stopped for a passenger to get off the passenger does not stop to finish a conversation before getting off. The conductors should bear in mind that their duties are more onerous than before. With the lazy jogging horses or mules the driver could look about him, and was even quicker to perceive a waiting passenger than the conductor, who was often enjoying a bit of gossip or a discussion perhaps with a passenger upon the rear platform. Now that the gripman has just as much as he can do to keep from running over careless people, he cannot assist the conductor in looking out for passengers, and the latter will have to wake up and keep a look-out.

ELECTRICIANS differ as to the exact meaning of general terms, such as the *ampere*, the *volt* and the *ohm;* some professors compare the *ampere* in electricity to the *flow* of water in a pipe, the *ampere* being the unit of current strength; the *volt* is the unit of electro-motive force, which some describe as akin to the *pressure* in a steam boiler; while the *ohm* is the unit of *resistance.* These definitions, however, are very indefinite; and as "practical units" their meanings have been changed by one congress after another, in Paris and elsewhere. In such a case we may well claim exemption from using technical terms. And in common language, let us continue to glance at the possibilities of the future, in reference to the use of electricity to promote what is called, in the parlance of the street, "rapid transit;" for people have no time to be amazed at what has been done, and the wonder is, what is going to happen next? We know not what is going to happen to-morrow; yet coming events cast their shadows before.

MAYOR ROCHE, Chicago, was good enough to state his views recently to a representative of the STREET RAILWAY GAZETTE anent elevated railways. His honor seems anxious to have an "L" road built in Chicago during his first year's mayorality. In fact, in the course of his speech at the opening or official starting of the North Chicago cable railroad, March 26, Mayor Roche declared that Chicago *must* have an elevated railway too. At the municipal election the following week, however, the most prominent alderman connected with the parties who are anxious to build an elevated road or two on the West Side, was outvoted, chiefly because there is a stronger feeling against the "L" railway than for it. Nothing daunted, the mayor thought sure that an elevated road was coming to Chicago very soon by an "alley way;" and so his honor went to New York the latter part of April to inspect the "L" roads there and in Brooklyn, so as to be fully prepared to give an intelligent reception to that expected to materialize quickly on the alley way, as well as others. It is his belief that elevated railways will be built in Chicago, and in running order, between this and next summer; he went to look at those in New York in order to inform himself as much as possible on the subject.

"SNAKES" are sent with samples of Beaman's fare boxes for testing purposes, and to show by experiment that his is "the only fare box positively secure."

Persecution of Mr. C. B. Holmes.

Our readers want to know how the lawyers' tack on Mr. Holmes stands. Several have w ten to inquire. Some ask: How did the c end? This question comes from long distanc where telegraphic dispatches have not given c tinuous reports of the proceedings, and to s we have only to say: The end is not yet.

At this writing, the "trial," so called, reached its twenty-fifth day. So far back April 19, Mr. Sumner C. Welch, the able offic in charge of the accident department of the C cago City Railway company, was attached Judge Hawes, charged with contempt of co by attempted jury-bribing. As soon as the m ter was published in the newspapers, We called at the clerk's office to see the pap which he found in the office of Judge Barnu son! As soon as he read the papers he said t reporter: "This case will fall as flat as a p cake. It is nothing but a genuine case of c spiracy"—*i. e.*, a conspiracy among the mani lators of the law against the Chicago City R way company. The case has not yet fallen flat as a pancake; it is too full of the leaven malice and uncharitableness. But that it is malicious attempt to ruin the railway compa and especially to pull down its president, Mr. B. Holmes, becomes more and more evident the case proceeds. The details of the proce ings would fill a large volume. We can give sum and substance thereof in small compa however. It will help to clearly understand all by bearing in mind two or three well-kno facts.

Let one fact be stated in words quoted fr the New York *Times* of Sept. 24, 1882, after mean set of lawyers of the Empire city, w tried to ruin the Third Avenue Railroad co pany and its president, Mr. Lewis Lyon, h been discomfited: "Few people have an idea the evil energy displayed by a certain class of called lawyers in hunting up and investigati claims for damages against corporations, pecially railways. The instant that mention an accident, however trivial, appears in newspapers, they rush to the person injured secure the case. * * * The fellows w practice getting business in this way are not go lawyers, nor even honest ones. They instig litigation, regardless of whether there is any j tice in the claims they set up; take cases 'speculation,'—as the famous suit of Bard against Pickwick was taken,—but always mana to chisel a few dollars out of their delud clients for 'expenses;' and if they ever succe in worrying the company into a compromise settlement they will take the lion's share of money paid, or perhaps all of it." Such is t legal pestilence which Mr. Holmes' faith servant, Sumner C. Welch, has energetica fought against for years, and so successfu that several lawyers have become furiously vengeful.

If any doubt the accuracy of the description certain "respectable" lawyers, above quote here is another: The famous Daniel Dougher (who nominated Mr. Cleveland at St. Loui made an eloquent speech at the banquet of t American Street Railway association last C tober, in Philadelphia, in the course of which mentioned the illustrative case of a lawyer w got a verdict of a thousand dollars for a cli of his against a railway company, and when got the money from the railway company said to his client: "I tell you, that was a migh big verdict. I didn't think we could accompli anything, but we beat them;" and so he drew check and gave it to the man. It was for fif dollars, and the man said: "Look here, M ——, the verdict was a thousand dollars. You you don't mean to say that you are going keep nine hundred and fifty dollars and give fifty dollars for my injury?" The indigna lawyer said: "Here, give me that check back He then drew his check for seventy-five dolla and said: "Take that, you d—d cormorant."

As Mr. Holmes has testified, and as some the directors have testified, Mr. Sumner Welch has done his best during past years to re cue victims from the hands of fleecing lawye or prevent them from falling into their clutch He has played the part of the Good Samarit all along, procuring doctors for the injured, a

ettling just claims amicably and on liberal erms. Consequently lawyers were deprived of source of great revenue—to themselves.

If any imagine that Chicago lawyers are bet-er than the hungry ones of New York and Phila-lelphia, here is the declaration of Judge Shepard,)f Chicago, when Lawyer Wade Abbott was)rought before him, May 12, charged with con-empt of court by forging divorce decrees: 'This court-house is full from top to bottom of nen who are making money by nefarious means. Some of them are professional corrupters of jus-ice, and they are all engaged in various kinds of lespicable and rascally business." Lawyer Ab-)ott was sent to jail for ninety days.

The Welch case had then reached its sixth lay. Nothing up to then nor since has been)roved or attempted to be proved against Mr. Welch, beyond the insinuation that he intended o bribe Juror Rosenthal, or, at all events, that ie spoke to him while he was on a jury trying a :ase against the railway company. Rosenthal's estimony to the effect that Welch spoke to him is iot corroborated, except in a feeble and doubt-ul manner, and the defense is that Rosenthal is nistaken.

It is admitted, however, that Mr. Welch did speak to a juror in another case,—that of Ker-oot,—which was reported in our last number. t is not pretended that he did more than speak-ng to him. And the extraordinary part of that vent is that the other side spoke to the jurymen also—behind the scenes. And what is most to)e regretted in connection with that part of the 'investigation" (as this persecutive prosecution s politely called) is that Judge Hawes confined he inquiry so as to shield Judge Barnum, who vas counsel for Kerfoot, and who also spoke to nembers of the jury out of court, it seems.

Juror Dennison (who sat on the Kerfoot case) vas asked if Welch spoke to him during the rial. The juror answered: "Yes; and also Mr. Kerfoot, Mr. Hardy, Judge Barnum, and——"

"I did not ask you about Mr. Kerfoot or Judge Barnum," said the judge (Hawes), frowning. 'What did Welch say to you?"

"Oh, nothing particular. Good morning, or something of that sort," was the reply.

In answer to another one-sided question, Juror Dennison refused to be hampered, and proceeded o say: "There were several of them standing round—Judge Barnum, Mr. Kerfoot, and——"

Judge Hawes exclaimed: "I told you I didn't care to hear anything about Judge Bar-num or Mr. Kerfoot! What did Mr. Hardy (the railway company's lawyer) say?"

"I told him and them" (persisted the witness) 'that the lecture we had heard from one of the expert medical witnesses on the location of the backbone was worth twice as much as our pay as urymen."

Mr. Hynes (Welch's lawyer) elicited the state-nent that Judge Barnum and Mr. Kerfoot had spoken to the juryman often while the Kerfoot case was in progress. And it appears to us, from ll that has been brought out hitherto (and the case for the prosecution is now exhausted), that Welch's object in speaking to juries has been to prevent the other side monopolizing talking fa-vors.

Until the case is ended we will say no more, except to mention that no effort has been spared o vilify Mr. C. B. Holmes—and all by inuendo. The proceedings are nominally against S. C. Welch. Some of the lawyers who pose as the self-appointed champions of the purity of the aw are guilty of open champerty; yet the num-ber of the law's limbs who have been outwitted by Sumner C. Welch is so great that the prose-cuting attorneys have been strengthened by a forcible backing; and at one stage of the pro-ceedings efforts were made to incite the Bar as-sociation to "support" their brethren—Pope, Parkhurst, and the rest—in running down C. B. Holmes and his hustling lieutenants. The Citi-zens' association was also tempted to join the crusade against the superintendent of the largest Sunday-school in the world. But the Bar asso-ciation, as such, did not lose its head, although Attorney Starkey has made himself scarce. The most impudent move of the enemies was to agi-ate the Citizens' association against Mr. Holmes. It was ineffectual. And, really, the whole trouble is now almost "as flat as a pancake," and the horse the prosecution are riding upon will soon drop down dead unless Judge Hawes will wind up the case in such a way as to infuse new life into it, and stimulate the grip of the King-Parkhurst-Pope triumvirate.

The last move, hitherto, was the repetition, on a small scale, of what has been aptly described by philosophers and historians as "holding the candle to the devil." Mr. Holmes avoided the temptation, and kept out of the spider's parlor. He is, therefore, left alone for a season; and Judge Hawes takes a pause.

American Street Railway Association.

The sixth annual report of the Association has been issued. The principal item of "news" it contains is the treasurer's financial report. The rest was reported, in the main, in the STREET RAILWAY GAZETTE for November. This official verbatim report, however, is most convenient for reference; it runs over 179 pages, with an excellent portrait of Mr. Thos. W. Ackley, last year's president, together with a list (as usual) of the members of the Association, which are 152 in number, appended. Lists of officers are also given for each year since the Association was organized, as well as the officers for the current year.

The treasurer's report shows cash in hand Oct. 20, 1886, $1 018.07; received during last year $2,459.40, from 143 members. Payments were: secretary and treasurer's salary, $999.96; "annual report" expenses, $548.10; legal opinions published, $276; miscellaneous printing, $101.95; postage and miscellaneous items, $96.80. Thus, the receipts exceeded disbursements by $436.59; and the amount in bank at commencement of their current fiscal year was $1,454.66. The Association is therefore in a healthy financial condition evidently.

The subject deserving most attention, as far as we can bring it to the front, is the great increase in membership anticipated at the next annual meeting, commonly called the Washington Convention, which is to meet on Wednesday, October 17. The executive committee at the Philadelphia meeting, last October, proposed the following amendment to the constitution and by-laws:

ASSOCIATE MEMBERS.

"Be it resolved that the constitution and by-laws be amended so as to permit manufacturers and dealers in street railway supplies to become associate members of the Association, on the payment of the membership fee of twenty-five dollars, and the annual dues assessed active members, it being understood that said associate members shall have no voice in the deliberations of the Association, except by general consent, and under no conditions shall they be permitted to vote upon any matter before the Association."

The subject had been referred to the executive committee, by the Association, and there was a strong feeling in favor of suspending the rules and laws of the Association, in order to admit associate members there and then; but the secretary maintained that such action would be unconstitutional, and after hearing his explanation every one present agreed with him. Therefore it could only be adopted as a notice that such amendment be resolved upon, and carried into effect at the next annual meeting.

THE SALT QUESTION.

Beside the matters referred to, the report before us is accompanied by an addenda of eight pages, containing Prof. Raymond's translation of Drs. Siedamgrotzky and Born's essay on the question, "Does the use of salt on snow act prejudicially on horses' feet?" The authors were induced to attack the burning question of salt-strewing experimentally. The temperature of snow is lowered by the addition of salt, as everyone knows; but the degrees vary according to whether the snow be damp and hard or otherwise; and, moreover, the quality of the salt has much to do therewith. "Cattle salt," which is adulterated with a large percentage of oxide of iron, is what horse car companies generally use. This treatise contains extracts from the reports of 238 experiments. In conclusion it is deducted with certainty, that salt used to dissolve snow is not injurious to horses' feet; and that diseases of the hoof are caused by wet straw in stables, want of cleanliness, etc. It is well worth the while of proprietors and managers of street car horses of procure this treatise on salt-strewing.

Exhibition of Street Railway Equipment and Supplies (proposed) at the Washington Convention.

Having heard several complaining at the last meeting of the Am. St. Ry. Association, at Philadelphia, to the effect that the Association neglected to provide facilities for exhibiting street railway equipments and supplies, in connection with the annual meetings, we have just inquired, of some of the numerous people interested, what their views are on the subject. The head of one well known firm of manufacturers says (June 2):

"I have always felt that an exhibition of improvements in devices pertaining to the construction of street railways, would be the most valuable part of the annual meetings of the Street Railway association, and have so expressed myself frequently to members of the association, all of whom agreed with me; but until the Association, as an organization, express a desire to have manufacturers make such an exhibition, and offer them some encouragement in the work, I don't feel like forcing such things upon their notice, and especially as they have heretofore rather looked upon exhibitors as intruders and hangers on.

"Can't you work up a feeling, on this subject, among the members of the Association so that at their next meeting they will make a formal resolution asking manufacturers in future to show new and novel discoveries at the annual meetings?"

We have received several communications to the same effect, but the last paragraph of this one differs from the rest, inasmuch as it implies that the Association may not, in a constitutional manner, make official arrangements for an exhibition in connection with the next meeting. Under the Secretary's guidance, the Association very property decided at Philadelphia not to receive "associate members" without giving proper notice of motion, and therefore deferred the opening of the door for associates for a year. "Associates" is an entirely new element, however, and foreign to the existing constitution; whereas, the arranging of such an exhibition as proposed would not be inconsistent, probably, with the constitutional object of the Association. Article II. (of the constitution) says:

"The object of this Association shall be the acquisition of experimental, statistical and scientific knowledge, relating to the construction, equipment and operation of street railways, and the diffusion of this knowledge among the members of this Association, with the view of increasing the accommodation of passengers, improving the service and reducing its cost; the establishment and maintenance of a spirit of fraternity among the members of the Association by social intercourse, and the encouragement of cordial and friendly relations between the roads and the public."

There is no better way to acquire "experimental, statistical and scientific knowledge" than by the means proposed. If the Executive Committee can see their way clear to undertake such an exhibition at Washington next October, we venture to assure them that exhibits will come in in abundance. The following is a specimen of manufacturers' readiness to exhibit:

Baldwin Locomotive Works, Philadelpha, Pa., June 5th, 1888.

Editor STREET RAILWAY GAZETTE:

Dear Sir: Replying to your circular letter of the 31st ulto., we would say that if a complete and first-class exhibition of street railway appliances were arranged for in connection with the convention at Washington in October, we would send a motor. Very truly yours,

BURNHAM, PARRY, WILLIAMS & Co.

THE OLD "JOHN BULL" IS THERE ALREADY.

The opportunity which presents itself at Washington next October is such that occurs once only, to get up a splendid exhibition of the various kinds of street cars, motors, and everything connected with street railways. It is such a chance that can never occur again. Not only would almost all manufacturers and dealers connected with street railways contribute to the exhibition, but the door could be opened naturally enough for steam railroad exhibits also. And what is more, the Board of Regents of the Smithsonian Institution, including President Cleveland and the chief cabinet officers, have been desirous

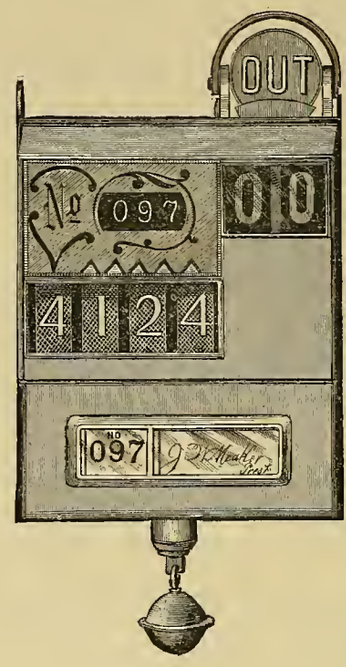
for some time to secure specimens of the kind for exhibition; and no doubt every aid would be rendered to make a temporary exhibition a success, and provide for the preservation of articles for permanent exhibition at the United States National Museum, which is under the direction of the Smithsonian Institution.

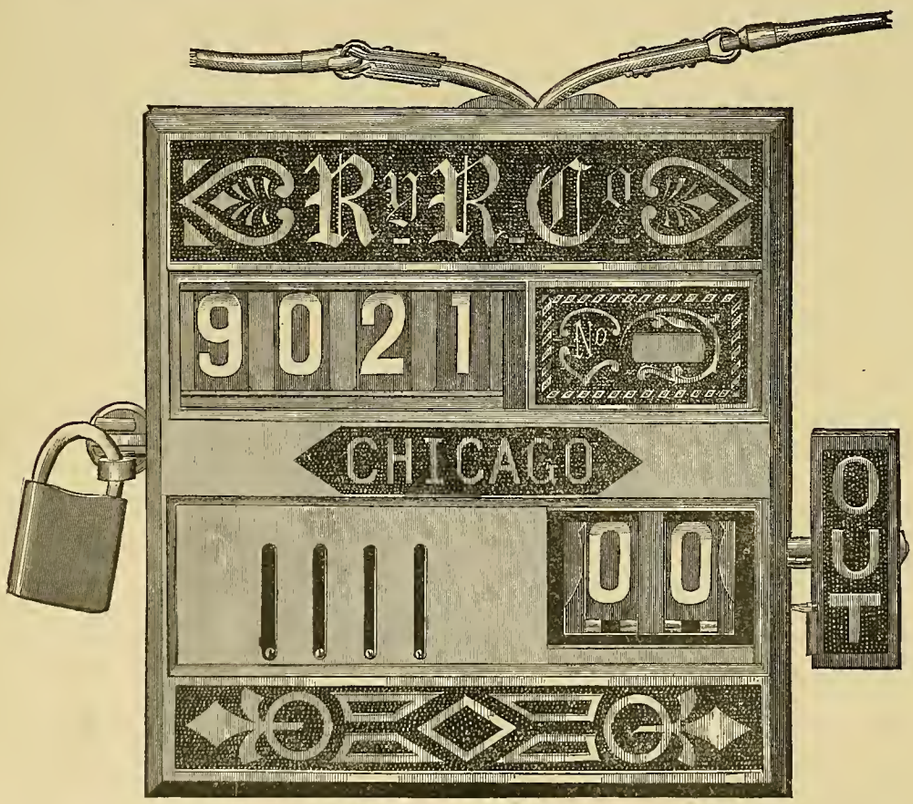
At all events the annual report of Prof. S. F. Baird, presented to the Board of Regents July 1, 1885, says: "It is intended, as opportunity offers, to gather in the Museum a collection of objects illustrating the history of American railroads and steamboats, with a view to preserving permanently the memorials of the growth of this most important interest which has been so closely connected with the material progress of the United States.

"Several important specimens have already been received, notably the 'John Bull' locomotive engine which was built in 1831 in England by George and Robert Stephenson for the 'Camden and Amboy Rail and Tramway Company, by whom this engine was used from 1831 to 1861. This is now stored at the Armory building, but will be placed on exhibition as soon as proper space can be provided."

The Railway Register Co.'s Register.

Be it known that John W. Meaker, residing at Chicago, in the county of Cook, and State of Illinois, has invented a new and useful improvement in fare registers. So says the preamble to Letters Patent No. 357,725, dated Feb. 15, 1887. Since then the patent has been in much litigation, and the invention has been assigned to the Railway Register company, of Chicago.





Messrs. West & Bond, the well-known patent attorneys, Chicago, inform us that the Railway Register company have been sued—under the Corbett reissue patent, on the ratchet; under the Benton patent, on the resetting devices; and under the Harris patent, on the trip indicator; also by the Railway Register Manufacturing company, of Buffalo—and that it has been held that the register in question is no infringement of either of said patents. Further details are given in the company's advertisement, in our present number. And in the same advertisement is a list of the numerous companies already using this new register, all of whom speak very highly thereof. The stationary type is to be used on the West Chicago lines, in lieu of the neck machines (which have too many brothers-in-law).

These are wheelless machines—both the neck and stationary ones—and combine strength with simplicity. They are also very secure; the neck machines are perfectly reliable, until a dishonest man neglects to operate it, and rings a decoy bell hidden on his person. The stationary machine cannot possibly be "fooled" in that way.

Damage suits are the most dangerous enemies that street railway companies have to contend against. The Kansas City council have just paid $450 to one John W. Rickerts for damages received by falling into a cable road excavation at Tenth and Walnut streets. Attorneys for street railroads have heretofore held that in cases of this kind the city and not the company is responsible for damages sustained. In the case of Rickerts, the city have paid the judgment and will make a demand upon the Grand Avenue Cable Railway company for the amount. If payment is refused, the company will be sued. In this manner, the question of a street railway's liability in a damage suit of the kind mentioned can be definitely settled. The outcome will be awaited with interest by many.

"Cable Railway Practice," Article V, by Edward J. Lawless, is held over until July number. This practical author is busy making extensions.

Our Card Basket.

Mr. John A. Brill has gone to Europe on flying visit.

Mr. G. W. La Rue is now associated with th Sprague electric railway and motor company.

Mr. G. W. Condict is general manager of th Electric Car Co., of America, as heretofore.

Mr. C. J. Van Depoele, the well known elec trician, has left Chicago, and is busy at th Thomson-Houston electric works, Lynn, Mass.

Mr. J. L. Windsor has resigned his positio as superintendent of the Auburn City railway.

Colonel Crowley, of Chicago, the we known railroad builder, who has the contract fc building the East Side Street railway, Topek Kansas, says the eleven miles of road there wi be in operation by the 4th of July.

Mr. J. B. Parsons, general manager of th West Chicago Street Railroad company, ha given so much food for reflection for the "wall ing delegate," *et al.*, at one interview (reported i May Gazette) that all agitation for "grieva ces" seems to have ceased.

Supt. J. C. Shaffer (Indianapolis) gives a d serving word of praise to the St. Louis Car Cc published in our Business Notes.

Prof. Reckenzaun's engagement with th Electric Car Co., of America, as consulting an advising electrical engineer, has terminate The company have purchased all his valuab patents, and will soon be in a position to p numerous storage battery cars in operation, v are informed.

Mr C. T. Yerkes enjoys a remarkable degr of relief from the incessant mosquito bites of th Chicago daily newspapers, to which he had bee subjected for a considerable time. There a two special reasons for this. One is, the Nor Side cable road is now working admirably; th gripmen are at last masters of their work. Th other reason is, that his neighbor on the Sou Side, Mr. C. B. Holmes, has been subjected virulent legal persecutive prosecution for son weeks past, attracting general attention, a syno sis of which we give in this issue.

Commander J. R. Bartlett, of the U. navy, succeeds Mr. D. F. Longstreet as gener manager of the Union Railroad company, Prov dence, R. I.

Mr. J. C. Robinson, whose book of testim nials is referred to elsewhere, has left New O leans for Texas.

Mr. H. H. Windsor, secretary of the Chica City Railway company, has repeatedly invit Mr. J. C. Robinson to visit Chicago.

Mr. Charles Hathaway, president St. Cl street railroad company, favored us with a c recently, looking none the worse from his rece duck-shooting experience.

Mr. Q. A. Woodward has resigned his po tion as superintendent of the Nashua (N. H Street railway.

Mr. J. B. Bartholomew, secretary of the T peka Rapid Transit Co., has issued an intere ing pamphlet on the wonderful growth Topeka. It is another illustration of the fa that truth is stranger than fiction.

Mr. Edward E. Higgins, formerly of t Standard Electric company, Vermont, has a cepted a position with the Sprague company, managing agent for western New York, wi headquarters at Buffalo. We think this a go acquisition of the Sprague company, as Mr. Hi gins' ability and energy stand very high.

Mr. Lucius Clark, general manager a treasurer of the South Bend (Ind.),Railway co pany, intends to be absent from that pla henceforth, to attend to business engagemer in a distant country; and for that reason thr street railways under his control are advertis for sale in this number of the Gazette.

Mr. W. G. George is filling the secretarysh of the South Bend (Ind.) Railway company wi great satisfaction.

Mr. T. L. Beaman has resigned his positi as secretary and treasurer of the Knoxvi (Tenn.) Street Railroad company in order to gi his whole attention to the manufacture and s of the Beaman Fare Box, which is meeting w great favor. He was secretary and treasurer

ıe railway company for ten years ; and it is to is successful management that the prosperity of ıe line is principally due. In the hands of such man, the Beaman fare box is bound to succeed.

Mr. S. H. Davis has been elected to succeed Ir. Beaman as secretary and treasurer of the noxville Street Railroad company.

Superintendent A. W. Anderson, of the ayton, Ohio, street railroad (3d street line) onored us with a call the last week in May, and isited the North, South, and West Chicago reet railways.

Mr. James H. Hewitt, under whose manageıent and superintendency the car service of the itizens' Street Railway company of Wellington, ansas, was greatly improved and its earnings aterially increased, has terminated his connecon with the line and returned to his home in t. Louis.

Mr. A. J. Edgeworth, of Wichita, Kansas, as purchased the franchise, road and equipment mplete of the Citizens' Street Railway company of Wellington. The line and equipment e in first-class condition. Several of the cars ave been lately rebuilt and a great deal of work as been done on the tracks.

Mr. G. H. Littlejohn is the new superinndent of the Topeka City railway, and he surised the car drivers the end of May by giving em an advance of $5 per month each—unsocited. The rise affects about thirty men of all ades. The drivers are graded according to e length of time they have been in service, id this affects all grades.

Mr. Jesse Shaw, who has held the position of perintendent of the Topeka City railway for ven years, resigned May 1, his place having en filled by Mr. E. M. Littlejohn, of Boston, stated above. Mr. Shaw has accepted a posion with the Topeka Water Supply company. efore he left the street railway the employees esented him with a very fine stem-winding ld watch, on the inside of the cover of which as engraved the following inscription : "Prented Jesse Shaw, Supt. T. C. R'y Co., by emoyees. Topeka, Kan., May, 1888."

Mr. Robt. Gillham, engineer of the Kansas ty Elevated Ry. Co., under whose directions e first railway in Kansas City (described in anher part of this Gazette), was constructed, s gone to Boston, where he will remain about c weeks, superintending the construction of the ble railway which the West End Street Ry. Co. ve decided to build. Elsewhere we report the ection of Mr. Gillham as president, as well as ief engineer, of the People's St. Ry. Co., Kans City.

Mr. Charles L. Pullman says that the elec c railway at Pullman will be proceeded with thout delay.

Mr. Horace G. Bird reminds us that the mis journal box and gear, the Bemis patent ip trucks, and the Bemis truck for electric otor cars, continue to give the best satisfaction.

Mr. M. Maas, until recently with the Home surance company, has become traveling salesan of the Kail Manufacturing company, and is eady on the road ; he anticipates a great om for the Kail fare box and change maker.

Mr. Wm. P. Boyden has returned to Chicago m his trip east, having been holding proged conferences with the promoters of Mr. T. White's patents, the prospects of which reported excellent.

Mr. H. W. Caldwell's concrete mixer is in gent demand wherever cable railways are be; constructed.

Mr. Wm. G. Henderson, solicitor of patents, ose patent lists appear monthly in the Gatte, has removed to Norris building, 5th and streets, Washington, D. C.

Major Blodgett, secretary of the Railway gister company, of Chicago, speaks most hly of the care and abilities of patent attors West & Bond.

Messrs. Henry and S. W. Tanner (father l son), during a recent visit expressed themves highly pleased with the prospects of the nner wheel, and they are now in Chicago for purpose stated elsewhere.

NEW PROJECTS, PASSING EVENTS, &c.

Alabama.

Bessemer. The "dummy line" has received a new steamer from the Baldwin Locomotive works, Philadelphia.

East Lake. A Baldwin motor has arrived for the East Lake street railway.

Arkansas.

Little Rock. The preliminary surveys and estimates are being made for a 10-mile extension of the electric street railway of Little Rock, of which the first division is to be put in operation as soon as possible. The engineer in charge of the work is Mr. F. J. H. Rickon.

California.

Fresno. The Julian storage battery system is to be used on the Fresno electric railway, for which $30,000 has been subscribed.

Pasadena. The City Railway Co. will use electric motors instead of steam locomotives on their dummy line.

Sacramento. The City Railway Co. will have its electric line ready by the end of August.

San Bernardino. The Southern California Motor Road Co., whose officials are given in our Directory, have twenty miles of road completed and twelve miles more are being added. Three new cars and three dummies are now being made for this road.

San Jose's electric road is now running.

Connecticut.

Birmingham. From this city a correspondent sends us news concerning the Birmingham and Ansonia electric railway, which has just been opened. It is the enterprise of Mr. W. J. Clark, with whom are associated Mr. H. Holton Wood, of New York; Mr. J. B. Wallace, George O. Sneller and others, of Ansonia, Conn. The rolling stock equipment is somewhat different from that of the ordinary street railway, consisting principally of specially built freight cars, to draw which they have a 75 h. p. motor placed upon a special motor car. The passenger equipment at present consists of three cars with motors and one ordinary passenger car; but owing to the demands of the passenger traffic they will at once double this equipment. The completion of the line was delayed several months on account of extensive grading, which was in progress by the municipal authorities. Everything so far has worked in the most satisfactory manner, and I think, without exception, it is the smoothest running electric railway in the country, this fact being probably partially accounted for by the substantial road-bed, and partially by some of the later improvements in the Van Depoele system. The freight motor is really a marvel, it pulling with ease all the freight cars which they can put behind it and get upon the sidings. They use a single overhead conductor arranged for the under contact traveler. The equipment at the power station consists of a 175 h. p. Manning boiler, a 125 h. p. Hewes & Phillips' Corlis engine, and a 100 h. p. Van Depoele generator and exciter.

Hartford. The Hartford and Wethersfield Horse Railway company have asked the court of Common Council to allow them to substitute electricity for horse flesh. Within the past six weeks the company have lost twenty-seven horses from some unexplained disease, and this has caused a decided step in the line of procuring some form of electric street car motor. Several cars are being fitted to run by storage batteries, and will soon be tested.

Delaware.

Wilmington. The Wilmington city railway company, who have adopted the Sprague electric motors, as stated in May Gazette, have obtained permission to extend their tracks across the Eleventh street bridge.

District of Columbia.

Washington. The Washington & Sandy Spring Narrow Gauge street railway company has been incorporated by Messrs. Henry M. Baker and A. G. M. Prevost, of the District of Columbia; J. L. Husband, G. G. Kimball, H. Maurice Talbott, O. P. H. Clark, and G. O. B. Cissel, of Maryland, and E. J. Evans, of Virginia ; capital stock $150,000.

Florida.

Orlando. The Orlando Street Railroad company is buying motors for its electric railway.

Georgia.

Augusta. The Augusta *Chronicle* (exposition edition) of May 21 contains a map showing Augusta as the commercial centre of the Southeast, and a history of the rise and progress of this important city of the rich Savannah valley. The Exposition will open Oct. 10th, and the Augusta and Sumnerville Street Railroad company contemplate considerable extensions by then.

Another street railway company is being organized it is said.

Columbus. The Columbus street railroad company will probably use Baldwin motors on their dummy line.

Illinois.

Chicago. The American Cable and Electric Conduit company has been incorporated; capital stock $500,000; to construct and operate electric railways, etc. The incorporators are Oliver Thomas Somerville, Graham D. Hazen, William R. Riley and Isaac 1. Johnson.

William Thiel, a manufacturer of "brothers-in-law" (false bells concealed under conductor's clothes to made it appear that fares are registered when they are not), was held to the Criminal court June 4 in bonds of $1,000. The most important evidence against the defendant was that of conductor Ferguson, who was arrested while operating one of the "brothers-in-law." He has turned State's evidence and confessed that he had frequently falsely registered fares. Conductors Marble and Nye, who are also under arrest, stated that Thiel had approached them with false bells to be worn under the coat or vest. Superintendent Nagle, of the West Chicago Street Railroad Co., testified to finding the various bells which he produced on the conductors whose arrest he had caused. The conductors will be used as witnesses against the other manufacturers. The Stanley Bros., who were arrested on a charge of manufacturing the little deceivers, are said to be in Canada.

The American Cable and Conduit Electric Co. received license of incorporation May 15, at Chicago. The capital stock is $500,000. It is intended to construct and operate underground conduits and cables and electrical railways. The incorporators are Oliver T. Thompson, Thos. Somerville, Abram D. Hazen, William R. Riley and Isaac T. Johnson.

The Calumet Car Co. was incorporated May 25; capital stock $250,000; to manufacture all varieties of street cars, omnibuses, baggage wagons, etc.; incorporators, Richard W. Johnson, George W. Wilbur and Samuel E. Varmilva.

The Electro-Carbon Motor Co. was incorporated May 31; capital stock, $1,000,000; to manufacture and sell motors for surface, underground and elevated railways; incorporators, E. Beekley Hamlin, Albert H. Meaton and John Barton Payne.

The West Chicago Street Railroad company, who bought 6,251 shares of the stock of the West Division Railway company, has made another payment amounting to $500,000, and W.A. Hammond, the trustee, on May 23, began the disbursement of the money—$80 per share—at the National Bank of Illinois to those persons who sold their stock. This makes over $2,500,000 out of a total of $4,063,150 to be paid. The purchasers are in advance of the requirements of the contract, and now have the right to pay the remainder as fast as they please in sums of $100,000 and upwards. In accordance with the agreement the stock held by Mr. Hammond in trust for the full payment has been surrendered by him and in its place he has received the $4,100,000 of 5 per cent. bonds issued against the stock. This last payment releases to the West Chicago Street Railroad company $1,000,000 of these bonds, and as fast as payments are made hereafter double the amount of the payment will be turned over to Mr. Yerkes' company.

A Meigs "L" road for West Lake street.

The West Lake Street Elevated Railroad Company appeared before the Committee on Streets and Alleys, West, June 8, among those representing the road being Col. Alberger, Col. H. C. Thompson, Judge Booth and others. They presented a petition bearing the names of a majority of the property owners of every mile of the street.

Col. Thompson stated that they would be ready to commence the building of the road within four weeks after the ordinance was passed. The frontage was submitted to the Department of Public Works for its verification. The ordinance submitted was drafted by the Law Department, and contains many safeguards that have never before been ingrafted in an ordinance of that character.

Ex-Alderman Kerr and Mr. Hannah were also before the committee, and filed what they stated to be a majority of the frontage on all the streets sought to be included in their franchise.

The ordinance for the Lake Street company contains the same provisions that will be inserted in all other ordinances. The road is to commence at Canal street and run west on Lake street to the city limits. The two tracks are to be located either in the center of the street or one track over each curb line. Plans and specifications are to be submitted to the Department of Public Works for its approval. The plan designated is what is known as the Meigs system. The distance between the supporting columns shall not be less than thirty-three feet, and no part of the girders shall be less than fourteen feet above the established grade. The fare shall not exceed 5 cents, and at the expiration of two years after completion the company shall have commutation tickets on sale at twenty five for $1. The city reserves the right to alter any street grade, build any viaducts needed, etc., without incurring any liability, the elevated road having to change its road as circumstances may require. In case the company refuses to change the grade of its tracks as ordered, the city will proceed to remove the entire structure and make the company pay the bill. One mile of the track must be completed within one year after the passage of the ordinance, and $100,000 cash must be deposited with the City Comptroller as security for any possible damages. No other company whatever shall use the tracks for any purpose. The following section, which is entirely new, is also contained in the ordinance:

The said Lake Street Elevated Railroad company shall, in its written acceptance of privileges given under the provisions of this ordinance, agree in writing that the said company will, on the 1st day of January and July of each year after said company shall commence to operate its cars, file with the comptroller of the city a statement of its gross receipts from its business for the six months preceding such statement, which shall be sworn to by the president and secretary of said company, and in said agreement bind the said company that it will, at the time of filing such statement with the comptroller, pay into the city — per cent. on the amount of such gross receipts arising from its business for the six months prior to the filing of said statement; and it shall also specifically agree that the said amount, when paid, shall be in addition to all other taxes imposed by law, and said company shall also obligate itself in the bond required to be filed under the provision of this ordinance that it will pay into the city treasury the percentage on its gross receipts as provided by this section.

Peoria. The citizens and City Council of Peoria are wild for electric cars. The Rapid Transit Co. have obtained an ordinance for twenty years, stipulating that the company shall operate its cars by electricity only, save that it may use animal power for thirty days in case of a breakdown. The cars must be run not more than ten minutes apart between the hours of 6 a. m. and 10 p. m. The track must be Johnston steel rail, flat, and weighing 45 pounds per yard, the rails to be 4 feet 8 inches apart. The company is required to pave 16 feet wide on Washington street, from Locust to Hamilton street, with Ottawa brick, but is not required to go ahead of the city in the matter of other paving where the streets are still unimproved. They are allowed to put up poles 115 feet apart on each side of the streets traversed, and these poles must be painted white to distinguish them. The stay wires from these poles support the central copper wire that runs parallel to and between the tracks, and this wire is to be 18 feet above the rails. Provisions are made for good cars, and the company is compelled to commence operations within six months of the passage of the ordinance, and must build and operate three miles of road during the first year. It is further stipulated there shall be no snow ridges created by the company in winter on the line of its track, and the council reserves the right to permit any other company to use any three consecutive blocks of that track that in the aldermanic wisdom seems fit. The fare is restricted to five cents per passenger for a half trip, but on Fifth and Sixth streets five cents is to take a traveler out and back on the short belt section of the road. The company is obliged to submit quarterly reports to the city council; is held responsible for all damages to life and property in operating its cars, and is not allowed to transfer, sell, or lease its franchise without aldermanic consent. The council also reserves the right to amend the ordinance unconditionally at any time, and there are other minor stipulations in any quantity in the document. The conditions that proved unacceptable to the new company were that the company shall "sprinkle its right of way on all paved streets, and after twelve years it shall turn over 2½ per cent. of its total earnings into the city treasury."

The other street railway companies (the Central and the Adams street) are also anxious for rights to use electricity, but they will not accept the sprinkling and percentage terms.

Pullman. The Thomson-Houston (Van Depoele) system is the one decided upon for the new model electric road mentioned in the May GAZETTE. The road is to be constructed under R. T. White's patents, which we have described in previous issues. The plans and specifications have been completed and the contract let, and when finished it will cost in the neighborhood of $100,000. The road will, it is expected, be in running order September 1.

Quincy. An electric railway is likely to be built here, rather than cable. The Quincy Cable & Transit Co. has been incorporated, however; capital, $100,000; incorporators, W. H. Meyers, Albert Fishell, R. T. Hicks and W. H. Craw.

INDIANA.

Indianapolis. "The Citizens' Street Railroad Co., of Indianapolis," as the new company is officially styled, is monarch of all it surveys—but its right is disputed to some extent. Under the charter of the old company, sold (as stated in the May GAZETTE) to Chicago capitalists, with Mr. C. B. Holmes as president, the purchasers (*i. e.*, the Citizens' Co.) have a right to all the streets of the city, to construct and operate street railways. Over a year ago an organization known as the Dudley company obtained an ordinance to construct a cable road on streets not used by the existing street railway company. But they failed to raise the capital for constructing a cable line. After a year's napping they resolved to construct and operate an electric railway, and set to work in such a hurry that they omitted to get their franchise altered to authorize them to use electric motors! The Citizens' company, as well as the Dudley (cable-electric) people, were working hard on the same ground, June 6. The mayor and city attorney visited the workmen of the Citizens' company at noon and asked by what authority they had commenced work upon the cable(-electric) company's streets. The officials were referred to Superintendent Shaffer, but that gentlemen could not be found, and the work went on. At 6 o'clock the day force was relieved and a night force put on by the Citizens' company, and the work was pushed as rapidly as possible. If this company succeeds in holding Market street, east and west of the Circle, the cable(-electric) company will be shut out.

A special correspondent, writing June 7, says: "The Chicago syndicate which recently purchased the street railways of this city are giving the people an example of Chicago pluck and enterprise, although they have not been in possession two months. Manager Shaffer has introduced horse power instead of mules, and put open cars on the lines for summer travel, something never before seen here. Besides this, several suburban extensions are under way. In February, 1887, a charter was granted a company to lay a cable road here, but nothing has been done by the holders of the franchise save to try to sell it. Failing to find a purchaser, because a cable line in Indianapolis will not pay, they concluded to change to an electric motor line, and, without waiting for permission from the coun tore up a square of street and began laying t track. Tuesday Cyrus H. McCormick, of C cago, one of the street car line owners, was the city, and in company with Manager Shaff drove over the lines proposed to be occupied the electric company. As a result of that vi gangs of men began work yesterday puttir down rails on the principal streets in the electr route. The move created a great amount talk and led to a called meeting of the coun to-night, but as the Chicago company appears have been acting strictly within their charter, one can see how it is to be headed off.

IOWA.

Council Bluffs. The Manawa Lake Mot line was opened May 20, when large numbe left Council Bluffs for the lake, which w reached in twenty minutes. "The mot worked very nicely, and is able to make mu better time were the track in good conditio Men are at work fixing the bad spots and in pu ting in a switch at the north end of the line enable the motor to change ends."

Des Moines. The supreme court rendered decision May 17 of very general interest in t famous street-car case of this city, granting the broad-gauge company the right to use a kind of motive power except horse power, whi which they must discontinue. Twenty-tv years ago the city council granted to the na row-gauge company an exclusive charter to o erate a street railroad for thirty years. Aft having a monopoly of the street-car business f twenty years a rival company was organized, a has been in litigation with the old ever sinc The court holds that the old charter granted e clusive rights for horse power on all streets occ pied by the old company. This knocked out t new company that had expended already $15 000 in a plant, unless it could operate sor other motive power. The city council granted charter for an electric railway and the supren court was asked to decide on the new phase the question. It does so by deciding that t old charter was exclusive only as to the mode locomotion then in vogue. As electric or cab cars were not dreamed of they were not includ in the charter, and the rival company can ha an equal chance to the city streets with ele tricity.

KANSAS.

Eureka. Work was begun on the Eurel Street railway June 4

Horton. A franchise has been granted for street-car line on Main street, from Front stre to the Union depot. This will be the seco line for Horton. This company has a capit stock of $144,000.

Leavenworth. The work on the Rapid Tran company's extension to the Fort is now progres ing, and is to be pushed to completion as quick as possible.

Liberal. Two street railway companies ha been organized—one the Liberal and State Li Railway company, with a capital stock of $7 000; the other the Liberal Street railway, with capital stock of $50,000. The directors a Messrs. Christopher A. Hoffman, Charles Merry and Herman V. Nichols.

McPherson. The McPherson Street railwa is now owned by Herington men, William We holding a half interest.

Salina. The street railway here is now own by "home" capitalists. Hitherto Salina a McPherson men owned the street railways both cities; now there has been a division properties.

Topeka. "The equipment of the Topel Street Railway company will be one of the fine in the country when the new Pullman ca come," says a local correspondent.

The East Side Circle railway is progressi rapidly. Col. Crowley, the contractor, says has an ample force at work. The Shunganun bridge is nearly completed. The ties are all hand and the iron is on the way. He declar the line will be ready for operation within thir days. Four steam motors are now being ma at Richmond, Va. They will be different fro the motors now in use in this city in that th will have trucks in front; they will also have revolving broom on each rail to throw sno from the track in winter time. The cars are n

ing built at the Pullman car-works, and will be bstantially and elegantly finished.

The Rapid Transit graders are moving along ith a rapidity that augurs well for the boast of e directors that an excursion will run over the ad to Silver Lake on the Fourth of July. The ading is now completed as far as Soldier town- ip.

Wellington. The street railway here was sold st month to Mr. Edgeworth, of Wichita. A w superintendent is wanted.

MASSACHUSETTS.

Boston. As stated elsewhere, Mr. Gillham, e famous cable railway engineer, is now in oston to show the West End Street Railway mpany how to make a start with the construc- on of their cable road. A Western contem- rary has the audacity to observe that cultured oston is at last making an effort to follow the ogressive and well cabled cities of the West in e march of civilization. Let us hint that there e many first that shall be last, and the last first; d Boston may get ahead yet — in time.

Brockton. The East Side Street Railway com- ny has decided to adopt the Thomson-Hous- n system of electric propulsion according to e report received; but another communication ys that the railway company has issued the fol- wing statement: "At a meeting of the di- ctors of our company last evening (May 29), it as voted that we use the Sprague system of ectricity for propulsion of cars on our road."

North Adams. The Hoosac Valley Street ilway company has sold their franchise, etc., to e Thomson-Houston Electric company, who ll convert the road to an electric line.

Revere. The Revere Electric Street Railway mpany has secured locations, and the work of nstruction will proceed forthwith.

Salem. The Naumkeag Street Railway com- ny will use the Sprague electric motors.

Salisbury. The Thomson-Houston system is be used on the Salisbury Beach Electric rail- y.

MICHIGAN.

Grand Rapids. The noiseless motor, which has en in the course of construction in a shop on uth Division street for several months, was ven a trial on the street car track between 1 d 2 o'clock A. M., May 27. Its external ap- arance is similar to an ordinary horse car, only s slightly smaller. Inside is an upright boiler d propelling machinery, taking up most of the mpartment. Coke and kerosene are used in furnace, and the quantity of smoke emitted small. It makes but little noise when in mo- n, and runs quite rapidly when desired. It s many advantages over other light motors, it claimed; but from what we hear, it does not swer the purpose for which it was designed. . Nathan Caldwell is the inventor.

The members of the congregation of the Hol- d reformed church have objected strenuously street car co. laying tracks past their prop- y, and some weeks ago secured an injunction. is was dissolved and the street car company l the track in one night, about the middle of y. Next night the Hollanders held an in- nation meeting, and at its close put to flight railroad employees, who were defending the perty, by a volley of stones and clubs, and e up the track. The police were summoned l the mob greeted them with stones and n dispersed. On the morrow the company aid the tracks, under police protection. When last spike was driven a dummy engine was rted out to confirm possession, and this was signal for another sortie. The church bell mmoned the indignant church members and en the dummy appeared it was greeted with a vy shower of rocks and clubs. The officers de a flank movement and captured one man, ned Paul Yost, and secured the names of eral others. The prisoner is a deacon of the urch. The railroad company has the court ision at its back, and is preparing to resort stern measures if necessary.

MINNESOTA.

St. Paul. We are informed that the new omson-Houston electric railway works admir- y at West St. Paul. The report says: "The tor car that left the foot of Jackson street at 05 P. M. to-day had on board two car loads of resentative St. Paul and Minneapolis business men among them a majority of the Boards of Aldermen and city officials of both cities. In fact the Minneapolis delegation appeared to be more interested in the success of the scheme than the St. Paul crowd. As has been previously advertised in the city papers, the special object of the excursion was to witness the operation of the new electric motor at South Park, over which Mr. J. H. Lawrence and the South St. Paul Rapid Transit Company have labored for the past year. Arriving at South Park the delegations from both cities, headed by Mr. Lawrence, proceeded to the corner of Allison avenue and South Concord street, where is located the east end of the motor line. The operator, two press representatives and Mr. J. H. Lawrence made the first trip up the curve and back just to see how the machinery would work, while the crowd scattered about on the surrounding elevations and watched with admiration the success of the scheme, which all were carried away with. From the first trip until all the crowd had ridden to their heart's content, the motor car was kept plying up and down the steep grade and around the angles (not curves), which are to be found all along the line. Though the track was wet and the rails rusty, the machinery moved without a hitch, everything passing off to equal the highest expectations of the parties interested in the scheme. When the operation of the motor had been satisfactorily tested the party adjourned to the dining room of the Grand Hotel, where they were the guests of Mr. Lawrence to lunch. After the guests had partaken of the excellent lunch provided, their host made a brief speech and was followed by Mayor Ames, of Minneapolis, and others."

MISSOURI.

Kansas City. The Tenth street cable was laid May 26, a distance of about a mile and a half. This road is completed except a section on Brooklyn avenue, which will not be finished until about August 1st. The length of the road, as far as finished, is about 3½ miles, double track. The construction was done under the directions of Engineer Robert Gillham. Its history is interesting. The city council granted the franchise in the spring of 1887, to Messrs. B. F. Jones, Henry N. Smith, Jr., and H. B. Pain, who in the early part of May turned the franchise over to the People's Street Railway company. This company is comprised of Messrs. Robert Gillham and H. S. Churchill of this city, and the remaining stockholders are "foreign" capitalists, coming principally from Chicago. The People's Street Railway company, under the new organization, appointed Mr. Gilham chief engineer of the road and began its construction at once. As soon as the portion authorized is finished, further extensions are contemplated.

At the annual meeting of the People's company, just held, Mr. Robert Gilham was elected president, Mr. H. P. Churchill, secretary and treasurer, and Mr. Arthur Orr, of Chicago, vice president. The capital stock was increased to $600,000 and none of the bonds are for sale on the market.

The Blue Valley Street Railway company has not purchased the Independence Avenue Horse Car line of the Metropolitan Street Railway company, as reported in some papers.

The Interstate Elevated Railway company of Kansas City, Mo., and Kansas City, Kas., has the Riverview, Kas., cable line in operation.

It is reported that the Chicago, Milwaukee & St Paul Railway company has purchased the Second street dummy line now under construction in this city.

The Metropolitan Street Railway Co. has laid tracks on East 18th street, and overcome the opposition that was manifested.

The Riverview Cable Railway was formally opened May 27.

As soon as enough yokes are furnished by the Kansas City Car and Wheel company the construction of the Washington street line will be commenced. Mr. Robt. Gillham is chief engineer. It is expected to be in running order by November 1st.

The Waldo Park Railway Company has about completed an arrangement with the Grand Avenue Cable Railway company which will enable it to land passengers in the heart of the city. The western dummy line extension of the Westport cable line is the connecting link which will make this arrangement a feasible one.

St. Louis. The Missouri R. R. Co. and the People's Ry. Co. accepted the ordinances authorizing the extention of their lines, and deposited the required bonds, May 18. The Missouri Railroad company, or Olive street line, will, under the provisions of its ordinance, extend its cable line west from Sarah street to King's highway. The People's line has permission to change its motive power and extend its tracks to Tower Grove Park.

The Rapid Transit company of St. Louis propose to build an elevated road here, and introduced an ordinance into the House of Delegates May 15.

MONTANA.

Helena. A franchise has been granted to Messrs. Porter, Smith & Co. to build a street railway and operate it with animal, cable, electric or other approved motive power. Two miles must be in operation within six months from date of ordinance.

NEBRASKA.

Beatrice. The South Beatrice Street Railway Co. was incorporated May 17. Their object is to build and operate a street railway starting from the postoffice over the principal streets of the southern part of the city. The franchise is for fifty years. The capital stock is $20.000, divided into shares of $100 each. The incorporators are Warren Cole, W. Nicholls, N. N. Burmbach, J. S. Grable, J. T. Beaver, S. S. Green, S. K. Davis, A. L. Green, and H. A. LaSelle. Work will be begun early, and a portion of the line will be completed the present season.

This makes the second street railway company in Beatrice; there are now about four miles of street railway in successful operation, by the Beatrice St. Ry. Co.

Omaha. A "Rapid Transit" connection is to be constructed between the two Omahas. A steam motor line, between Omaha and South Omaha, has been ordinanced. The proposed line is not the motor road of which so much has been said, but another with a steam motor, which shall be entirely safe and under the supervision of the council. This will run to about two miles from the center of the city, where it will be connected with the cable line, thus giving almost a five-minute service between both places.

The Omaha Horse Railway company held its annual meeting May 7, and elected as directors Frank Murphy, W. A. Smith, W. W. Marsh, S. H. H. Clark and Guy C. Barton. The following officers were chosen: President, Frank Murphy; vice president, Guy C. Barton; treasurer, W. W. Smith; secretary, J. E. Wilbur.

NEW JERSEY.

Asbury Park. Mr. F. W. Child, president of the Seashore Electric Railway company, writes May 23: "I notice in the May issue of the GAZETTE a statement to the effect that the Seashore Electric Railway company have had difficulty in getting right of way, etc. That is not so; we have all the right of way needed."

We are much obliged for the correction.

NEW YORK.

Auburn. The Auburn City Railway company have decided to adopt electricity.

Buffalo. The Buffalo Street Railroad company (of which Col. Watson is president), have ordered a storage battery car from the Electric Car company of America, Philadelphia.

New York. The Board of Aldermen are afflicted with "boodlism," it is feared. By a vote of 14 to 10 they have refused to let the N. Y. & Harlem R. R. company operate the Julien Electric Cars on their Fourth avenue line. The electric cars will, therefore, not run below Fourteenth street. This strange action has excited the suspicion that the fourteen anti-electric aldermen are in a "boodle combine" says the N. Y. *Times.* Commenting thereon the *Electrical World* says: "If the objections of the aldermen were founded on intelligence and a fair comprehension of the subject there would not be much to say, and one could meet them with arguments of a satisfying character; but it seems hopeless to deal with men who object to the use of these storage cars on the ground that they would be dangerous to passengers who happen to have steel nails in their shoes. Such a criticism, which was made at the Board meeting by one member,

gives likelihood to the story about another alderman who, when it was proposed to introduce a number of gondolas on Central Park lake, objected on the ground of expense, saying it would be enough to buy a pair and leave the rest to nature."

Anent the Fulton Street Electric Railway, the N. Y. *Times* says: "The defeat in Committee of the North and East River Electric Railway company's bill throws that corporation upon the tender mercies of its old bugbear, the Bleecker Street and Fulton Ferry Railroad company. It will be remembered that the North and East River company under their franchise laid tracks through Fulton street from the North River to William street, where the Bleecker street line enters Fulton street and runs to Fulton Ferry. The North and East River company relied upon the consent of the Bleecker Street company for the use of its tracks from William street to the ferry, but the Bleecker street people wouldn't listen to it. In its traversal of the island the electric road had to run upon the tracks of two other companies, both of which consented thereto. They are the Central Park and North and East River Railway company, and the Ninth Avenue and the Dry Dock, East Broadway and Battery Railroad company. But the Bleecker street company would not fall in line, although the electric road offered to lay new tracks from William street to the ferry. Now that the legislature has failed to give the luckless company the relief it desired—that of amending the railroad laws so that the courts might have power to adjudicate the matter—the North and East River line is using every endeavor to get the Horse Car association to champion its cause. The Horse Car association, it is said, is disposed to favor the new road, and at its meeting next week an effort will be made to gain the consent of the Bleecker street company to allowing the electric road to use its tracks. If that consent is not obtained, and the Bleecker street line maintains its obdurate attitude, there is no alternative for the North and East River company but to wait patiently until the next legislature convenes and again present its bill for relief."

The general term of the New York Supreme Court has decided that the Third Avenue Railway company cannot use cables on its line in place of horses.

Port Chester. The P. C. & Rye Beach electric street railway is nearly completed. President F. H. Skeele informs us (May 22) that they shall use either the Daft or Sprague motors.

Rochester. A strike broke out, and no cars were run, May 23. During their dispute with the company the men remained quiet and orderly, and an agreement was soon reached.

Syracuse. The Third Ward Railway company have decided to adopt the Thomson-Houston electric motors.

North Carolina.

Asheville. Work on Mr. N. Atkinson's electric railway has commenced,

Ohio.

Dayton. The White Line Street Railway company, who contracted for the Van Depoele electric system last year, are so hampered that the prospect of seeing electric cars in motion there is not "within sight" yet by a long way; the portion that was intended to be operated by an undergrond conduit is "blocked" by the strenuous opposition of property owners along the line, while the city council will not permit them to put an overhead conductor.

Ironton. The Ironton and Petersburg street railway is being constructed by Mr. W. M. Hewitt. The company consists of Mr. H. Burkholder, of Chicago, and Mr. M. W. Conkling, of New York, and others. They will probably adopt electricity.

Newark. The Newark-Granville Electric railway is to be six miles long, for which Mr. R. Cunningham holds the franchise, and a company is incorporated with $100,000 capital.

Painsville. Mr. S. K. Stage writes, May 25: "We have a charter to build a street railway. We intend to build 5 or 6 miles of electric road. Our organization is called 'The Painsville & Fairport Railroad company.' Have not commenced work yet."

Steubenville. The Steubenville street railway is to be operated by Sprague electric motors.

Tiffin. The Tiffin Street Railway company has obtained a franchise to use any approved motor. It will probably adopt electricity. Mr. H. W. Yeager is president and Mr. J. P. Myers treasurer.

Pennsylvania.

Philadelphia. The new electric motor for propelling street cars will soon be tried on the Lombard and South street branch of the People's Passenger Railway company. Workmen are now busily engaged in relaying the tracks with the new rail used for cars provided with the Wharton motor. Eight-wheel cars instead of four will be used. They will be large enough to comfortably seat thirty-four persons. The weight of each car will be 14,600 pounds. An experimental car will first be run on Fourth and Eighth streets, and if it is found practical the cars will be operated on the Lombard and South streets branch.

Rhode Island.

Woonsocket. The Woonsocket street railway has obtained permission to extend its road to Blackstone.

South Carolina.

Charleston. The Enterprise Railroad company want a noiseless motor instead of mules.

The Charleston city railway company have completed an extension of seven miles of track and added several new cars, president Riggs informs us.

Tennessee.

Bristol. Operations for building Messrs. Barker & Reynolds' electric railway are in progress.

Texas.

Dallas. The Dallas Electric Light and Railway company is using its best efforts toward the completion of the electrical railway at the coming Dallas State Fair and Exposition, in October.

Paris. The Paris Railroad company has not yet commenced building its two and a half or three miles of road, although the city has over 10,000 population.

Virginia.

Richmond. The people of Richmond are proud of having the largest electric road in the world, as they say. A letter from the street railway company to the Sprague people, signed by T. N. Motley, H. Steers, and M. B. Flynn, says: "We must confess that we sometimes shared the doubts that others have been so free to express as to the possibility of the successful completion of this work, and hence it is with the greatest pleasure that we acknowledge the successful fulfillment of all the terms and conditions of the contract, and compliment you on achieving so signal a success."

Washington Territory.

Seattle. "Not the least among the wonderful scenery, both natural and artificial, of Seattle's environments will be her cable road," says the Seattle *Times*. This cable railway will cost $200,000. There will be one trestle 1,225 feet long and 126 feet high, which will require 300,000 feet of lumber to build. This will be the highest cable-road trestle yet heard of. Two excursion steamers will be built on Lake Washington to run in connection with this road.

West Virginia.

Huntington. Mr. J. Young, of Athens, Tenn., is building an electric railway here, between three and four miles of which is to be in operation by July 4th.

Parkersburg. The city railway is being constructed, and will be pushed as rapidly as possible.

Wisconsin.

Racine. The Belle city street railway company are about building a new car house, and contemplate an extension of track.

Canada.

Davenport. The Davenport Street Railway company (recently organized, with a capital stock of $30,000), will construct a street railway from Davenport to its big neighbor, Toronto, and will probably use electricity. Mr. G. G. Mackenzie is the secretary.

Montreal. Over one hundred street railway horses were roasted to death June 8th. Fire broke out at 1 o'clock in the morning in the stables of the Montreal Street Railway company at Hochelaga, and before help could reach the horses in the larger stable, in which there were 135, the building was a mass of flames. Al forts to save the imprisoned animals were f less, only one out of the entire lot being resc The shrieks of the frightened animals and t cries of pain were heard blocks away. Sev of them managed to burst through the woo walls of the stable, covered with burning that had fallen upon them from the lofts al the stalls. The moment they gained the o air, strangely enough, they turned and in t panic dashed into the flames again, where perished. The stables adjoin the spot w stood the gasometer that recently killed six by exploding. In the rear of the large st was a smaller building in which there were ei horses. These were all safely taken several firemen being badly burned in the v uresome work. The building was burne ashes. The horse hospital was also destro although the dozen horses in it were saved. fire was not extinguished until 4 o'clock. The is in the neighborhood of $100,000.

Toronto. The Passenger Transportation c pany will construct a street railway, accor to plans approved by the Board of Public Wo and intend to have it ready by July 4. Th a peculiar date for a Canadian event.

British Columbia.

Vancouver. The city clerk (Mr. Thos. G. Gingan) informs us that a street railway comp is being organized in that new city.

United States of Colombia.

Bogota. Mr. Frank W. Allin, vice-presi and secretary of the Bogota City Railway c pany, writes May 19: "I look on your pape so valuable I wish to help to make it as pe as possible, and for that reason ask yo change the name of our president from G Stayner to Tunis G. Bergen, who is also t urer. Other officers unchanged." Corre accordingly.

England.

Leamington. The Leamington Town Cou has granted permission for the tramway comp to experiment with an electric tram-car—sub to the supervision and approval of the t clerk, who "will see that no injury is done to roadway." The Milverton Local Board (part of whose district the experiment will ext have also given like permission. The Lon *Electrical Engineer* says: "It is believed that intention of the promoters is to utilize the e tricity generated during the day in connec with the Midland Electric Lighting compa

Liverpool. The Liverpool "overhead railw is to be built and operated by a special comp as lessee of the Mersey Dock and Harbor Bo This Board obtained parliamentary power 1882 to construct an overhead railway along line of docks. They took no further actio the matter until last year, when they obtaine extension of time and increased powers, inc ing the right to lease the undertaking to a vate company. Such a company is now b organized, with Sir William B. Yarwood, Robert Alexander and Mr. Arthur Earl the principal promoters. The proposed cap says *Industries*, is £450,000 in shares, £150,000 in borrowing powers.

Scotland.

Glasgow. The Glasgow and Suburban ways bill has been investigated by a select c mittee of the House of Lords, as recorde *Industries* of May 4. In order to secure consent of the corporation of Glasgow to scheme, the company has offered to pay a of £65,000 to the corporation as wayleave. number of new features are embodied in proposal. It is proposed that the tunnel sh have an outer skin of iron, then a shell of crete, then an inner skin of iron. At the p where the Kelvin bridge crosses the river, in mediate proximity to the proposed line of subway, the promoters propose to co-ope with the authorities in building a new struc which would comprise a subway and br combined. The trains will be "drawn by r actuated at a central station." The spee the rope will be eleven miles per hour.

Germany.

Hamburg. The Julien storage battery t car is in operation here. The first car (No is similar to that exhibited at Antwerp in The length of track is 5,862 yards, nearly

les of which run through crowded streets, d there are steep inclines and numerous curves. ıother car has been constructed (No. 86) with ɛ motor placed between the two axles, the ɔtor being built by Elwell-Parker, Ld.

INDIA.

Madras. An electric railway is to be conucted here.

Splendid Opportunity for Electricity.

A good opportunity to any one who desires to y a street railroad, already in successful opeion, with special advantages for electric prolsion, presents itself in a progressive city of ,000 inhabitants, within fifty miles of Chicago, . The charter is to run for 38 years to me, having been granted in 1876 for 50 ars, authorizing the use of horses, or "any ıer approved motor." There is no other eet railway in the city. Only four miles of ck is constructed; but the franchise gives the ht to construct many miles more; and there is ;reat demand for increased transportation fa- ities. The population has doubled during the ;t eight years; several steam railroads meet :re; and the city is lighted by two well-known ctric lighting companies (who have no street lway motor on the market), and it has tele- ɔne service. The street railway franchise ɔwned by one man; the existing line pays very ll (what little there is of it), but before he will ke the extensions that are demanded by pubnecessity, he will sell it. He is, moreover, ;aged in other business, and should be glad release from the demands made on his time the street railway.

ABUNDANCE OF WATER POWER.

What makes the opportunity of very special vantage for electric propulsion is the fact that re is abundance of water power to run the ıamo; an adjoining river supplies power to the various manufactories flourishing there. Prospective purchasers can have extracts of franchise, and any further information de- d, by addressing *Doubleu Aitch*, care of E STREET RAILWAY GAZETTE, Lakeside ılding, Chicago.

Books, Pamphlets, Etc.

Annual Statistician. The 1888 edition of this y useful multum in parvo book has been on reference table over a couple of months; it is a most excellent companion for editors all who have occasion to refer to various istics. Its contents are briefly noticed in our ctory supplement this month, pages 29 and 30.

Hardware, Metals and Machinery is the title of ıonthly trade journal published at Birming- ı, England, and from the May number we n that some new kind of engines are being t at Crewe for drawing canal boats along t railways built by the canal side, thus doing y with horses and mules in that work.

THE STILWELL & BIERCE MANUFACTURING IPANY, Dayton, Ohio, have issued their No. catalogue, wherein is described one of the t economical and fuel-saving devices ever ed upon the market. Those who own or age electric or cable railways, or use steam ny way, would do well to write for one. A phlet may be had for the asking, especially pplicants mention that they write in response his brief mention thereof in the STREET LWAY GAZETTE.

Steam and Hydraulic Machinery is the title of llustrated pamphlet of 144 pages, new edi- , issued by the Pond Engineering Co., St. is (and Kansas City), Mo., containing cuts descriptions of engines, boilers, furnaces, es, pumps, pumping engines, air pumps, con- ing apparatus, injectors, feed water heaters, r filters and purifiers, steam gauges, count- indicators and attachments, valves, packing, , fittings, etc.

Table Talk for June shows marked improvets over the previous numbers. It comes out a new cover, new type, and enlarged pages, e the contents, which consist entirely of orig- matter written expressly for the magazine, of such a standard and character as cannot o fasten the attention of the general reader, —whether man or woman, boy or girl—will be sure to find there something entertaining and instructive. There is one point about it this month which is especially interesting. The Shakspere-Bacon controversy, started by Miss Delia Bacon some fifty years ago, and afterwards followed up by Mrs. Windle, and more recently by Ignatius Donnelly, *Table Talk* now insists must come to an end; because, it declares, that Shakspere himself has plainly and unequivocally settled that question; but how, and in what play and what act is *Table Talk's* own problem, which it invites the world to solve, and which the world can do without the aid of any other cipher than Shakspere's own words? When we consider that *Table Talk* has an eminent Shaksperean scholar to indorse the legitimacy of its problem, we think the literary world owes a debt of gratitude to that enterprising magazine. Published by the Table Talk Publishing Co., 402, 404, 406 Race street, Philadelphia. $1.00 a year, 10 cents single copy.

Street Railways is the title of an attractive pamphlet of testimonials to Mr. John Clifton Robinson, who became the disciple of George Francis Train when that eccentric man laid his first tramway in Birkenhead, in 1860. Mr. Robinson was at that time hardly twelve years of age. And since then he has been a thorough tramway (or street railway) man. He is also an inventor, *inter alia*, of the new "Victoria Hansom," now very popular in London and other English towns, in connection with which he came to this country chiefly at this time. He has sold his patent rights in the United States, but he is so delighted with this country that he should be glad to settle here instead of returning to England. This is a splendid opportunity for any important street railway company in quest of a thoroughly practical and efficient manager to engage such a man that they never have the chance to look upon his like again. Mr. William J. Richardson, secretary of the American Street Railway association, who has been acquainted with Mr. Robinson for several years, says: "I can not speak too highly of Mr. Robinson's practical abilities. He has for many years past occupied a very prominent position in the organization, development, and consolidation of street railway interests generally. He bears the reputation of being, and I believe him to be, thoroughly conversant with every detail of street railway work. His exceptional opportunities during the past twenty-five years have enabled him to become practically familiar with every known method of track and vehicle construction, —horse, steam, electric, compressed air, and cable traction,—and he has filled with marked ability the highest positions in street railway administration and management in Great Britain." We should be glad to give any further information desired concerning Mr. J. C. Robinson.

Railway and Steamboat Gazette is the title of a weekly paper, now in its tenth number, published at Boston. It keeps the public eye down very close to the "horse railways" of the Hub, and openly declares that "complaints from the public will be gratefully received." Our new contemporary devotes most special attention to the street railways of Boston, and looks up the West End officials lively. At the same time it gives space for news concerning other horse-car companies in Massachusetts. It fills a much-felt want, and increases in interest and edification each week after another. Other large cities would do well to follow suit, and start and maintain similar special organs. We wish the *Railway and Steamboat Gazette*, and especially its "horse railway editor," every success.

MR. WRIGHT'S book on the construction, equipment and maintenance of American street railways, the publication of which was announced in the GAZETTE for April, has been most favorably commented upon by every publication having talents capable of appreciating a truly valuable book. Our contemporaries appreciate the reliability of this latest addition to street railway literature. Mr. Wright has not allowed his imagination to lead him by the nose. Like the Apostle Paul, regarding another subject, Mr. Wright knows whereof he speaks, and he has written about what he has actually done himself, not mere theorizing for the guidance of others. Mr. Wright has contributed valuable papers to the various engineering societies to which he belongs, and he contributed highly appreciated information to the American Street Railway Association, during the first years of its existence; but in none has he shown more practical ability than in this book on American street railways. The confidence placed in his instructions, when the contents of the book were published in serial chapters in THE STREET RAILWAY GAZETTE, was not in vain, and many roads, car houses and stables built recently have been constructed *a la* Wright. Truly, as the majority of his reviewers say, none could speak (or write), with as great ability and as much authority on this subject as Mr. Augustine W. Wright. The editor of the book (Dr. Heckel) informs us that the publishers (Rand, McNally & Co.) have received many complimentary letters speaking most appreciatingly of Mr. Wright's new book. So have we. And it is one of our most valuable books of reference.

THE SPRAGUE ELECTRIC RAILWAY AND MOTOR CO. have received an order from the U. S. government for motors for use in the service, and an installation is to be made at once on board the U. S. steel cruiser "Chicago" of motors to be used in the training and elevation of guns. The electrical and mechanical apparatus required for this work will have to be of the most delicate and perfect construction; and the Sprague company have been selected as the most capable of accomplishing these results.

THE TANNER street car wheel was described and illustrated in our February number. Since then Mr. Yerkes has had it tried on his car, No. 220. The Tanner wheels have also been running on the railroad from Boston to Pittsburgh for some time. The wheel gives good satisfaction, and it is pronounced a great improvement. Mr. S. W. Tanner (inventor) and his father (Mr. Henry Tanner, of railway brake fame,) are now in Chicago organizing a company to manufacture the wheel on a large scale.

Patents.

The following list of patents issued last month relating to intermural traffic is specially reported for THE STREET RAILWAY GAZETTE by Wm. G. Henderson, solicitor of American and foreign patents and trade-marks, Norris building, 5th and F streets, Washington, D. C. A copy of any of the following will be furnished by him for 25 cents:

382,083. Foot guard for railways—T. A. Griffin, Utica, N. Y.

382,247. Sand box for street cars—W. V. H. Wilson, Troy, N. Y.

382,275. Switch for street railways—C. F. Spencer, Rochester, N. Y.

382,347. Elevated street railway system—J. W. Adams, Chicago, Ill.

382,407. Elevated cable motor or other railway structures—Z. P. Boyer, Philadelphia, Pa.

382,483. Electric motor for railway cars—W. M. McDougall, East Orange, N. J.

382,575. Cable road and machinery for operating the same—E. J. Weston, San Francisco.

382,714. Electric motor switch—R. H. Mather, Windsor, Conn.

382,715. Switching device for electric motors—R. H. Mather, Windsor, Conn.

382,726. Locking device for cable splices—W. R. Patterson, Chicago, Ill.

382,769. Street indicator for cars—G. A. Pidduck, Englewood, Ill.

382,778. Underground conduit for electric wires—W. F. Smith, Philadelphia, Pa.

382,876; 382,877. Electric railway—R. M. Hunter, Philadelphia, Pa.

383,273. Electrical tramway—H. T. Blake, New Haven, Conn.

383,274. Electrical tramway—H. T. Blake & C. Sterling, New Haven, Conn.

383,466. Driving machinery for cable roads—W. Heckart, Yonkers, N. Y.

383,708. Cable supporting sheaf for cable railways—O. C. Crane, New York, N. Y.

383,756. Crawler for electric and other conduits—H. G. Morris, Philadelphia, Pa.

383,770. Underground conduit for electric railways—E. E. Ries & A. H. Henderson, Baltimore, Md.

383,844 Overhead conducting system for electric railways—G. T. Woods. Cincinnati.

Patents Described.

The following are brief descriptions of patents relating to street railway interests issued during the past month, specially prepared for THE STREET RAILWAY GAZETTE by J. C. Higdon, mechanical expert and solicitor of patents, rooms 55 and 56 Hall building, Kansas City, Mo. A printed copy of any of the following will be furnished by him for 25 cents (stamps):

CABLE GRIP.—W. J. E. Carr, Leavenworth, Kan. This patent covers an arrangement of wedges for closing the movable jaw upon the cable.

STREET CAR.—J. W. Evans, Newburyport, Mass. This patent covers a metallic skeleton frame for summer cars.

AUTOMATIC CAR SWITCH.—J. R. Potter, Providence, R. I. An arm depending from the car is provided with a roller and is adapted to depress one tappet to throw the switch and another one to throw it back to its normal position after the car has passed.

RAIL FOR STREET RAILWAYS AND CHAIRS.—I. H. Randall, Boston, Mass. This patent covers two meeting-rails, each provided with vertical webs, a chair also provided with vertical webs and a flexible seat and tie-block located beneath the rails.

CABLE CONDUIT AND TRUCK.—W. Heckert, Yonkers, N. Y. The cable is carried on mova ble trucks. An organization of parts designed to secure a button upon a cable, consisting of the following combination: The cable center, the two-part egg-shaped mass of soft metal surrounding the cable center and provided with spiral corrugations, the surrounding cable strands fitting into the said corrugations, and the secondary mass of soft metal surrounding and separating the strands.

DOUBLE GROOVED GIRDER RAIL.—A. M. Moxham, Johnstown, Pa. A street car girder rail consisting of a vertical central web terminating at bottom in a double shouldered stub or bead, and at top in a flat head having a center bearing portion for the tread of the car wheels, grooves on each side thereof for the flanges of said wheels, and exterior portions on the outer sides of said grooves, provided with straight sides between points.

RAILWAY RAIL PAD.—H. J. Fackenthall and L. Wallace, Philadelphia, Pa. An elastic pad for rails, consisting of a block provided with a flat under-surface, beveled longitudinal edges, a concave upper face and a central longitudinal rib having a concave upper face the side edges whereof are equal in height to the side edges of the block proper.

CABLE GRIP.—S. Gibson, San Francisco, Cal. This patent covers an automatic let-go, consisting of a curved plate pivoted at one end to some stationary part of the grip frame, the said plate being set to strike and be thrown up by a projection on the surface of the roadway, and a curved bar being placed to throw the locking-dog that holds the grip lever.

CABLE-COVERING MACHINE.—C. H. Gersch, Chicago, Ill. This machine winds a covering of steel wire upon a traction cable.

TENSION CAR.—W. H. Dodge, Mishawaka, Ind. The take-up carriage is provided with a catch adapted to engage and automatically arrest said carriage when moved in one direction, but let it slide freely in the other direction.

SAFETY CATCH FOR CABLE RAILWAYS.—C. Vogel, San Francisco, Cal. This patent claims a pair of levers overlapping the slot in the tube, arranged to be opened by the grip shank passing by, and closed automatically by means of weights.

Business Notes.

THE BEAMAN FARE BOX will henceforth receive Mr. Beaman's entire attention. Since this new candidate for the favor of street railway companies has been advertised in the GAZETTE, enquiries for the "absolutely secure" fare box have poured in. We congratulate Mr. B. on the good success we hear he has met with. It is meeting with marked approval; and several very valuable improvements have recently been made.

KAIL'S change maker was not quite correctly described in our May number, as far as the way to give change was mentioned. To give change for a dollar, it it is only necessary to touch the half-dollar button twice; each fifty-cent compartment in the change wheel contains a quarter, two dimes and a "nickle." The Kail Manufacturing company's advertisement, in this month's issue of our Directory Supplement, contains an additional testimonial from no less a firm than the Pullman Palace Car Co. Mr. Chas. Pullman says: "I have made a thorough examination of your Combined Fare Box and Change Maker, and wish to state that it is the best device of the kind that has come under my observation. It certainly fills a long-felt want, and should be universally adopted."

THE KAIL MANUFACTURING CO. have secured the services of Mr. M. Maas as traveling salesman, as stated in "Our Card Basket."

THE RAILWAY REGISTER COMPANY will henceforth let the merits of their register be known throughout the street railway world; the r a dvertisement appears in our present number; and the following is a testimonial we dropped across:

The Chicago West Division Railway,
59 State street, Chicago; May 23, 1888.

This company has had in use on its various lines of railway,,since Sept. 1st, 1886, about 750 fare registers of the Chicago Railway Register Co. After trial of other devices we are well pleased with this register, and believe that, in mechanical construction, simplicity of action and undoubted accuracy, this register is superior to any heretofore used by this company.

G. L. WEBB, Sec. & Treas.

THE LACLEDE CAR COMPANY, St. Louis, are building 60 cars for the new cable line in Kansas City. The cars are to be furnished complete, including grips.

PULLMANS' STREET CAR DEPARTMENT shows signs of great activity. The Pullman company have numerous cars in course of construction, and being delivered as rapidly as possible, for the Omaha Motor Line, the Scranton Suburban, Minneapolis Street Railway company, Topeka City Railway (open cars of special design), Topeka Belt Line, West Side company of Topeka (improved combination cars), Sheboygan Street Railway company, Alton Street Railway company, Joliet Street Railway company, Pittsburgh and West End company, etc.

THE DAFT ELECTRIC MANUFACTURING COMPANY, 115 Broadway, New York, have just purchased the old watch factory at Marion Heights, Jersey City, to which has been added a large brick addition. The company will use the entire building in the manufacture of their line of specialties of electric motors. The old factory was too small to accommodate them, as the large increase in their business has compelled them to purchase the building at Marion. This will be a convenience, as it will only be about twenty-five minutes' ride from New York, on the main line of the Pennsylvania railroad, in close proximity to the station, fronting on the Pennsylvania railroad. We congratulate the Daft company on the success of their business and the enterprising management.

THOMSON-HOUSTON Co's Western office (n at 148 Michigan Ave., Chicago,) will soon en upon "aggressive work." They mean to exte their electric railway business immensely, n that they control the Van Depoele system electric propulsion. We are informed that th find it extremly difficult to manufacture appa tus enough to supply their orders promptly. stated in their advertisement, they have sixte street railways in operation.

THE GRIFFIN WHEEL AND FOUNDRY C whose advertisement appears for the first ti in our present issue, are now prepared to exte their street railway business; their car wheels already extensively used, and now they are p pared to meet increased demands. They a supply axles, cable yokes, frogs, switches a track castings.

THE BURNHAM & DUGGAN RY. APPLIA Co., Boston, has been organized. The purpose the corporation are manufacturing and sell railroad switches and railroad appliances of kinds; purchasing, holding and working any vention and letters patent relating to railr switches and railroad appliances; granting rig and licenses to manufacture and sell railr switches and appliances in the United States; a of doing all things which are necessary or ir dent to any of the above mentioned things.

THE SPRAGUE ELECTRIC RAILWAY & MO Co. report business as excellent, and constai on the increase, with very large sales of sta ard motors; and in addition they have closed c tracts for the equipment of an electric railwa Steubenville, Ohio, also the Naumkeag roac Salem, Mass., and have several others ready t closed up.

Mr. J. A. DUNCAN, agent of the Sprague Pittsburg, Pa., under date May 31, says that motor business there is very good indeed, constantly increasing; he has recently instal a large number of motors and has many m already spoken for, and in every single insta they are giving complete and entire satisfac to the users, which cannot be said of any ot make of motors in use there, it is said.

OF the many instances we see every day of superiority in the economy, reliability, and of maintenance of electric power, as demonst ed by the Sprague Motor, one of the most sa factory is the experience of Mr. L. J. Wells 113 Fourth street, Des Moines, Iowa, who sa "I have been using a three-horse power Spra Electric Motor for nearly three years, runr elevator, hay hoist, pump, horse cleaners ventilating fan. It has not cost me one cent repairs and saves me at least six hundred do a year."

THE ST. LOUIS CAR CO's thirty cars h given great satisfaction at Indianapolis, Mr. J. C. Shaffer, superintendent of the Citiz St. Ry. Co., writes May 24: The report you m of our road in the May number of the GAZE is substantially correct. We do not, howe expect to build any cable road this year. new cars are being built by the St. Louis company, and it is due this company to recog their enterprise and ability to build good car short notice. We gave them an order on A 25th for 35 open cars, reversible seats, to sea passengers. Ten (10) of these cars we ar have on Monday, 10 on the following Fri and the balance by the 12th of June. You perceive that this is remarkable work on t part; and the young men interested in this c pany deserve to be, and I am sure will be, cessful, if they continue to push their busine the future as they are now doing."

HAZELTON'S TRIPOD BOILER IS "boomi Two 200 h. p. boilers have been supplied to cable road at Los Angeles, Cal.

The Street Railway Gazette.

OL. III. CHICAGO JULY, 1888. NEW YORK No. 7

Henry Martin, Esq.

PRESIDENT MT. AUBURN CABLE RY. CO.

[*By Our Cincinnati Correspondent.*]

In one brief sentence the life history of Henry artin is a repetition of the story with which e pages of American biography are replete : plucky, energetic boy, who came to this coun- y poor, but whose industry, integrity, and per- verance gradually pushed him along, till at iddle life he occupied an eminence of success. r. Martin's history is one that should inspire ery poor boy with hopeful confidence of the ture.

Sixty-three years ago on the 5th of last March, County Monaghan, Ireland, the subject of is sketch was born. His parents were poor, d he was apprenticed to the linen industry, ırning the trade and starting for America with at and his native talents as his only capital. e landed in New York, July 7, 1847, when 22 ars old. The outlook was cheerless, indeed. e did not know a soul in all America, and had t a few dollars ; and, to make matters worse, was ill with "ship's fever," and for weeks was nfined to a hospital. After he recovered he ınd employment at his trade in the New- rgh (N. Y.) cotton factory. Two years of :tory life satisfied him, and he started out to .rn more of the wonderful country of which, Ireland, it was common talk that fortunes ıld be picked up in its streets. Mr. Martin ned his face toward Cincinnati. Many of : old settlers no doubt remember a tall, slender ıth, with beardless face, who knocked timidly front doors ; his black eyes all the while keep- ; a sharp lookout for the dog. His name may : be remembered—more than likely never own. This was Henry Martin. He was a "aveling man," as he puts it ; in other words, was a book agent for the Presbyterian Board Publication, of Philadelphia.

While following this humble occupation, Mr. rtin met, loved, wooed, and married Miss Isa- la Stewart, who, in after years, did much by wifely devotion to further his success, and is v happily sharing with him the fruits of their ıt effort. A year at canvassing demonstrated he young Irishman's entire satisfaction that road to prosperity did not lie in that direc- ı. He turned his face westward once more, | in 1850 he and his wife took up their resi- ce in St. Louis.

n the three years he had been in America the ng man had worn off much of his raw, old- ntry ways, had educated himself, and his ex- ience as book agent had taught him self- fidence. This and his native energy and un- ıg industry, coupled with obliging manners, n gained him numerous friends. Among se was S. M. Edgell, a man of considerable minence and influence in St. Louis, who se- ed for Mr. Martin the position of city gher. For five years he filled this office, and careful economy laid by a little capital. With racteristic Irish prudence he cast about for a means of investing these savings. He opened a dry-goods and sail-duck store. Fair dealing, judicious advertising, and a personal attention to the details of business told their story in an increased business and an accumulated bank account. Ten years thus passed, and in 1865 Mr. Martin resigned his official position, placed his business with an agent, and, with his family, betook himself to Europe for a much-needed rest and additional opportunities for self-improvement.

After eighteen months abroad Mr. Martin returned to America, and on his way to St. Louis stopped off in Cincinnati for "a visit," and here he is yet. His keen business tact quickly saw

Henry Martin

that Cincinnati promised a brilliant future. The first few years after his return to Cincinnati Mr. Martin engaged in successful real-estate speculation and some other enterprises ; but, his old love for a mercantile life returning, he established a Yankee notion store on Pearl street, with Mr. Frank Thieman and James Y. Thompson for partners, under the firm name of Martin, Thieman & Co. Subsequently Mr. Thompson withdrew, and four years ago the partnership was dissolved, Mr. Martin continuing the retail business at Twelfth and Main streets in a five-story building, occupying four stores, and dealing in everything in the dry-goods line, from a spool of thread to a Brussels carpet. This business is still continued by Henry Martin & Co. Although Mr. Martin is sole proprietor, the "Co." is used merely to insure the receipt of his mail, there being numerous Martins in town whose Christian name is Henry. This store is now managed by John H. Martin, Mr. Martin's eldest son, at present in Europe on a bridal tour. Such is Mr. Martin's mercantile history.

Now for the most remarkable chapter in his life. Most men when they invest in a new enterprise do so from speculative reasons. Philanthropy and an Irish love of independence, however, were the novel levers that moved the dry-goods merchant's ambition to become a street railroad magnate.

Among the properties which Mr. Martin purchased when speculating in real estate was a large tract in Mt. Auburn. Here he built a number of tenement houses and also located his own home. This part of the city was accessible only by what was known as the Inclined Plane Street railway. A single fare of five cents carried passengers from the city to the foot of the incline. To get to their homes, a few hundred feet away, on top of the steep hill, another five cents was exacted, or else a roundabout and tiresome walk of three-quarters of a mile was necessary. This ten-cent fare early impressed Mr. Martin as being unjust ; and on behalf of his tenants he sought every available means to have the fare reduced to five cents. But the street railroad company was obdurate. As the mountain could not come to Mahomet, Mahomet went to the mountain. In other words, after several years of exasperating effort, and finding himself as far as ever from his object, Mr. Martin decided that the quickest and easiest way would be to build his own railroad, and by competition force the stubborn Main street line to terms.

About this time the cable street railway system began to come into vogue, and Mr. Martin spent a year in careful study of the applicability of cable power to the scheme which had now become the one dominating purpose of his life.

To quote Mr. Martin's own words in narrating his early monopolistic experience : "It was just four years ago now—I remember the republican convention had just nominated Blaine —when I went to Chicago to look into the cable system. I spent a week in the windy city, and came back full of determination to build a cable road and make a five-cent fare to the hill-tops. I drew up articles of incorporation for a street railroad company, and got Thomas J. Emery, one of the largest real-estate holders in the city, to go into the scheme with me. Just then I was taken sick and almost died. I afterward went to California, and improved my chance while there of studying the cable railways of San Francisco. I also read every book and pamphlet procurable bearing on the subject, and came back more than ever determined to attain my object. The company was organized and began its fight for a franchise from the old board of public works—a fight which is still kept green by its successors, the present board of public affairs. They couldn't shut us out, though, but they did what they considered an equivalent—

granted us a franchise over what was believed to be an impassable route, up Sycamore street hill, where the grade for 2,300 feet varies from 9½ feet in 100 to 13 feet in 100."

This is Mr. Martin's modest tale, told the reporter as he lay propped up in bed, suffering from lame ankles, caused by a jump off a swiftly-moving cable car.

After fighting for years against the most obstinate opposition, Mr. Martin at length owned a franchise, and he started in, nothing daunted by the obstacles of the route, to construct his road. Ground was broken and work begun a year ago last February. The cable system decided upon was that originally invented by Wooster Haddock, of this city, and subsequently improved by the joint inventive genius of Mr. Martin and Mr. Haddock. The new road crosses the Walnut hill's cable road four times, and at one point in its tedious climb up Sycamore street hill a curve was found necessary where the grade was 13 feet in 100. A steam railroad track is also crossed. To overcome all these difficulties, Mr. Martin believed the Haddock system was best adapted, and accordingly pinned his faith thereto and backed it up with his money, Mr. Haddock being retained as engineer—a position he filled till about a month ago. Opposition still continued, and it would fill a column of this paper to recite all the injunctions, mandamuses, and other suits brought against the dry-goods merchant, who thus rashly dared to defy the municipal daddies and oppose and compete with old established heads in street railroad business. The lower part of the road was at last completed and thrown open for travel last spring. The ride was from the corner of Fourth and Sycamore streets to the power house, Mt. Auburn—one and a half miles. The fare was five cents. This worked a revolution in hill-top railroading in this city. The exorbitant fares on other lines were reduced, and Mr. Martin now proudly and justly claims the credit and honor of creating this economic and satisfactory (to the public) turn of affairs.

After finishing the lower part of the road, and vanquishing his rival, the Main street line, which, by the way (as is told elsewhere in this paper), is hopelessly insolvent, Mr. Martin turned his attention to the Avondale branch, completing it three weeks ago. The formal opening of the road was on Wednesday, June 27, last, and it was celebrated by a grand banquet, given by the citizens of Avondale as a mark of their appreciation of Mr. Martin's public-spirited enterprise in giving them quick and cheap transit to the city.

Although Mr. Martin is a dry-goods merchant by experience and inclination, he has displayed abilities of another kind in no mean degree. The entire construction of the four and a fraction miles of cable road, and the erection of his power house and setting up of the massive though simple machinery, he personally superintended. He hired and discharged all his men, from the common laborer to the skilled machinist, himself; bought supplies of all kinds, and not a day passed that he did not make two or three trips over the entire line, seeing that no portion of the work was neglected.

With all his strict attention to business, Mr. Martin is a consistent Christian and regular church-goer. He is so strongly opposed to labor of all kinds on Sundays that every Saturday night he turns the management of the road, of which he is president, over to Vice President Wurlitzer, not caring to be connected, even in an official capacity, with a corporation that finds itself obliged by circumstances to perform labor on the Sabbath day. Monday morning the management is again assumed by Mr. Martin.

Personally, Mr. Martin is a man of commanding appearance, being over six feet in height. He is sparely built, however. His dress is very plain, and he would be easily mistaken for a farmer in well-to-do circumstances. His home is in a commodious, square brick house on the very summit of Sycamore street hill. From the windows on one side of the house is a view of the down-town half of the road, and from the other side can be seen the power house, a couple of furlongs distant. One son, James G., lives at home. The other three children—two daughters and a son—are married, though all are residents in this city or vicinity.

A fitting close to this sketch, and one to reflect credit on Mr. Martin's foresight, is mention of the fact that the Mt. Auburn cable road, even in its incomplete state, is earning $50 per day more than its incorporators expected.

Thomson-Houston Electric Ry. System.

In the following cities roads are now in operation under the Thomson-Houston-Van Depoele patents:

CITIES.	MILES.	CITIES.	MILES.
Ansonia, Conn.	4.	Montgomery, Ala.	11.
Appleton, Wis.	4.50	Port Huron, Mich.	4.
Binghamton, N. Y.	4 50	St. Catherines Ont.	6.
Detroit, Mich.	2.	Scranton, Pa.	5.
Fort Gratiot, Mich.	1.75	Wheeling, W. Va.	5.25
Jamaica, N. Y.	10.	Windsor, Ont.	1.75
Woonsocket, R. I.	4.	Lima, Ohio	4.
Revere, Mass.	4.50	St. Paul, Minn.	10.

And the following use Thomson-Houston motors: Alleghany City, Pa., 4 miles; New York, N. Y., 1 mile.

The following are in process of construction: Wichita, Kan.; Dayton, Ohio; Omaha, Neb.; Scranton, Pa.; Chattanooga, Tenn.; North Adams, Revere and Salisbury, Mass.; and Syracuse, N. Y.

Total number of miles in operation, 82.25.

Railway Register Co.'s Register.

Since this register was described in the GAZETTE, several enquiries have been received for further information concerning it. Some letters addressed to the publishers were taken over to Major Blodgett, who was found busy filing a number of testimonials, one of which, taken from a well-filled letter file, may be found in our Business Notes.

Concerning this register, Major Blodgett states in a letter replying to enquiries, and accompanying samples, as follows:

"It is a wide departure from anything of the kind that has ever before been offered to the street railway companies of this country. All other registers have been a system of wheels, while this machine has not a wheel in it, but is a series of endless chains. There is no connection whatever between the trip register and the whole-number register, except that both are operated by a common pull; hence there can be no mistake in the transfer of the trip-number to whole-number of the register.

"You will notice the spring and ratchet on the back, which makes it utterly impossible, when the register is in order, to ring the bell without registering, or register without ringing the bell. In addition to the sounding of the bell you will notice a click of the ratchet at each motion, which cannot be counterfeited by a small bell which is sometimes used by conductors. The machine is never opened, when in order; hence there is no opportunity for the conductor, or even the register clerk, to study the mechanism of the machine. They are strong, simple in construction and less liable to get out of repair than any other machine. They have been adopted by all the street railway companies of Chicago. They are also in use in Milwaukee, Wisconsin; Kansas City, Missouri, and a number of other smaller cities. It is only two years since the first machine was made, and it has met the universal approval of all the railroad men who have examined it.

"Before removing the back of the machine be sure that the trip register is rung back to zero, as otherwise the pins on the chain would prevent its removal. The trip register is set back to zero by taking hold of the out-and-in sign,* and pulling it out and in until the two zeros appear. The trip and whole number are both perpetual, or, in other words, have no stop, as the trip register rings up to 99, then shows two ciphers, and repeats itself again. The whole number rings up to 9,999, shows four ciphers and repeats itself; so that all the register clerk has to do is to note on the trip sheet of the conductor the number at which the register stands when the conductor starts in the morning and deduct that amount from the statement of the register when it is turned in for settlement at night, the difference showing the number of fares collected.

"While a stationary register has gained some friends among railway managers, yet it is due largely to the fact that never until now has a portable register been offered that was not liable to be out of order, and also easily tampered with by the conductors. To meet the requirement of some of the railroad management, particularly the Philadelphia syndicate, we are now making a stationary register, which in our judgment is as far superior to any that has ever yet been offered, as our portable register is superior to any other device in the hands of a conductor.

"We put our registers on the market on their merits, and should not expect you to make a contract with us that you might not cancel on sixty days' notice, if at any time a better machine should be offered you."

*As shown in cut in the Railway Register Co.'s advertisement, p. x.

Sprague's System a Grand Success.

The following letter is one of many unsolicited endorsements of the Sprague system of propelling street cars:

Wilmington, Del., June 14, 1888.

THE SPRAGUE ELECTRIC RY. AND MOTOR CO.

Gentlemen:—I desire to express to you our entire satisfaction with the overhead system of electric propulsion of street cars as constructed by you on the Riverview extension of our line. The system has been in operation here for three months, and from a practical experience during that time we can pronounce it a complete success. In fact, we consider it by all odds the best and most economical mode of running street cars in suburban districts, or in any place where permission to erect poles can be obtained. In comparison with horse power, we find it decidedly cheaper and more efficient in every way. It is popular with our patrons on account of its cleanliness, its smooth and rapid motion, and especially for the absence of the usually overtasked and laboring horse.

Our road is quite hilly, and the cars, loaded sometimes with seventy passengers, climb with ease, at the rate of five miles an hour, a 5½ per cent. grade having a ninety foot curve. The cars are sixteen feet long, and each has been running continuously from the start sixteen hours a day, making sixty-four miles daily on the 1⅓ miles of our extension.

At first, many persons here were skeptical about the successful use of electricity as a motive power instead of horses, but the practical demonstration made on our line has converted them, and directors, press and public have only words of praise for electricity, and endorse it *the* future motive power for street car traffic.

Each member of our board fully approves the above statements.

Wishing you every success, I remain, yours etc., WILLIAM CANBY,

President Wilmington City Ry. Co.

Legal Pointers.

[*From the Railway Age.*]

Street Railway—Collision With Truck—Presumption of Negligence.—Proof that a street car was being driven at an unusual speed, and that it was suddenly struck by the shaft of a truck, which penetrated the front panels of the car and injured a passenger seated there, raises a presumption of negligence on the part of the driver of the car and calls for an explanation.—*Ct. of App. N. Y. Hill v. Ninth Ave. R. Co., 14 West. Rep. 921.*

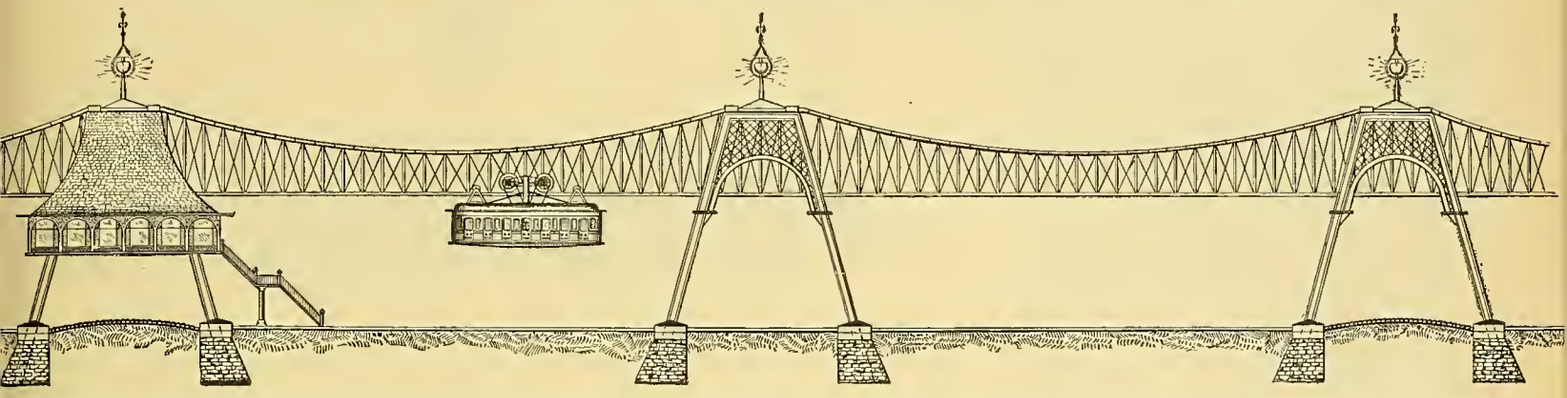
Street Railway—Remote Cause of Accident—Duty of Court to Instruct.—In an accident case where the evidence is uncontradicted that the cause alleged is remote and not proximate, it is the duty of the court to determine that point as a matter of law and instruct the jury accordingly.—*Supt. Ct. Pa. South Side Passenger R. Co. v. Frich, 10 Cent. Rep. 367.*

It is not generally known that the heirs of the Perin estate, Cincinnati, are reaping a most fruitful harvest from the street car lines in Baltimore. They have recently constructed an electric road, which is doing splendidly, and which by aid of the funds already in the treasury makes the company an exceedingly strong one. Nelson Perin has returned for a short while to look after the interests of his family. He will start back early.

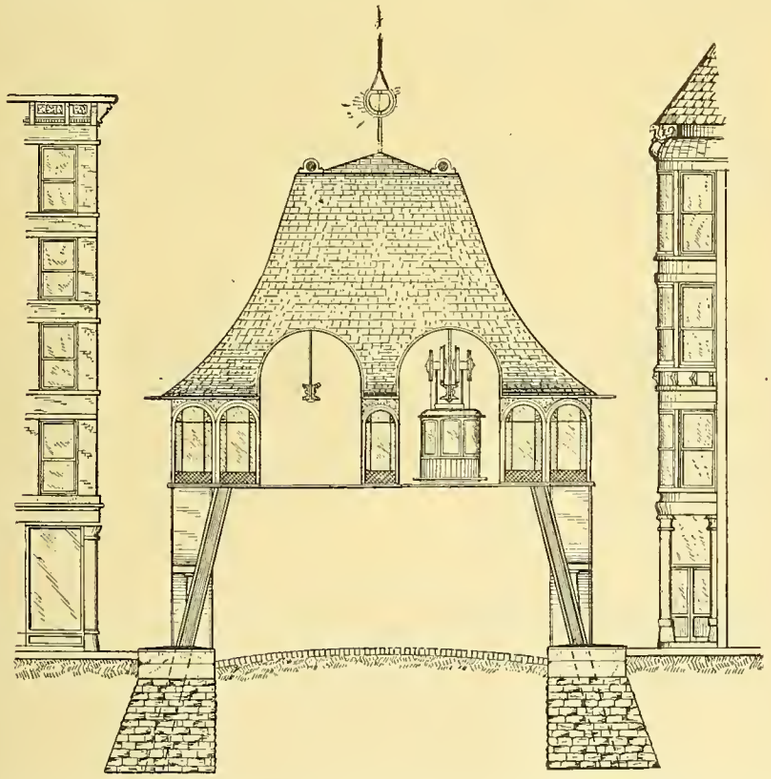
Forsyth's Elevated Suspension Railway.

Mr. R. Clark Forsyth is the inventor of one of the latest schemes for transporting passengers intermurally. He has just opened office in Chicago, to introduce his system and build up all the lines he may have contracts for. This new kind of railway has features peculiarly its own; it affords another chance for electric propulsion particularly; and we have much pleasure in presenting cuts thereof. Fig. 1 speaks for itself. Fig. 2 (the lower one) shows the station entrances, with car coming in.

The invention is principally designed, says the



patentee's prospectus, for use with light cars in high speed transit for street service, and for the transmission between cities of express packages, mail matter and similar freight. It consists essentially of two parallel cables braced and tied together, extending from the top of and between open arched piers. From these cables there is suspended by suitable ties and struts a road girder upon which is secured the track rail from which the car suspends. These girders are formed of two channel beams, arranged back to back and secured rigidly together by castings and rivets or bolts, the castings being of such shape as to allow the beams to lie within recesses formed by the side projecting ends of the cast-



ings, and thus relieve the shearing strain on the rivets. These beams break joints with each other and, riveted together, form a stiff girder, capable of taking considerable lateral as well as downwardly deflecting strain. Upon the upper flange of each of these channel beams, rails of ordinary form are secured by inverse coneheaded bolts sunken into their surfaces, so as to form a continuous track.

Upon the cables at suitable intervals along their length are mounted steel castings, formed with an opening at one side between flanges, through which flanges the bolts pass to tighten the castings upon the cables to prevent their slipping out of place. From the inner sides of these castings on either cable project lugs provided with pins. Struts and ties connect these pins and bind the two cables firmly together as a unit. From the lower side of the castings project lugs, provided with a pin, to form pin hingeing connections with the struts and ties depending therefrom. These struts and ties receive at their lower end similar pins passing through the webs of the channel beams, and carry the road girders from these connections.

When the invention is applied to street railroads in cities it is designed to erect at each street intersection a pier of structural iron. Heavy concrete and masonry foundation anchorages are built at each of the four corners of the street intersection, and from each of these anchorages springs upwardly and obliquely, toward the center of the street, a straight line column. These columns approach each other at their tops, and are rigidly united one to the other by transverse beams. Over the apex of the pier thus formed is passed the cables. These may be secured to the transverse beams by fastenings of such description as to allow of the adjustment in length of the cable to take up the slack and thus provide for additional means of maintaining the perfect alignment of the intermediate portions of the roadway lying between the piers. The street way is entirely unobstructed, the foot of each column being within the curbstone line.

Midway between these arched piers in blocks of unusual length, an additional supporting arch may be placed to avoid the necessity of making the piers at the intersections of the streets of excessive strength as would be necessary to carry the entire block, and thereby producing piers of unsightly and cumbersome appearance, the object being largely to produce a roadway of great stiffness and strength, while at the same time it may be light and graceful, and thus avoid obscuring the street overhead.

It is designed to have stations at suitable intervals along the road for local traffic. These stations may be provided for between the double arches at the street intersections: stations for up travel being upon one side of the arch, and stations for down travel being upon the other, and each provided with stairs upon which to ascend from, or descend to, the sidewalk below. It will be noiseless in its operation, the speed will be from 15 to 20 miles between stations, and the cost of construction is calculated to be from $50,000 to $60,000 per mile, double track.

The car is a feature of the invention. The floor beams extend from each side to receive a footboard of convenient width. Opening out upon this footboard between each double row of seats, which are placed transversely to the car, is a door upon each side of the car. It is designed to seat four persons on each seat; thus every eight occupants of the car are provided with ample accommodations for entering and leaving. The doors upon the opposite side of the car from the depot platforms are locked during the entire trip, while those upon the platform side are intended to be controlled from a central point by the conductor of the car or other person in charge, thus preventing their being opened while the car is in motion.

A rigid steel casting sustains the floor beams of the car, and rising through the roof spans the roadway, and attaches to truck, carrying frames suitably provided with springs and sustained on flanged wheels mounted upon the rails on the top flanges of the channel beams, each on its respective side. Boxes are provided on these trucks in which are journaled shafts, on one end of which is carried the flanged driving wheel and upon the other a double flanged pulley, two of these pulleys being upon each side of the track. These pulleys may be actuated by belts, driven by any suitable motor situate within the car.

It is deemed best to suspend an electric conductor from the roadway between the beams and take off therefrom current to supply electric motors. The form of conduit preferred has an outside metallic casing, slotted at the bottom to admit of a bar, projecting upwardly and into it. Within this casing, a copper tube, or other good conductor of electricity is placed, insulated from the outside casing in any of the usual methods. A brush of wire is arranged to be carried by the bar, and to receive the electric current from the conductor. From this brush the current may be carried to an electric motor placed within the car and thus propel it through the belts and drivers.

In cars of considerable length it is necessary to provide auxiliary trucks upon the forward and rear ends of the car, and acting as leading and trailing trucks to the main truck. These may be provided with flangeless wheels to allow the car to round the curves. A frame is pivoted to a strap embracing a floor beam of the car, this frame being provided with a base plate, which is bedded upon the casting, secured to the roof timbers of the cars. The casting has its upper surface an arc of a circle, having its center at the frame, being free to move in the casting through the slot.

The base plate carries standards, in which are axled flanged wheels, free to roll upon the track rail. Side play is thus given the truck with its wheels and it is free to move laterally to accommodate itself to the varying line on the track.

This describes the invention as applied to a double track road having traffic in opposite directions. The double cable system of suspension

is equally applicable to a single roadway. In this modification the strut and ties, from both cables approach each other at the lower ends and are received upon the same pins between the two channel bars, thus supporting and bracing it firmly in the two directions. The foregoing relates to a preferred motive power and a preferred form of car. It is obvious that the roadway as constructed is equally well fitted for any other means of locomotion, and may receive any form of car found suitable.

Weems' Electric Expressage.

This beats anything on record, and pushes all other probabilities of the future aside for the time being. As stated in a previous issue of the GAZETTE, Weems' "electric expressage" is a scheme to carry newspapers and ordinary express packages from city to city at lightning speed. A package will reach Chicago in about two hours from New York, Philadelphia, or Baltimore, it is claimed, or go right across from Atlantic to Pacific in nine hours; that is to say, a car will go from east to west about one-third as fast as the outside of the earth moves from west to east. The above-mentioned rate of speed includes stoppages. The running speed, it is said, will be ten miles a minute.

The *Railway Age* calls this "the dream of a Baltimore inventor," but it adds that "inventions which seemed much more wild than this are now in successful operation. It is not safe in this age of the world to undertake to draw the line between impracticable theory and actual practice."

The Electro-Automatic Transit Company, of Baltimore City, has been incorporated, with a strong board of directors, and the "enterprise" is no longer a "scheme," we are assured; it has assumed practical shape, and a line is to be built right away from Washington to Baltimore. "It has created an intense interest in scientific and other circles, and has been pronounced eminently practicable. It bids fair, at a very early day, to revolutionize the world on the question of rapid transit."

Although the "system" is most useful for long distances, its utility for large cities is evident. When New York, Chicago, Philadelphia, and Boston have their underground railways built, Weems' electric expressage may be used advantageously in a special chamber, beside or between the underground tracks, to deliver parcels all over the city "in no time," and home-cooked meals may be expressed from homes to offices almost as quickly as the dishes now go from kitchen to dining-room. At all events, if the "enterprise" will succeed as projected we have no doubt but that its intermural utility will soon be developed. It may be operated in conjunction with an elevated railway quite as well as underground.

The accompanying cuts speak for themselves. The top part of Fig. 1 shows a horizontal (or plan) view of the car or box; in the middle is an end view; and the bottom part shows the car as it appears on the track, from a side view. Figs. 2 and 3 give an idea of a double and a single track respectively, from which it will be seen that the shuttle-carriage runs on two rails, with a top rail to hold it down; this overhead rail is also the conductor of the electric current. Fig. 4 gives a general view of this electric shuttle-race, with faint traces of the "train" proceeding towards the left.

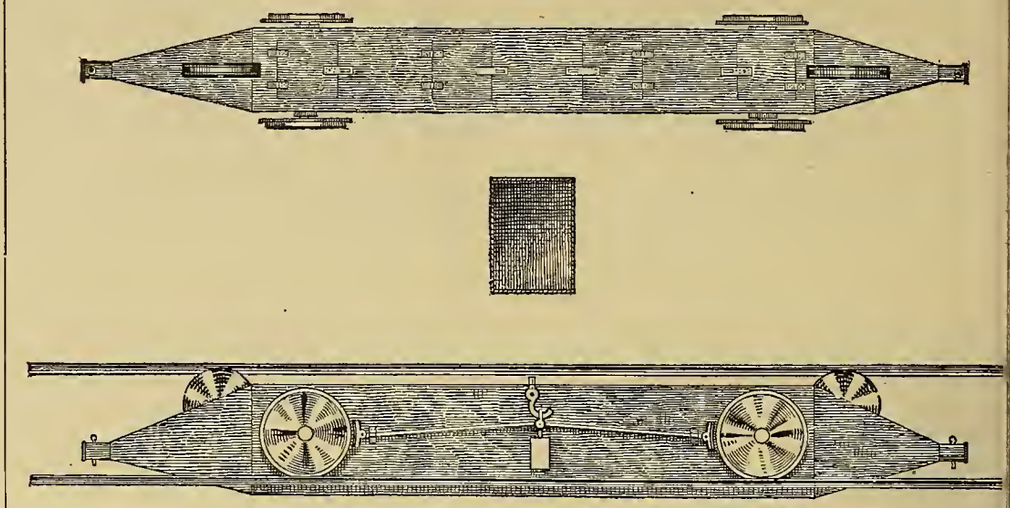


FIG. 1.—WEEMS' ELECTRO-AUTOMATIC TRANSIT CAR; PLAN, END AND SIDE VIEWS.

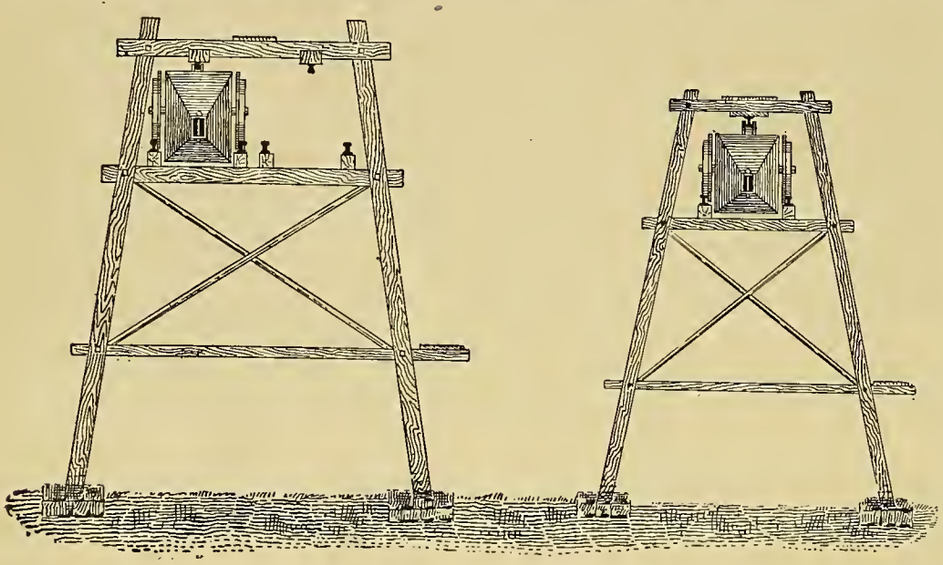


FIG. 2.—DOUBLE TRACK.

FIG. 3.—SINGLE TRACK.

FIG. 4.—THE ELECTRO-AUTOMATIC TRANSIT COMPANY'S STRUCTURE (AND CARS).

The Electro-Automatic Transit Company feel that they have got hold of something unusually wonderful. On the back cover of their handsome illustrated pamphlet they quote from the work commonly called Shakespeare's: "There ar more things in heaven and earth * * * than ar dreamt of in your philosophy." We hope tha this Weems' electric expressage is somethin more than a beautiful dream. In their pros pectus the company remarks that:

"As a means to the end, which we now hav in view, and which is the momentous question this present age of struggle for the mastery ove time, the use of electric force is making suc strides, and attracting such attention in th world of mechanics as to render its gener adoption, in all cases where power is necessar merely a question of time. By the use of th force, intelligently handled, the great desider atum, rapid transit, can readily be obtained, t the fullest extent of its meaning, and with it, th blessings and advantages which must inevitabl accompany it. The old adage, 'Time is money is none the less true than trite; so if time b saved by this means, in the transaction of bus ness, it holds good that its concomitant, mone will likewise be saved. Acting upon this an cient axiom, a western journal, a few years ago with an eye to future possibilities, asked th question; 'why is not some plan devised to en able banks, moneyed corporations and the publ generally to have the advantage of quick trans for commercial paper, securities, money, etc thereby saving interest, instead of being oblige to await the ordinary modes of uncertain ma delivery?' This question suggested a propos tion to a railroad corporation, by a clearing house and a number of merchants in one

the large western cities, offering a han some bonus, daily, for a train saving only eig hours, which would have saved one day's inter

on exchanges, etc., but the road was unable to accommodate them. The use of electric force has been brought to bear upon this particular subject, in the system herein treated of, which will be found to be not only feasible, but eminently practicable."

This lightning railway is to consist of a light structure, elevated some twenty feet from the ground. A permanent generator, of prescribed horse power, is to be located at each end of the line, from which the current will pass to the conducting rail, and will be immediately taken up by the traveling motor, to which one or more cars can be attached. On approaching its destination, it will pass a certain defined point where the electric current will be cut off, leaving the train to its own momentum which will gradually decrease. Each car then will encounter a trip lever, located at a sufficient distance from the stopping place, which will spring the brakes in succession, bringing the train to a standstill at a designated point. The cost of such a railway is figured out to be the exact sum of $5,079 per mile for a double track, and $3,366 per mile for a single track.

When such a scheme as the foregoing gets into satisfactory operation, we venture to predict that soon afterwards passengers may be sent cross country, or from one part of a city to another, in a reclining position perhaps, at the rate of several miles per minute. But that is not yet.

Cable Railway Practice.

By Edward J. Lawless.

Article V.

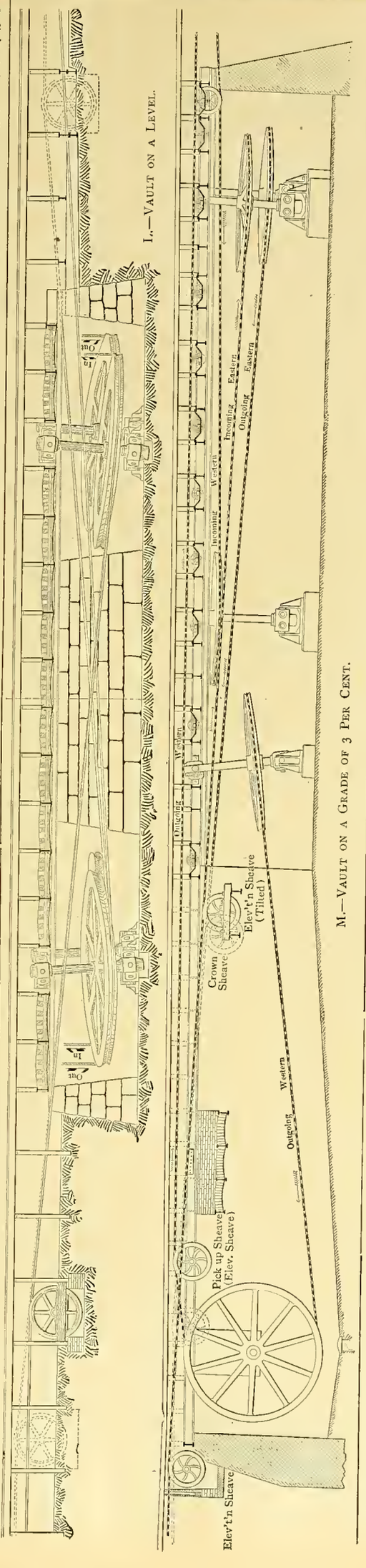
The location of the power house, in a great measure, depends upon the length of cable to be operated, and the grade of the street in front of it. If the power house can be placed at a point where the grade of the street descends both ways towards it, it is desirable, as the cars, when changing from one cable to another, can easily do so by gravitation. Should it be necessary, however, to locate where the street is level, or on a grade, then the cables, if there are two, the vault in front of the power house, should cross; that is, suppose a line is running north and south, with two cables, the cable leaving the north side of the vault should run south and the south north. This is for the purpose of shortening the distance as much as possible for trains to travel by momentum when making the change above referred to, without having sharp angles in the cables at points of "let go" and "pick up."

The vault containing the large sheaves in front of the power house should be so constructed as to allow the cables to be handled freely and quickly; as, frequently, a great deal of work is required to be done in this vault, especially if a cable strands, when promptitude and dispatch are essential; and this cannot be obtained when men are in a cramped position.

The large sheaves around which the cables pass, to enter and leave the power house, should be twelve feet in diameter, made in halves, so that if any accident happens to them they can be changed without too much trouble and expense. As the strain on these sheaves, particularly from the incoming cable, is very severe, every precaution should be taken to make them stand the work required. It is advisable to make the axles holding these wheels adjustable, so they can be set at different angles when necessary, and provision made to wash and clean out the bottom box.

The accompanying cut L shows a vault and arrangement of cables and sheaves where trains pass the power house on a level street. Here it will be seen that the angles in the cables near the vault are reduced to a minimum, while the distance for trains to travel by momentum is comparatively short.

Cut M shows a vault located on a grade of about three feet in 100 feet. This line runs east and west with the up-grade towards the west. Here it will be seen that if the cables were arranged in the same manner as shown in cut L, it would be impossible for trains going west to travel the required distance by momentum; so it was found necessary to turn the west cable a short distance east to the foot



L.—Vault on a Level.

M.—Vault on a Grade of 3 Per Cent.

of the grade, pass it around a twelve foot sheave and then start it on its western course; an arrangement that works very satisfactorily, and trains make the change of cables without experiencing any difficulty.

The drums or winders around which the cable passes in the power house in use at the present time, are of three different kinds. The clip or grip drum used on the Clay Street Hill and Presidio railroads, in San Francisco, a description of which is given by Mr. A. W. Wright, C. E., in the Street Railway Gazette of July, 1887. The drums placed close together, having grooves filled with wood, around which the cable forms the figure 8 in use on the Market and Sutter street railroads, in the same city, also described by Mr. Wright in the Gazette of September, 1887, and the drums containing several grooves around which the cable is wound three or four times in use on all cable lines east of the Rockies.

All these methods of winding the cable seem to give satisfaction. It is a question, however, whether the figure 8 will work as satisfactorily in a cold climate where ice and snow prevail in winter, as it does in San Francisco, where the thermometer rarely reaches the freezing point. It certainly requires a greater tension on the cable than either of the other methods, and makes the use of the combination or "root" tension carriage indispensable. When using the figure 8, there should be a double set of grooves filled with wood, so that when one set is worn out, the cable can be transferred to the other and the wood removed at leisure. These wood fillings last about twelve months. The drums should not be less than twelve feet in diameter, and placed close together so as to present as much friction surface as possible for the cable.

With the drums in use, in all eastern cities, the general experience has been that the groove containing the incoming cable, having the greatest strain on it, shows wear sooner than any of the others, and, when this occurs, it rapidly gets worse, and soon has to be abandoned altogether. The same result is experienced on the next groove; and in a few years the whole drum has to be abandoned, simply because the grooves are worn, although the balance of the drum may be in perfect condition and capable of giving several years' additional service. For this reason the grooves should be made interchangeable (there should be at least six to each drum). It is well worth the slight extra cost to do so, as the benefits derived during operation are considerable; for, should one of these grooves get worn more than another, the circle made by the cable in that groove will be smaller than the circle made in the others, consequently, the cable must either slip or stretch. Grooves of wrought iron or soft steel can be so made that it is only a matter of a couple of hours to make the change, while a change of drums is liable to take twenty-four hours, entailing a heavy pecuniary loss to the company and great inconvenience to the public. They should be not less than twelve feet in diameter, and hung outside the bearings to permit the removal or replacing of the cable when necessary, or put on an extra lap when the cable stretches, without having to cut it. It is claimed by many that intermediate gear should be used to drive these drums; that is, there should be a gear wheel attached to the shaft of each drum with a small gear wheel between. Others hold, however, that the intermediate gear is unnecessary, and the results seem to show that their claim is a good one. Drums and gear similar to the kind mentioned were used by the Metropolitan Street Railway Co., of Kansas City, on the Fifth street cable line, when, owing to a settlement of the foundations, it was found necessary to take out the intermediate gear. When this was done, the only difference observed in the running of the cable was that with the intermediate gear only; three to four laps of the cable around the drums were necessary, while, without it, it took from four to five laps. An extra lap, however, does not seem to make any perceptible difference in the wear of the cable. The Grand Avenue Cable Co., of Kansas City, also dispensed with the intermediate gear, and derive very satisfactory results from the wear of their cables.

To be continued.

The
Street Railway
Gazette.

E. V. CAVELL, - - - - - - MANAGER.
WILLIAM HUGHES, - - - - - - EDITOR.
EDWARD J. LAWLESS, - - - ASSOCIATE EDITOR.

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Matter for publication should reach the General Office by the 1st of each month. All communications should be addressed, THE STREET RAILWAY GAZETTE, Chicago, Ill.

Articles and papers on subjects relating to intermural transit always appreciated; the GAZETTE's columns are open for the expression of independent opinions, and the discussion of all matters connected with street railways—on the surface, elevated or underground. A special column is devoted to the publication of trade notes and items from manufacturers and dealers.

"EVERYBODY" of the quarter million visitors to Chicago during the Republican convention, greatly admired Chicago's street car facilities; and many newspaper editors have commented favorably thereon.

THE Metropolitan Elevated Railway Co. have thrown a cloud over "L" roads investments by deciding to pay all their surplus earnings for the past quarter, with the exception of 1 per cent. toward the liquidation of judgments obtained against the company for damages to real estate abutting on their lines. These judgments already aggregate $1,500,000; and still there's more to follow.

CHICAGO'S transportation facilities are unequaled! The delegates to the Republican convention spent Sunday, June 24, in Chicago. In the morning they went to church, it is said, and in the afternoon they roamed about the attractive spots of the "Garden City," on the border of Lake Michigan. The newspapers which have ridiculed the North, South and West side street cars, in season and out of season, thus spoke of Chicago on the special occasion referred to: "Freed from the smoke, dust, noise and bustle of every-day life, Chicago presented herself (Sunday) with the magnificent drives, the grand parks and the uncqualed transportation facilities to the delegates."

CONVENTIONS political, conventions religious, conventions educational, and street railway conventions, are familiar enough to all our readers. But a convention of the agents of one great firm is something unusual; and much interest is awakened by the announcement that there is to be a grand convention in New York, in the near future, of the numerous representatives of the Sprague Electric Railway and Motor company, from every part of the United States, etc., when they will celebrate their business success. It is stated that of all the men in the electrical business, those making the most money are the Sprague agents. Their energy and push are remarkable, and with the Sprague system they feel that they are invincible.

LETTERS of inquiry were sent only to those with whose views we were not acquainted in reference to sending exhibits to Washington, if the American Street Railway association should arrange for a proper exhibition. We know the views of many of the principal manufacturers and business firms without asking them. From the replies to our inquiries we learn that everybody, or at least nine out of every ten, are very much in favor of such an exhibition as has been suggested.

RAPID transit in cities has received a new wave of popular discussion since Mr. Frank J. Sprague read a paper, June 19, before the American Institute of Electrical Engineers, on "The Solution of the Rapid Transit Problem." Mr. Sprague maintained that it will be solved by using electricity to haul the cars either underground or elevated. The electrical developments and inventions within the last year or two had, he said, been great; but electricians were now so hopeful that they hardly trusted themselves to make assertions as to the more bountiful results that may, and within a year or two largely will, be attained.

ELECTRICITY, as a motive power for street railways, has now passed the experimental stage, says the *Commercial Advertiser*. The state of the art has now reached a point where all may witness the principle actually applied and working satisfactorily under the ordinary conditions of daily life. A number of rival systems, each, no doubt, possessing merits of its own, compete for recognition as the best; but this antagonism is a sign of health. Very likely there will always be such a competition, just as we find different makes of sewing machines or steam engines. But the main fact is, that the utility of electricity as a motive power for railway transportation has now been demonstrated, and is rapidly coming into use. Experience must decide among rival systems in the light of the record of each, and of the peculiar conditions of locality.

EXHIBITS there will be, as usual, at the Seventh Annual meeting of the American Street Railway association at Washington. For instance, Major Blodgett says he will be there "in any event" with his Railway Register Co.'s registers. Mr. Wm. Wharton, jr., and the Electric Car Co., of America, we understand, are making arrangements for exhibiting their storage battery cars. The Sprague Electric Railway and Motor company have also been looking how the ground lays, it is said. In a word, there is every prospect that there would be a splendid show if the American Street Railway association will "take the matter up." The executive committee have it under consideration, we believe; and it is probable that the Smithsonian Institute will give valuable aid, and hold out inducements for fitting up a street railway department in connection with the National museum.

"ELECTRICAL Power on Tramways" is the subject of an illustrated article in our London contemporary, the *Electrical Engineer*, for June 29, in which Herr Coerper's "improvement" in electric propulsion is criticised enlargedly. In its issue of June 8 the same paper had given full extracts of Herr Coerper's illustrated article published in the STREET RAILWAY GAZETTE for May, and at the same time in a leading article on electric tramways, it declared in effect that the said improvement, like Jarman's scheme, was of no advantage. This is the exact language: "Viewed in the light of experience, Mr. Jarman's special system appears, therefore, to be a device to overcome a difficulty which does not exist; whilst at the same time it is more complicated than any of the designs which have already been found to answer in actual practice. The motor and gear proposed by Mr. Coerper is also intended to overcome an imaginary difficulty, viz., that of too big a current at the start." This is a peculiar way of putting it. What Herr Coerper professes to have overcome, as we understand him, is too little force or power when the most is wanted. As stated in our May number, "hitherto the greatest difficulty has been that when the greatest force is required (such as when starting or going up grades) then, most provokingly, the electric energy becomes weak est!" Does our British contemporary mean t say that that is merely "an imaginary difficulty? We have never heard of too big a current at th start here, but the real difficulty seems to be tha the bigger the current, over or above a certai point, the weaker becomes the force

Mr. C. B. Holmes is all Right.

Nothing more occurred in court since our las issue in connection with the prosecution c Sumner C. Welch, chief clerk of the accider department of the Chicago City railway, on th charge of contempt of court by "attemptin to corrupt or unlawfully influence Juror Rosei thal," as they alleged, who was on a jury tryin a claim for damages against the railway con pany, until July 11, when Judge Hawes delivere his opinion and sentenced Welch to the coun jail for six months, refusing to grant an appea The Judge's opinion, as has been aptly describe was "a moral disquisition, having for its obje the showing of a conspiracy which never existe It was for publication in the newspapers." Wi that view we fully agree: it seems pretty cle that these proceedings were maliciously co ducted from the start, for reasons stated in t June GAZETTE, and that Judge Hawes' mi had been poisoned against Mr. Holmes and a connected with him before the "investigation commenced. Consequently every event, eve word, and even silence, have been misconstru and discolored; everything that could be ma to appear as in the remotest degree supporting t preconceived notions of the prosecuting attorne and Judge Hawes, were clutched with avidit while everything tending to upset the tacit, if n expressed, understanding between those w thus prostituted the forms of law was vigorous suppressed. Talk about "conspiracy!" In t ing to make it appear that there was a co spiracy between Superintendent Holm Accident Clerk Welch and Attorney C. Hardy, to do an illegal act, their enem have betrayed an acquiescent and ill-disguised not a very active and deliberate, conspira simply to try to ruin Mr. C. B. Holmes (for has been the chief aim all the time). What t full programme of the prosecution may ha been is not likely to become known; perha they had not agreed on details (that they co not have done very well); but they had eviden determined to do their worst, having condemn the accused before they were examined, sor what after the manner of the famous judges Lidford:

> We all have heard of Lidford law,
> When judges first did hang and draw,
> And sat in judgment after!

History continually repeats itself, with circu stantial variations. The mountain labored t menduously in this case; and behold a mo has come forth. After all their lofty disqu tions anent the purity of the law, the only o come, as far as the prosecution is concerned, been to send Mr. Holmes' accident clerk to for six months, and he was released on a sup sedeas in less than 24 hours.

Judge Hawes did not venture to have Holmes held over to the grand jury, but p claimed his recommendation to have that b investigate. That simply means, probably, t the prosecuting attorneys may present an ind ment to the grand jury, so as to cover as m as possible their own virulent abuse of Holmes, and Judge Hawes' manner of presid over the "investigation" in his court. But Holmes may be very desirous of having such investigation, as a jury (grand or petit) would far more likely to give him fair play than person dressed in a little brief authority of ju ship. Anyway, a fair investigation by a gr jury would be likely to wipe away the odi that Judge Hawes has tried to cast on him. general opinion among Mr. Holmes' acqua ances is that he has been most unjustly abus Here are the chief points of the case:

1. Judge Hawes forced Mr. Holmes, when the stand, to answer the questions put to him "Yes" or "No," in cases where it was impo ble to state the truth through those narrow ch nels. For instance, he was asked if he heard that his accident clerk, Sumner C. We was a jury briber. If he had replied "Y

here would have been some degree of truth in it; ut such a monosyllabic answer would have con- ained much more falsehood than truth. Conse- uently he adopted the only alternative the court as pleased to allow him, and he answered "No," s that answer contained by far the most truth. he real inwardness of that matter is this: in rder to "intimidate" rapacious lawyers who oncocted unjust claims against the railway com- any, and promised their deluded clients that ey could get a big verdict by hook or by crook, elch pretended to them that he could "fix ries" quite as well as the lawyers. Some of em believed that he really could, and were erefore discouraged from prosecuting vexa- ous and unjust claims. Welch had thus de- beratety acquired the reputation of being a ry briber; and ambitious lawyers and legal llies of the Whitney type called upon Mr lmes and told him Welch was a jury briber. ne of the most noteworthy of these was Law- r Whitney, who was recently shot by Mrs. M. . Rawson for grossly vilifying her with his legal ngue. Whitney was so outrageously abusive hen he called in reference to the claim of a cer- in lady that Mr. Holmes declined to hold con- rsation with him, and instructed Welch to see hitney's fair client and try to settle with her rect. Thus Mr. Holmes had "heard" in a nse that Welch had the "reputation" of being le to fix juries; but he had never heard such a ing as a *bona fide* fact. And the clear impres- on made on our mind after watching the whole oceedings closely, and being present in court en Judge Hawes delivered his grandiloquent inion, is that Welch is not a jury briber. He s gained the reputation of being one, in order frighten certain lawyers; he has frequented sa- ons and kept his ears open to watch the tricks evidence manufacturers; he has followed the otsteps of jurors as closely as possible, and pt an eye behind the scenes often, in order to event the total corruption of juries by the er side. Lawyers have put detectives to tch him, time after time, and if he was a jury ber he would have been caught long ago no ubt. To our mind, the fact that Welch has en watched closely, without finding anything ainst him, goes a long way to prove that he is t a jury briber; whereas Judge Hawes put it other way, saying that Welch himself had d he was a jury briber, and, as he had been *tched* as a jury briber, therefore he undoubt- y is a jury briber! Strange argument, truly; l no judge of experience would be likely to such flimsy "evidence" except his judgment s warped by prejudice.

. Going to law, under the most favorable cumstances, is very miserable business; and l showed he possessed a just estimate of legal ceedings when he exhorted his followers not go to law. From then till now wise men have ferred suffering wrong rather than going to , unless obliged to. One of the unpleasant- works connected with a cable railway is the lement of claims for accidents, and the worst tion of that department is the claims handled a certain class of lawyers. Whenever an ac- ent occurs the conductors and drivers of all l-managed street railway companies are re- red to take all particulars on the spot, and ertain names and addresses of all eye-wit- ses. As soon as an accident becomes known, warm of lawyers (in Chicago at all events) with eye to business, proffer their services and l out various inducements to secure a client; eral lawyers, who cannot get business other- e, have special canvassers for clientage, and points generally urged by these legal drum- s are: (1) Mr. So and So (the lawyer) is mately acquainted with Judge So and So, and ays secures a verdict whenever he can get a before him, and he (the lawyer) would no bt be able to have this case tried before his or; (2) my boss can also get acquainted with jury, during the trial, and induce them to a big verdict. It has been Sumner C. Welch's ness to fight these pernicious arguments and himself thoroughly posted as to the devel- tents of such unjust claims. To do so effici- y it is necessary not only to keep a record of he honest facts, but to watch the progress of evidence manufactured by the other side, and eady to refute every expected and unexpected false assertion. Judge Hawes seems to be in blissful ignorance of this state of things, or at all events he ignored it; and when his honor got a piece of "evidence" to the effect that Welch had told somebody that his (Welch's) was very hard work, and that if he didn't do it somebody else would, the court came to the conclusion, very willingly, that Welch was a jury briber, and that jury bribing was the very hard work which Welch was obliged to perform or else somebody else would; *therefore*, Mr. Holmes employed Welch as a jury briber! That was the reasoning. Verily, the Judge's manner of arriving at conclusions challenges our profoundest admiration.

3. Judge Hawes probably intended it as an apparent piece of fair play to Mr. C. B. Holmes when he said: "As was said of Hardy, so it must be said of Holmes, the evidence does not show that he ever personally attempted to bribe a juror or suborn a witness or directly instructed Welch to do so. His responsibility, according to the evidence, springs not from active participation, but rather from passive acquiescence." That phrase is extremely inconsistent with some of his honor's other remarks. And that piece of exoneration appeared to spring from judicial policy more than from just spontaneity. His honor was frank enough to say that he had known Mr. Holmes "personally, long and well." Why he should give him what seems to us a most unjust treatment cannot now be unearthed. But in view of this brief admission of previous long friendship, it is no wonder that Mr. Holmes was completely staggered when Judge Hawes, his own familiar friend, sternly forced him to answer a complicated question by "Yes" or "No," which it was impossible to answer perfectly without an explanation. After what occurred then and since it is a little curious that his honor did not submit Mr. Holmes to the indignity of being "held over" to the grand jury on the charge of conspiring with his attorney and his accident clerk to bribe juries. We wonder that, instead of that, he exonerated Mr. Holmes of everything except "passive acquiescence" in certain work which the Judge says has been performed by S. C. Welch, but which Welch never performed, as we believe, and as Mr. Holmes firmly believes. As a result of the whole business Mr. Holmes expresses greater confidence in Welch's integrity than ever. There was a time when it was not so strong. Mr. Welch's accounts did not balance up properly seven or eight years ago, when many thousands of dollars passed through his hands during the construction of Mr. Holmes's cable road. It was doubtful whether Welch had paid certain accounts and wages twice over (with only one accounting) by mistake, or whether he had acted dishonestly in the matter. Mr. Holmes, after due investigation, very generously gave Welch the benefit of the doubt, and since then he has been a most faithful "hustler" in Mr. Holmes's office. That, and a pocket-handkerchief lark years previously, were dilated upon by the prosecuting attorneys and Judge Hawes as evidence that Welch is a dishonest man and a jury-briber. His honor, therefore, safely ventured to send Welch to jail for six months, while admitting that "could this court be assured that he will be punished for this act [attempting to bribe a juror] there [in the criminal court] it would gladly relegate him to that tribunal."

A more astounding excuse for sending a man to prison we never heard of. It seems to us that Judge Hawes feared that Welch could not be convicted on the charge of attempting to corrupt Juror Rosenthal, nor on the curious charge of conspiring to bribe juries on which his honor had previously bound Welch over to appear before the grand jury, and therefore he sent him to the county jail for six months on the charge of contempt of court—such constructive contempt being the alleged attempting to corrupt Juror Rosenthal! And really there does not seem to be the slightest real evidence that Welch ever bribed or tried to bribe any one. There is some suspicion that bribing has been done, to a small extent, in one or two cases, by a lawyer having business connections with the attorney of the Chicago City Railway Co. But it is very evident that such a thing, if it was really done, was entirely outside the knowledge of Mr. C. B. Holmes, and would not have been tolerated by him for a moment. And as for Welch, not a single instance of bribing, or attempted bribing, has been brought against him except the constructive attempt to corrupt Rosenthal which has been charged against him, but on which Judge Hawes, as already pointed out, fears he cannot be convicted before a jury. That was the wisest observation made by his honor, if we rightly understood him, during the whole proceedings.

TURNING THE TABLES.

As soon as they could next day (July 12) Attorneys Hardy and Hynes went to the Appellate court and applied for a stay in the proceedings. Judges Moran, McAllister and Garnett, without any hesitation, granted a supersedeas to Sumner C. Welch on a writ of error, and fixed the bail at $3,000; and Welch was released.

Origin of the Fire Unknown.

Among Passing Events, page 97, we record the burning of the Montgomery electric railway and steam plant, etc. As it was remarked in some quarters that an electric spark started the fire, we made special inquiry, and the following reply is conclusive on that point:

MONTGOMERY, ALA., July 11th, 1888.

EDITOR ST. RY. GAZETTE, Chicago, Ill.

Dear Sir: Yours of 3d to President E. B. Joseph has been referred to me for reply.

The origin of the fire, by which we lost our electric railway and steam plant and 6 cars equipped with motors, is a mystery to us. The fire occurred 3 hours after we had shut down the plant for the night. I am satisfied it was not caused by electric spark. We have been running 14 months. Length of single track 7¼ miles; double 2½; total 9¾. Operated by Van Depoele system, overhead wires. Respectfully,

GEO. B. SHELLHORN, Supt.

Special Notice to Our Subscribers.

If your STREET RAILWAY GAZETTE fails to come, please examine your last receipt and see if the time for which you paid has not expired.

The GAZETTE has an established circulation through ninety-seven out of every hundred street railway offices, and 95 per cent. of our subscribers are good and prompt payers, but five per centum neglect to sent us a couple of dollars annually. We are compelled, as a matter of fair play, to strike off the names of non-payers from our subscription books. We shall be glad to re-enter them, it is needless to say, as soon as we may receive the one thing needful.

Correspondence.

CINCINNATI, July 1.—The past few weeks has witnessed quite a boom in street railway matters in this city. Two new routes have been put into operation and a new system of motive power adopted on an old established road—an innovation here—electricity being the power used to propel the cars, and at the same time the agent employed to light the cars. In addition, quite a number of projects are now in the preliminary stages of work. The first and most important road opened was the Mt. Auburn cable company's branch from the Mt. Auburn power house to Avondale, a distance, round trip, of five miles, and which the cars make in the unprecedentedly rapid time of thirty minutes, including stops. So appreciative were the Avondale populace of this example of Mr. Martin's enterprise that they tendered him a complimentary banquet on the 27th ult., which was quite a fashionable affair of that suburb.

That old landmark, the main street line of railway, connecting the heart of the city with the zoological gardens and the hilltops, via an inclined plane and known as the Cincinnati Inclined Plane railway, is in deep trouble. Its capital stock has been ordered sold by the Probate court for one cent on the dollar. This decree was made in accordance with the request of the administrators of the estate of the late George A. Smith, formerly president of the company. The administrators, in their petition, set forth some novel and instructive facts, showing how a once-prosperous road, sticking to its old-fashioned mule power, and little boy drivers, and rude boy conductors, can be ruined by en-

terprising and pushing competing lines. The petition says that the company has a bonded indebtedness of $125,000, bearing seven per cent. interest, and other debts that will swell the total to $175,000; that, by reason of competing cable lines, the business of the company has run down to such an extent that it is now wholly insolvent and that it has neither funds nor credit to make needed improvements. It alleges that the stock is worthless; that all of it excepting five shares is owned by the Smith estate, James M. Doherty and Joseph S. Hill; that Doherty has no means, so that in case of failure of the company the whole loss would fall upon the Smith estate and Joseph Hill. Mr. Hill, who is secretary of the company, and, since the death of Mr. Smith, its president, also says that the income of the road does not pay its expenses; that the road's earnings have decreased fifty per cent since the establishment of the two competing lines of cable road, and that the amount of the road's indebtedness can not be realized from the sale of the franchise. The court ordered all the stock of the company sold at one cent on the dollar. Messrs. M. J. O'Connor and St. John Boyle become the purchasers.

It is pleasant to turn from these sordid topics to one of a social and happy nature, the marriage, on Thursday, June 14th, of Mr. John H. Martin to Miss Neva Kate Weir. The groom is a son of Henry Martin, president of the Mt. Auburn Cable Railway company, and himself the treasurer of the company. The bride is the daughter of Col. L. C. Weir, superintendent of the Adams Express company. The wedding took place at the home of the bride's parents, and was the most fashionable event in society here this spring. On the day following the wedding the happy young couple left for New York, and a cablegram since announced their safe arrival in Europe, where they will remain until September.

Albert Rybolt, a conductor on the Clark street line, died under very mysterious circumstances some time ago, but nothing came of the official investigation. His funeral was largely attended, Superintendent Harris heading the procession.

The books of the tax assessors, just returned, show the following taxable values of street railroad properties in this city:

Cincinnati Inclined Plane R. R. Co.	$ 39,127 00
Cincinnati and Clifton Inclined Plane R. R. Co.	19,910 00
Price Hill Inclined Plane R. R. Co.	32,330 00
Mount Adams and Eden Park Inclined R. R.	11,700 00
Columbia and Cincinnati Street R. R. Co.	7,635 00
Walnut Hills Cable Line	35,000 00
Mount'Auburn Cable Line	22,975 00
Eden Park, Walnut Hills & Avondale St. R. R.	19,700 00
Cincinnati Street R. R. Co.	340,463 00
Newport and Cincinnati Bridge Co.	76,490 00

And now the Cincinnati Street Railway company are talking of an electric motor. They propose to give electricity a trial on the Broadway Hill, where extra teams of mules are required to draw all the east end and Newport cars up the steep ascent. The electric system may be also put on the Colerain avenue line.

What might have proven a terrible catastrophe occurred on the Mt. Auburn cable line the evening of July 4. A car crowded with passengers, when approaching the power house, down a steep grade, became unmanageable, and, jumping the track, was almost completely wrecked. None of the passengers were seriously injured, though a four-year-old girl at play near by was struck and received probably fatal injuries. Had the car jumped to the opposite side, it would have been hurled down a 40-foot declivity into a stone-quarry, and the result would have been frightful. The car became unmanageable through the brake refusing to work and striking the curve. The grip was wrenched off.

Boynton's Bicycle Railway.

In the December GAZETTE we gave an illustrated description of the Adams' elevated railway, which Mr. Yerkes subsequently pronounced as the best system of elevated railways yet brought to his notice. In the same issue we ventured to call attention to "Smith's Universal R.R.," but more as a dream than otherwise. We were so incredible as to remark that "the brain of Inventor Smith is full of the scheme: he can see (in immediate prospect), not only the streets of all cities covered with his Universal railways, but such rapidity and 'absolute security' can be attained with the system that the Universal is destined to supersede all our present great railroads." Our readers thought that a joke on Smith.

But sure enough Boston is in the birth-throes of a bicycle railway that will be all that inventor Smith dreamed of, and is likely to put Adams' "L" system in the shade.

Mr. E. Moody Boynton, ten years ago, received inspiration from the bicycle which led him to experiment and at last devise a railway which is likely to supersede all our present railroads, and for which patents have been secured in all the leading countries of the world. The most experienced railway and civil engineers, it is said, have given it as their opinion that his system means as great a revolution and advance in rapid and economic railway transportation as the present railway system is over the old stage coach or baggage wagons, or as the large bicycle is over the boy's velocipede. A company with $5,000,000 authorized capital has already been organized, which looks as if there were moneyed men who believe the system to be feasible. Everybody knows that transportation involves, next to real estate, the largest investment of civilized nations—over $10,000,000,000 in America, and double the sum in other lands—and is but a small fraction of the sums that in the near future will be required for all the world.

Boynton's system does not disturb or destroy existing roads; it saves more than half their expenses, while trebling speed. To reduce the cost of transportation is a measureless benefit worthy of the greatest invention of the age, which, in the language of the eminent chief examiner of engineering and railway patents, "is simple, inexpensive and practical."

Over the "bicycle" road San Francisco is brought within 48 hours of New York. A man can travel 100 miles an hour or more, and he will travel in a car where there is no such thing as standing-room nuisances. If one is traveling a long distance and rides in a palace car, he can go up stairs to the smoking-room instead of smoking on the same floor with the ladies, and he can go so fast that he can't see the posts or trees flit by him as he passes. He won't need to take a sleeper unless he be bound for South America.

An exchange publishes an illustrated description of this new system in its application to cross-country railroads. We are promised drawings, etc., of structure and equipment of this bicycle suitable for city transportation.

Feeding Draught Horses.

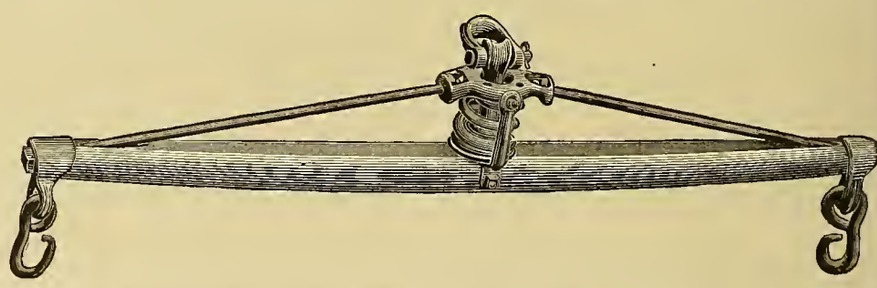
BY CHAS. CHALLENGER, BRISTOL, ENGLAND.

[*Concluded.*]

Barley is not so extensively used now-a-days in this country as it was before the introduction of maize as horse food, which dates back to about the year 1840. Up to that date it constituted a large proportion of the food of hard-worked horses; almost to the same extent as it is now employed throughout the Continent and the East. Then English grown barley only could be procured, which commanded, and still does, a high price. Maize was forced into notice on account of its lower price. But barley is now largely imported from foreign countries, and may be purchased at temptingly low prices, being cheaper now than maize. The imports for 1885 amounted to 4,309,657 quarters — 400 lbs. to the quarter.

Great deference should be paid to the teachings of those who speak from a life-long experience, who have studied to bring about reforms where needed, and where the reformers have first of all put their principles to the test, and found them fraught with much good to the animal kind, and advantageous in their results to mankind. The following extract, then, from Armatage's "Horse Doctor," in the chapter on "Dyspepsia," may be looked upon as emanating from a source akin to the above sentiments. He says (page 208): "With regard to the nature of certain kinds of food, particularly those which stand high in the scale of nutritive value, it is usual to condemn them as hurtful on that account, and hence we find men of decided genius falling into the error of advocating entirely the avoidance of barley and wheat. * * * In 1876, wheat was making such a fearfully low price that farmers gave it largely to their horses, and sold their oats and beans. * * It is remarkable, also, that in reply to our numerous inquiries, we have not learned that such general consumption of wheat has induced an enzoötic visitation of acute indigestion in the farm horses to which it has been supplied. Besides, we can assert that for years we have used barley for working horses, and, in many instances, it has formed the bulk of their food, and, yet again, we have made sudden changes from oats to beans or peas, to barley and back to oats, yet none of these fearful states have resulted. In large studs of horses, it becomes a necessary study which article of food shall be supplied, which affording the greatest amount of nutrition shall at the same time be supplied at the smallest rate of expenditure. * * * While and barley are not essentially dangerous because they are nutritious, but because they are devoured in unnatural quantities, in an unnatural way."

Captain Hayes, New Veterinary College, Edinburgh, says: — "In Arabia, Syria, Egypt and other eastern countries, raw and unbroken barley is the staple food for horses. The natives of these countries utilize to the fullest extent the nutritive properties of barley, by mixing it with barley straw which has been bruised and broken up into small pieces. The horses get no other food except barley and this prepared straw for ten months in the year, and they thrive admirably on it."



Wilson Patent Spring Single-Tree.

The accompanying illustration shows the special features of the Wilson patent spring single-tree, which has been some years upon the market. No wordy explanation is required, as the cut speaks for itself, and the "vital points" may be seen at a glance. The benefits derived from its use will likewise make themselves manifest to all who are acquainted with the hardships suffered by draught horses in general, and street car horses in particular. In using this spring device, the load is constantly balanced on a spring, making it impossible for the horse, harness, wagon, machine or street car to receive any sudden shock or jar when starting the load or when striking an obstruction. The springs are made of best steel, all tempered and warranted to stand in any climate. The long truss rods are of steel, the woods are of best hickory, all well painted, and warranted to stand fair usage. It is light, strong and durable, and in fact is the only spring single-tree, it is claimed, embracing all the necessary points to save horses from sore shoulders and stiffness of limbs, preventing reluctance in pulling and destruction of harness. This tree is not an experiment, as it has been on the market for some years, giving perfect satisfaction; it is affirmed that parties once using them will not do without them. The Wilson spring single-tree is manufactured by the Jeffrey Manufacturing Company, Columbus, Ohio. Hitherto, no effort has been made to introduce it to street railway companies; but having been used by several horse car companies for some time, who speak very highly of it, the manufacturers now wish to call general attention to its merits.

Our Card Basket.

Col. G. B. Kerper was at the Press banquet, incinnati, last month.

President Edgerton, of the Kansas City levated railway, is in the East.

Mr. Chas. F. Washburn (Washburn & Moen Ianfg. Co.) speaks well for the Street Rail-'ay Gazette.

Mr. Samuel Cowdrev is the present super-ıtendent of the Watervliet Turnpike and R. ., Albany, N. Y.

Mr. T. H. Bailev, manager of the Thomson-Iouston electric railway department at Chicago, as returned to his post after a flying visit East.

Mr. W. S. Wales, of the Wales Manufactur-ıg company, has obtained letters patents for a are-box invention as related under "Patents)escribed."

The Hon. G. Hilton Scribner, president of ıe Central Park, N. & E. River Railway com-any, boarded the city of Rome June 13, bound or Europe.

Mr. W. R. Triggs, of the Richmond Locomo-ive and Machine company, has been elected resident of the Richmond Union Passenger Railway company.

Major E. A. Blodgett will be there "in any vent;" that is, at the Washington Street Railway Convention next October, exhibiting the Railway Register Co.'s registers.

Mr. Clift Wise, the well-known cable rail-'ay engineer, favored us with a call June 25, n his way to St. Paul, Minn. He looked quite s well as the best of the good-looking Pennsyl-ania delegates at the Republican convention.

Mr. Evans, of the Thomson-Houston com-ıany, has returned to Chicago, from Council 3luffs and Omaha, where he has closed a con-ract for an electric road to connect the two ities over a special bridge across the Missouri iver.

Mr. Wm. P. Craig is extremely busy; he is resident of the Palatka & Heights Street Rail-'ay company, Palatka, Fla., and he is now uilding a cable railway in Newark, N. J., which 'ill be in operation the beginning of next ıonth.

General Benjamin F. Butler, was at the Hotel Richelieu, Chicago, June 25. He had een to Minneapolis on business connected with he Meigs elevated railway system. The Meigs L" road in Chicago, as explained elsewhere, is ot likely to materalize yet awhile.

Mr. Julius E. Rugg, formerly general su-erintendent of the Boston Consolidated Street ailway, and withal vice-president of the Amer-ıan Street Railway association, is now superin-endent of the Minneapolis Street Railway com-ıany, and he is already becoming popular in his ew position.

Mr. John H. Martin, son of the president of ıe Mt. Auburn Cable Ry. Co. (whose portrait, utograph and biographical sketch appear in this umber of the Gazette), and Miss Neva Kate Veir, daughter of Col. L. C. Weir (superintend-nt of Adams Express company), were married une 14, and they are spending their honeymoon ı Europe. This wedding was a great event in ıe Queen city.

Mr. Elias E. Ries, the well-known electrician f Baltimore, holds his own in the *Electrical Engineer* against Mr. Otis K. Stewart's attack on ıe Ries method of welding rails by electricity. fe also promises a railway constructed upon is principle at an early date. Mr. Ries has emporarily taken quarters at the Boston office f the Baxter Motor company, No. 178 Dev-nshire street, where a working model of his ystem will be on exhibition for a few weeks. Ie and his partner, Mr. A. H. Henderson, were ıe guests of the Boston Electric club recently.

President John Kilgour says that the Cin-nnati Street Railway company will very shortly ut electric power on their Reading road branch) Avondale. The proposed line will be three ıd one-half miles long.

NEW PROJECTS, PASSING EVENTS, &c.

Alabama.

Anniston. The Alderhold Park and Dummy Line company expects to begin work within a month on its dummy railroad, and will complete it in six months. It also intends building a lake and hotel at Alderhold Park. About a hundred thousand dollars will be expended.

Huntsville. The contract has been let and the steel rails purchased for the "standard gauge" dummy line to be built from this city to Hotel Monte Sano, and will be placed in operation by August.

Mobile. The Mobile Street Railway company divided the Government and Davis avenue line June 19, so that cars on Government street start from the stable, and those out Davis avenue from the Union depot. The change is a great convenience to the public.

Montgomery. A very disastrous fire occurred here between 1 and 2 o'clock on the morning of June 30. The buildings and machinery of the Capital City Electric Street Railway company were completely destroyed. The building was a new three-story brick structure, and the plant and machinery very valuable. Six cars and one mule were also destroyed. The damage done reaches $35,000; insurance, $23,000. Another report says the whole loss was covered by insurance. Mr. William Wallace, foreman and engineer, was sleeping in the third story, and had to jump for his life. In the fall he broke one leg and received other injuries. The broken leg was amputated, and the wounded man may recover. The company will rebuild at once.

Arkansas.

Little Rock. The extension of the electric railway here is progressing rapidly.

California.

Los Angeles. Five hundred workmen engaged in the construction of the new cable road held a meeting June 16, and resolved to quit work if the company persisted in the decision recently made to reduce the wages of the men from $2 to $1.50 per day. The company afterward agreed not to reduce the wages. It was believed a strike would be averted, but word was received in the afternoon that the president of the cable company was in San Francisco endeavoring to secure a new force of men, and the men at once determined to stop work. An agreement has since been arrived at.

The Los Angeles Cable Railway company has made an assignment to W. R. Blackburn, says a dispatch of June 26. The road has been operated by electric motors.

Sacramento. "Sacramento is going to have an electric railway," said L. L. Lewis, connected with the Sacramento (Cal.) Electric railway, to a reporter, "and it will be something of which the Capital city will be proud. I have ordered cars from the Electric Car company of America, whose immense works are at Philadelphia. There will be delay in obtaining some of them, as the electric portion of them must be made in France, but I have a contract by which one car, fully equipped, must be delivered in Sacramento by July 1. It will be a sixteen-foot, four-wheel car, with a storage battery of eight horse power. The brakes, gongs, headlights—everything—are run by electricity. On Washington avenue, in St. Louis; Fifth avenue, New York, and in Philadelphia, I rode on electric railways, and they are the biggest thing out. The cars glide along without jolt or jar, and are under perfect control. The works in Philadelphia are unable to supply the demand for electric cars, and an addition for the exclusive manufacture of these cars is being made at a cost of over $300,000."

San Francisco. A temporary side track has been completed along Polk street from Sutter to Pacific, to allow the horse-cars that pass along that section to continue running while a cable trench is laid down. This when finished will connect the Larkin and Polk street cable way, which now terminates at Sutter street, with the six blocks of cable way recently laid down on Pacific street. This railroad will be pushed on still further. It is calculated that this cable extension will be in running order by August 15. It is intended, eventually, to run the lines out to Central avenue, but as the roads that way are not yet sewered this work must be held over for the present.

San Jose. The electric railway here is now in successful operation, as briefly mentioned in our last number. Two dynamos have been substituted for the old dynamo which has been in operation. Mr. Fisher, of the Detroit Electric company, says the reasons for making the change are: "First, because the unit of measurement was too large with the single dynamo. In the daytime six cars will be running, and at night only three; yet it would be necessary with the big dynamo to keep up a force sufficient for the whole, which would require a great deal of fuel. With two small dynamos, one of them can be shut off during the evening and the work done with a single one, thus enabling the company to save fuel. Second, the two dynamos will enable the company to maintain easily two grades of speed. A third advantage is that in case of any accident to the dynamos the road will not have to shut down, as each of these dynamos is amply strong enough when run at its full force to move all the cars on the road. Another great gain which results from two dynamos is that it enables the company to divide the road into four circuits—two in each of the eastern and western sections, and if anything should occur to stop the cars in one circuit, the others could still go on. We intend to have as perfect an electric road as there is in the world, and we are working for that end."

Connecticut.

Ansonia. Additional motors and cars have been ordered for the Derby Horse Railway company, whose line is worked by electricity, having been equipped by the Van Depoele company before they transferred their street railway business to the Thomson-Houston Electric company. The road is being operated most admirably, it is said.

Hartford. The Sprague company have closed a contract to equip the Harttord and Wethersfield Horse railway with electric motors.

Southington. The directors of the Southington and Plantsville Tramway company have inspected the Derby Electric company's plant, with a view to adopting the same system for their road.

Dakota.

Aberdeen. A special despatch from here of June 9 says: "Great excitement was caused here yesterday by the efforts of the citizens to prevent men and teams employed by the Electric Motor company from plowing up the main street for the construction of an electric motor line. Drays were driven across the street to stop the teams. A great crowd gathered and cheered the citizens upon the drays. The city marshal ordered the drays away, but the citizens retureed to the attack with an order from the mayor prohibiting further work. The franchise was granted in April, 1887, with provisions requiring the consent of the property owners along the line. This was not obtained, and the city asserts that the right under the charter expired June 6, no consent having been obtained. The company asserts that the provisions of the city charter apply only to horse car lines and not to the motor line."

Watertown. The long-talked-of motor line to Lake Kampeska culminated July 3 in a proposition from McIntyre & Joscelyne to build and equip the line within 60 days, provided the citizens would purchase 60 lots on the line at $100 each. This was readily agreed to.

Delaware.

Wilmington. President W. Canby, of the Wilmington City Railway company, has written a highly enthusiastic testimonial as to the working of the Sprague system on his road. His cars make 64 miles a day on a road with 5½ per cent. grades, and often carry 70 passengers.

Florida.

Pensacola. The Pensacola Marine Railway company, with a cash capital of $100,000, was organized in this city June 19. The work of construction has been inaugurated, and is being pushed as rapidly as possible to consummation.

Illinois.

Chicago. An ordinance has been passed granting the West Chicago Street Railroad company the right to lay tracks and run cars on Fifth avenue, Twelfth street, and Polk street. Also on Milwaukee avenue, a long street running

from Lake street a little to the west of the Chicago river in a northwesterly direction.

Specifications are ready for the conversion of a couple of the main West side horse-car lines into cable.

The North Side Cable railway is now running at full cable railway speed. Since our last number was issued it has met with its first fatal accident. Singularly enough, the newspapers admit that the railway company and its men are blameless in the matter. Here is what the leading Chicago daily said June 29: "Henry Jensen, a boy five years old, was run over by a cable train on Wells street at 7 o'clock last evening and instantly killed. The boy was playing with his sister in the street, between Eugenie and Florimond streets. When the train was passing the two children ran out, holding each other by the hand. The boy was the smaller of the two and was slightly in advance of his sister. When the grip car passed he reached his disengaged hand out to touch the side of the car, and the rear step struck him in the side, dragging him beneath the wheels. His sister let go of his hand and he fell between the cars. The wheels of the second car passed over his head, crushing the skull. The body was taken to the undertaking establishment of William Niemeyer, at 626 Wells street, and Officer August H. Miller placed J. R. Goss, the driver, and the conductors, M. P. Nelson and C. H. Gascoygne, under arrest. Hans Jensen, the father of the boy, is a journeyman harnessmaker, living at 55 Tell place. The mother of the boy is in a delicate condition, and it is thought that the news of his death may have a serious effect upon her. No blame is attached to the employes of the street railway."

On Sunday evening, July 1, a more alarming accident occurred, although far less serious. It was a fine Sunday, and a great crowd of people went to Lincoln Park on the North Side cable cars; and when the bulk of them returned, the cars were heavily loaded, and when the trains were following each other closely on the down grade of the tunnel, the weight became so heavy on the cable (for the cars were going faster than the rope), a slack was forced, whereby the cable wrapped itself around one of the grips, and that train could not be stopped until the engineer was signaled to stop the engine. In the meantime the grip-bound train dashed into the train before it, and there was a terrible fright. Here is a specimen of the incidents connected therewith, as related in a morning paper: "There was a touch of the ludicrous about the affair. Among the passengers of the Wells street grip car was a Mr. Thomas Laredo, of No. 352 Twenty-third street. He was in the car with his wife and a little baby. When the crash came he shouted to his wife to jump through the window, he himself doing the same with the baby. He fell on the pavement, but managed to hold the baby on top. He was finally dragged from under the car by some friends. But he had lost his wife. He hunted her high and low. He could find her nowhere. Nobody had seen her. Finally her hat was found. Then Mr. Laredo saw in his mind's eye Mrs. Laredo's mangled form, bleeding, dead. He wandered about aimlessly. At last at the Hotel Monroe he found her, and they were reunited, unhurt." There was no fatality; and only one lady hurt, by jumping through the car window. A couple of the cars were badly damaged; but the mishap has taught a valuable lesson to the managers and gripmen. And no such accident is likely to happen again. As Mr. Yerkes told a newspaper interviewer, the circumstance was unforeseen and the startling event was edifying. This road is far ahead of all other cable railways in freedom from bad accidents. The last-mentioned was not serious, although there was great alarm for a few moments. The railway people were not to blame in the first fatal accident, above referred to; and they were not at fault at all in the one other serious accident which occurred July 6: About a quarter past seven in the evening a man named Johnson attempted to board a train that was crammed full; he could not possibly get a foothold on any of the platforms, and, failing to get on the train any other way, he was so madly reckless as to rush in front of the train and attempted to get on the grip car over the dashboard. As an eye-witness says, "he slipped and fell in front of the car, which passed over him. His left leg was mutilated in a horrible manner, his head was badly cut, and he sustained severe internal injuries. He was at once taken to the Chicago avenue patrol house, where Dr. Cunningham dressed his wounds and then sent him to the hospital." The gripman released the cable and put on the brakes instantly, else the man would have been killed outright. As it is, he is likely to recover, minus a limb.

ELEVATED RAILWAYS IN THE MIRE.

The committee on streets and alleys of the Chicago city council has presented a report adverse to the petition of the Lake Street elevated road (Meigs system). It was discovered that the necessary majority of frontage had not been signed in any single mile. It appears that the railroad company, in making its calculations, counted the frontage of the alleys crossed and also the street intersections; and, deducting these, which belong to the city, the petition is short in each mile the number of feet represented by the streets and alleys referred to. The company may be able to supply the deficiency, but until it has been done, and the petition has been signed by a majority of the frontage in each mile, the ordinance cannot be legally passed.

"Boodle's" ugly head has popped out in connection with this "L" road business. An offer of $5,000 of the stock was offered to Ald. Rix, so he says, for his vote in the council chamber in favor of the "L" road ordinance; the proposer being E. A. Sittig, owner of the *Brewers' Journal*. Ald. Rix says further that Sittig told him subsequently that it was Ald. Reich he (Sittig) was to have gone to, instead of Ald. Rix. This was giving Reich away. But Sittig denies Rix's statement altogether. And the upshot of it is that Sittig, failing to get the virtuous alderman to deny or withdraw his statement, has "passed the lie" and instituted a suit for libel against Ald. Rix.

A similar charge has been made, or half made, against the South side "L" road,—the first that was in the field,—but nothing is likely to come of it.

The other proposed elevated railway, which proposes to come along an alleyway, is not dead yet. Col. Walcott, who represents the company, says the $100,000 bond money will be paid within the prescribed time. It must be paid ere another STREET RAILWAY GAZETTE is out, or else its franchise will become a dead-letter.

UNDERGROUND RAILWAYS.

Articles of incorporation of the Chicago Tunnel Railway company were filed at the office of the secretary of state June 21st. It is proposed to construct the said railway from a central point in the city of Chicago beneath the surface to Evanston, Lake View, Norwood Park, Oak Park, Riverside, Brighton Park, Union Stock Yards, Englewood, Washington Heights, South Park, and Washington Driving park, with spurs, branches, side-tracks, depots, ventilating shafts, surface approaches, and all other things necessary to conveniently operate the said railway. The railway is to be constructed either partly or wholly under ground. The principal business office is to be in Chicago, and the corporation is to continue in existence for fifty years from the 2d day of July. The capital stock is $27,000,000, and the incorporators are George W. Waite and George H. Waite, of Hyde Park; Wesley R. Crumpton, Frank McMaster, L. H. Clark, T. M. Nelson, and T. Z. Cowles, of Chicago; George W. Wilson, of Hinsdale, and James A. Slauher, of Itasca, Ill.

This is the third scheme for underground railways in Chicago. In reference to it the *Chicago Tribune* says: "The promoters of the Chicago Tunnel Railway company think they have struck the solution of the rapid-transit problem. Their purpose is to build an underground railroad on the general plan of the Metropolitan railway of London, which will connect the down-town portion of the city with the North and West sides and the suburbs. It is claimed that the expense of traveling would not be so great as that of an elevated road. In the first place, the costly question of purchasing the right of way, which is the chief item in an elevated road, does not cut any figure in an underground construction, and the expense of wear and tear is by no means so great. As to the practicability of the scheme the promoters express themselves confident. It is intended to cut down to bed rock,—say 100 to 150 feet deep,—and from a central point tunnel forward in all directions. The great disadvantage of the London underground railway—its darkness and smoke—will be obviated by using electric motors for the engines and lighting the tunnels by electricity. Another drawback to the London system—the painful climbing up and down the stairways to and from the stations—will be done away with by using elevators. The scheme of the Chicago underground railway includes the construction of mammoth passenger elevators capable of holding 50 to 100 passengers at every station on the road.

"The engineering difficulties to the proposed subway are not expected to be considerable [as stated in the STREET RAILWAY GAZETTE for March.] The stratum at the depth of 100 feet is soft limestone, which will make the best possible roadbed and offer the least difficulties in the way of boring. Should any quicksand pocket be struck, like the one which has sometimes bothered the lake tunnel engineers, the engineers of the road propose to meet and overcome that difficulty by an iron tubular tunnel which will be built in sections and riveted together underground, and as it is completed will be forced through the quicksand bed."

REDUCTION OF FARES.

The pleasantest event connected with the street railways of Chicago—pleasantest to the general public at all events—is the reduction of fares on the extensive system of the Chicago City Railway company, in accordance with the following notice:

"In keeping with the well-known progressive policy of this company, on and after July 5 1888, until further notice, any passenger on any 'north and south' line will be carried to the end of that line for five (5) cents, or, on request, will be given a transfer ticket without additional charge for continuous ride on any 'east and west' line crossed by the line upon which the fare has been paid. Any passenger on any 'east and west' line will, on request made at time fare is paid, be given a transfer ticket good for continuous ride to either end of any 'north and south' line crossed by the line upon which fare has been paid. Children under 12 years half price. Transfers issued from short lines to through cars. By this arrangement residents in all portions of the South division of the city town of Lake, and Hyde Park carried by the lines of this company will be enabled to reach Washington and Jackson parks, or the center of the city, for five (5) cent fare. This is the lowest rate for the distance ever furnished by any street railway in the world, and is attempted by the management in the hope that the territory will be rapidly developed, and the volume of travel be sufficiently increased to warrant this experiment being made permanent, and that many of the lines not now paying operating expenses be rendered self-sustaining.

"This company has built 130 new cars since the 1st of January, and is now building 100 of the best style of winter cars, all of which will be warmed in cold weather, and no pains will be spared to render the system and service as complete as possible. C. B. HOLMES,

"President and Superintendent."

The length of track now operated by Mr Holmes' company is 125 miles, 35 miles thereof being cable lines. A short line, the Twenty-Sixth street branch, a mile and one-half long, is being constructed and additions are constantly being made.

La Salle. Prominent gentlemen have been at La Salle this week looking into the feasibility of building an electric railway connecting La Salle Peru and Spring Valley. The distance between these three cities is but five miles, and the combined population is now 22,000. The travel between them is already enormous, while the facilities are poor. It is thought with a good street railway a great benefit will be conferred upon the citizens and a profitable business established for the builders of such a road. The projectors propose to use electricity.

Ottawa. The Secretary of State on June 1 issued license of incorporation to the Ottaw

ectric Street Railroad company; capital stock, 00,000. Incorporators: T. J. Grans, W. E. owan, G. S. Eldridge and James Briggs.

A franchise has been granted to the Rapid ransit Railway company to construct, own, aintain and operate a double track railway ong certain specified streets, to be operated th electric motor power.

INDIANA.

Columbus. A company with a capital stock of 20,000 has been organized here for the purpose building an electric street railway. The com- ny embraces a large number of the citizens, it is id.

Evansville. The election, June 25, for an ap- opriation of $30,000 for a dummy railroad stem through the city and suburbs, and $30,- 0 for the removal of the railroad shops from ount Vernon, Ill., to this city, resulted in the rrying of the proposition by a majority of 188. he appropriation is not to be paid until the mmy line and shops are in actual operation id before Dec. 31.

Indianapolis. Since the issue of our last num- er, the Chicago syndicate, owning the street ilway lines of this city, brought suit to restrain e city council and street commissioner from terfering with their tracks on any and all of the reets of the city, specially designating those er which the present controversy has arisen. hey cite its original charter wherein the rights all of the streets was granted, reviews the story of the present differences, and claims that e street commissioner has exceeded his author- y in stopping the progress of the work and in overing up portions of the track already laid. he complainant company alleges damages in the m of $5,000, and prays judgment against the ty for that amount. The street commissioner -day said that he had been informed that the reet car company had distributed ties on Cen al avenue, with a view of beginning to lay acks there; that he was watching the move- ents, and if the company attempt to lay track rther he would order the arrest of officials in- anter.

IOWA.

Council Bluffs. The Thomson-Houston com- ny have just closed a contract with the Coun- l Bluffs & Omaha Rapid Transit company for electric road between Council Bluffs and maha. The road will be ten miles in length id will be equipped with twenty cars. The ad will run across the new bridge, which has en built mainly for that purpose. The over- ad cross suspension method—Thomson-Van epoele system—will be used. The power sta- on is to be at Council Bluffs, and will require out 350 horse-power motors, and it is needless say that it will be a model. Work upon the ant is to be commenced at once.

Des Moines. The Capital City Street Railway mpany, better known as the Broad Gauge mpany, sent their secretary (Mr. H. E. Teach- t) to investigate the workings of the various ectric railways in operation, and try to find out ich system is the best. He examined the ads in operation in Lima and Mansfield, O.; nghamton, N. Y.; Scranton and Wilkesbarre, a.; Richmond, Va., and Philadelphia. His p has made him a greater believer than ever the electric railway, and the company will go ght ahead with the construction of their line. he Sprague company and the Thomson-Hous- n company have made propositions for the nstruction and equipment of the road, and e outside figures reach nearly $40,000. It is pected that the road will be in operation by pt. 1.

The Des Moines Street Railroad company ve lost their legal foothold to claim exclusive ghts in the city for animal power unexpectedly, hough their franchise gave exclusive rights, it as for a broad track, whereas they subsequently anged it to a three-foot gauge without the rmission of the city council, and thus they ve forfeited their exclusive privilege.

Fort Madison. Six cars have arrived and are w running on the Fort Madison Street rail- ad. Four are closed (winter) cars and two en summer cars. They are handsome and ar- tically finished.

KANSAS.

Horton. "A gentleman by the name of Fred E. Robinson was in the city recently," says our correspondent, "with a proposition to build a street railway from the depots to the west part of the city. Mr. Ransom, who owns an extensive addition to the city, made the company such liberal offers that they only asked of the city the right of way on the streets." Then follows a long complaint purporting to show that the mayor and city council gave Mr. Robinson the cold shoulder, and neglected to properly respond to a good offer.

North Topeka. The Silver Lake & Rossville Rapid Transit company are making headway, and property is doubling in value along the line as the road is being built. Mr. J. Q. A. Peyton and Mr. Brazier are the parties pushing it forward.

The building of the Rapid Transit road to Rossville, with its 100 feet right of way and all the requirements of a standard gauge road, says the St. Mary's *Gazette*, is looked upon as a favorable indication by those of our people who have adherent faith in the construction of the Missouri Pacific through this county.

Wichita. The Thomson-Houston Electric company have closed the contract for constructing the Wichita, Riverside and Suburban Electric railroad for two miles, furnishing six cars, six motors, two 50 horse-power generators, and all electrical appliances and fixtures necessary. A single overhead conductor will be used, and the contract involves about $60,000. If this portion proves satisfactory, three miles more will be built.

LOUISIANA.

New Orleans. A belt railroad is to be built here. "A rail shame" is the caption of a short paragraph in the New Orleans *Picayune*, which says: "City Surveyor Harrod, upon an examination of specifications, finds that they provide that upon Jackson street being paved, the Carrollton Railroad company shall change the T rails to flat rails. Notwithstanding the asphalt has been down for some time the T rail still flourishes."

They seem to want too much of the street railway companies in the metropolis of the Creole state, hence the following complaint:

OFFICE NEW ORLEANS CITY AND LAKE RAILROAD COMPANY,
NEW ORLEANS, June 9, 1888.

Gen. G. T. Beauregard, Administrator of Public Works:

Sir—In justice to myself and those whom I represent, as president of the New Orleans City and Lake Railroad company, I am compelled to take notice of the very severe, and, from our standpoint, very unjust strictness with which you referred to various city railroads in your last report to the city council.

Speaking for the company which I represent, I have the honor to say that while it is true that the streets through which its tracks are laid are not in perfect condition, there is no obligation upon them unperformed to which this company is legally or equitably liable. This company has never "spurned the law," and its stockholders yield to none in reverence to its majesty. Its obligations are fixed by the contract; and contracts are mutual. The city does not seem to think so; it forgets its promises and ignores them in a most reckless manner. Scarcely was the ink dry on the signatures of our "contract" in which the city bound herself "not to grant during the period for which said franchises are sold, a right of way to any other railroad company upon the streets through which said right of way is hereby sold," when she revived an extinct franchise, and, in violation of the foregoing stipulation, granted a right of way to another company on Camp street, which was and continues to be the cause of incalculable damage to this company. Is the city prepared to make some concession for this infringement? If not, a judicial proceeding must adjust its consequences.

As to the streets the obligations assumed by the company in the terms of the contract is rather broad, it must be admitted, but it does not mean that the railroad company should furnish new or paved streets.

* * *

Very respectfully, your obedient servant,
J. A. WALKER, Pres.

MAINE.

Waterville. The horse railway here is built by Mr. Alfred Soule, road-foreman with the Cambridge Street Railway company, until its shares were bought by the West End (Boston) Street Railway company. There is talk of adopting electricity for propelling the cars, especially since Mr. P. S. Heald has put an electric motor to run his sewing machines, and Messrs. Noyes & Goddard have put one in their stove factory.

MASSACHUSETTS.

Adams. The *Adams Sunday Express* says: "No event in the industrial history of North Adams has occurred for a long time of such importance to the town as the recent purchase of the Hoosac Valley Street railway by the great electric light corporation of Boston, the Thomson-Houston company, and C. Q. Richmond. Not that the road has not been well conducted, but the purchase of the property by a company of such wealth and influence as the Thomson-Houston means extensive improvements in many ways. The company proposes to establish a large electric plant here, and, as soon as the arrangements can be made, to utilize this force as a motive power in running the cars. The price which is said the company has paid for the road is $75,000, the buyers to pay a certain amount down and secure the indebtedness. The present board of officers of the corporation are: President, C. Q. Richmond; vice president, Eugene Griffin, of Boston; treasurer, C. Q. Richmond; clerk, S. Proctor Thayer; directors, C. Q. Richmond, S. P. Thayer, Eugene Griffin, R. P. Clapp, of Lexington, and D. W. Monty, of Sandy Hill; H. A. Fitzsimmons, manager. The company intends to carry out the original intention of the corporation with regard to the extension of the road to Braytonville, the Union, and Maple Grove. This will be effected at an early date. Much credit is due to the president of the road, C. Q. Richmond, for the move which the Thomson-Houston company has made in the matter, as it is due to his efforts that the attention of the company was called to the matter and finally decided to make the move it has."

Attleboro. The Attleboro Electric Light company is going to build an electric railway five miles long, which will be operated by Thomson-Van Depoele motors.

Brockton. A contract has been taken by the Sprague company for the East Side railway of Brockton. The first equipment will consist of six cars, with about five miles of trackage.

Revere. The Revere Electric railway will soon be an accomplished fact. The West End Street Railway company will probably introduce the power on its suburban lines, like the Arlington, Newton and Brighton division, and it is said that Mr. Whitney is now making the necessary arrangements.

Salem. Six cars of the Naumkeag Street Railway company have been fitted with Sprague electric motors. All the running gear is new, the axles being 3½ inch steel. The Salem Electric Light company furnishes the power, and the wires run to the Willows on their poles. The opening of the road is to be celebrated July 10.

Salisbury Beach. Mr. E. P. Shaw, of Newburyport, has contracted for Thomson-Houston motors on his Salisbury Beach railway, as partly stated in our last issue.

MINNESOTA.

St. Paul. The application of the St. Paul City Railway company for a repeal of part of the cable ordinance requiring the company to sell eight tickets for 25 cents, to be used between the hours of 12 and 1 p. m. and 6 and 7 p. m., was before the city council June 29 and again July 3 without arriving at any satisfactory understanding. Col. Barr, who represents the cable road, has experience with the council similar to that of Mr. Yerkes in Chicago a few months since.

There is an elevated railway agitation up here also.

At the meeting of the chamber of commerce July 2, Secretary Tallmadge reported on the elevated railway matter, and said that the chamber should use its influence to get the ordinance passed by the council, as the company wants to accept or reject something at once. The directors of the company have received temporary offers from several other cities, and as $2,000,000 is involved, they are anxious to know whether to put in their road between St. Paul and Minneapolis or in some other place.

The Enos electric railway ordinance was under discussion at a joint meeting of the council committee on railraads and the aldermen of the Sixth and seventh wards. Ald. Cloutier explained that the company wants to change its route and instead of coming in on the East Side and crossing the steel arch bridge would like to bridge the river at Nineteenth street south and come up Fourth street to Hennepin avenue. Ald. Stoneman wanted the company to give $10,000 bon

to put the road in running order in the time stated in the ordinance. Mr. Lawrence said the company would forfeit $25,000 unless the road was in every way satisfactory.

An ordinance was passed, July 3, allowing the trial of a noiseless and smokeless motor on the street railway lines of the St. Paul City Railway company for 30 days.

Minneapolis. Monroe street is now in the throes of an agitation for open cars with conductors on them. Hitherto they have put up with "box" cars and fare boxes. The following is a specimen of the free-ride incident reported in the Minneapolis *Tribune:* "Here is my fare, but you must come and get it," said a passenger on a Monroe street car yesterday, in reply to the ring of the driver. The latter grinned, and, of course, did not respond. As a result no nickel dropped into Mr. Lowry's cash box, and the gentleman enjoyed a free ride, if there can be any enjoyment in riding in a close bob-tail car with a hot sun streaming in. The residents of northeast Minneapolis propose to have larger cars and conductors to collect their fares, or they propose to ride free. The matter has been under agitation for a long time.

The trouble has assumed a determined conflict between passengers and the railway company. Once a policeman was asked to eject a gentleman who held a dime in his hand, ready to pay his fare, but the officer informed the driver that he could not interfere. On an out-bound car, July 2, there were 25 passengers. Only five of them responded to the "ring up" by the driver. Out of 13 passengers on another car the same day, but three responded with the nickels.

The case of Mrs. Fannie S. Steele against the cable road for $50,000 damages, sustained in the accident at Selby avenue hill last winter, was finished, June 30, the jury returning a verdict of $1,000 for the plaintiff. A stay of 30 days was granted.

Missouri.

Kansas City. The East Fifth Street Ry. Co. are building their new car house. They are also about to commence the construction of their extension through East Bottoms, and they will forfeit $5,000 if that line is not finished within a year.

The contracts for the construction of the Rosedale ave. motor line have been let to Messrs. Horace A. Keefer & Co.

Colonel C. F. Morse, president of the Metropolitan company, made his first appearance before the improvements committee June 4, on the question of the loop. He said that a large number of property owners had come come to him several weeks ago and asked him if he would consent to bring his Eighteenth and Twelfth street cars down Main and up Delaware street, instead of stopping at the Junction, as provided by the Eighteenth street franchise. After mature deliberation and consulting with his board of directors it was decided to accede to the property owners' request. The matter could not be delayed much longer, however, if the Metropolitan company was to build the loop.

A LEGAL CHECKMATE.

For a long time the Kansas City, Independence & Park Railroad company has been endeavoring to effect an entrance to Kansas City. It has met with strong opposition from the property owners of the right of way they selected. On August 31, 1887, the city council granted a franchise to the company, giving it the right of way on Seventh street. Many injunction suits were instituted against the company, but in all these cases it was victorious. The long lane of success came to a sudden turn June 2, when Judge Gill rendered a decision against the company in the injunction proceedings of Mary C. Stewart and others, which effectually debars that line from entering the city. The plaintiff maintained that the franchise was null and void on the grounds that the city had no right to issue a franchise to this railroad company, as it was incorporated under the general laws as a general railroad company. In March 26, 1887, the legislature passed a law which prohibited all cities and towns from granting street railroad franchises to any other corporations except street railroad companies. The law covering this case, which was taken cognizance of by Judge Hill, and upon which he founded his decision, is as follows:

Section 1. The legislative authority of no incorporated town or city of this state shall have the power to grant to any person or corporation the right to construct and operate on, over or under any street or alley of any incorporated town or city, any elevated,underground or other street railroad without compliance with the conditions hereafter named.

Section 2. The party to which said franchise may be granted shall be an incorporated company organized under the laws of the state to construct, maintain and operate a street railroad in the town or city to which such franchise is granted.

Section 5. The pendency of a large number of applications for franchises for street railroads in the towns and cities of this state that imperil large property rights creates an emergency. This act shall take effect and be in force from and after its passage.

The franchise was granted to the company just six months after the passage of the law prohibiting cities from granting franchises to general railroad companies for street railway purposes, and comes within the prohibition of the law. Judge Gill decided for the property owners on all points, and held the Kansas City, Independence & Park railroad franchise null and void. He further decided that, inasmuch as the franchise was null and void, all tracks and switches constructed by the railroad company on streets within the city limits were a nuisance and unlawful obstruction, and the company is liable to prosecution.

ELECTRIC LIGHT ON AND OFF.

The Elevated Railroad company has contracted with the Kansas City Electric Light company for the lighting of their cable cars while passing through the tunnel. The apparatus will be so constructed that the light will be turned on automatically as the cars enter the tunnel and turned off as they leave it. On the top of the cars will be placed a standard with a "V" at the end. An insulated wire will be strung through the tunnel in such a manner that it will come in contact with the "V" as the cars enter and will be firmly held in place by a spring, thus completing the electric circuit and turning on the light in the cars. The standard leaves the wire when out the tunnel, and the circuit is broken.

Moberly.—A communication of June 10 assures us that a company to construct an electric railway is to be organized here.

St. Joseph. The Union Railway company are making rapid progress with their experimental electric road north of Market square.

St. Louis. The Brush-Julien motor car on the Washington avenue road is again running.

President C. P. Maffitt, of the Missouri Railroad company, declares that storage batteries have not yet proved successful. Another overhead wire is to have "a fair trial" on his road if permission can be obtained to set up the necessary poles.

The East Avenue cable line is giving good satisfaction. It is expeditious, safe and popular, and the value of property along the road has been enhanced.

The machinery and arrangements of the Cable and Western Railway company were some time since found inadequate to the needs of the system, and it was determined to put in new machinery and divide the cable into two sections. The cable was too long, being six and two-fifths miles, or 34,620 feet. With the new machinery the cable is divided into two sections, to be known as the down town and West End divisions. The former cable is 26,500 feet long and the latter 8,500. The new machinery, which is the latest improvement, was invented and arranged by the

WALKER MANUFACTURING COMPANY,

of Cleveland, O. The plant consists of two Hamilton-Corliss engines of 30-inch bore and 72-inch stroke, each 1,000 horse power. They are designed to run together or separately. The fly-wheel for the engines is 22 feet in diameter and weighs 105,000 pounds. The main gear, or cog-wheel, which transmits the power from the engine to the cable machinery, has a 22-inch face, is 17 feet in diameter and weighs 45,000 pounds. The gear and fly-wheel are mounted on shafts 18 inches in diameter, and power is transmit through the gear to the big rope drums, and additional gear with 14-inch face and 12 feet diameter is used to transmit power to the drums, which move the cable. These drums the invention of Mr. Walker, and are made w a very simple and ingenious arrangement loose rings, or grooves, to receive the cal These rings are so constructed as to adjust the selves automatically to the varying tension of rope. The power-house vault is 40 feet lo 31 ft. 6 in. wide and 10 feet deep. It has t approaches from the engine house, and in it four U frames, carrying 12-foot sheaves. T arrangement of the cables is the cross syste such as is advocated by Mr. Edward J. Lawl in his fifth article on Cable Railway Practice another part of this number of The Gazette.

Springfield. The stock of the Springfi Electric Railway and Power company, which limited to $50,000, has been taken up rapid half of it by the citizens, on which 6 per cent guaranteed, with the privilege of redeeming it par at the end of a year. General Mana Keyser, who returned from Detroit June says three or four miles of the road will be operation by August 15th.

Montana.

Helena. Mr. J. J. Palmer, contractor for t Motor Line Street railway, says he will rece proposals for the following material and suppli to be used in the construction of two or m miles of a motor line of street railway to be bu in the city of Helena, Montana, to-wit: 80 100 tons of standard No. 1, 25 pound steel rails of approved pattern; 100 to 250 tons standard No. 1, 35 pound steel T rails; 50 100 tons of standard No. 1, 50 pound steel rails; 1,000 or more pairs of splice bars, rate 100 pounds; 4,000 to 5,000 pounds special ca iron castings for curves, angle braces, etc., r per 100 pounds; 100 or more kegs of railro spikes, rate per keg of 100 pounds each; 50 more kegs of bolts and nuts, rate per keg of pounds each; 100 or more kegs 20 p., 40 p., a 60 p. steel nails. A full-sized sectional detail pattern of rail should accompany each propos Estimated quantity of rails for present det mined construction, about 250 tons. All pri should be quoted at rate per gross ton for ra and rate per 100 pounds on other material.

All prices must be quoted f. o. b. cars at M nesota transfer, though quotations will be ceived and are requested, where practical, f. b. cars in the cities of Chicago, Cleveland, D luth, and St. Louis. Payments for material w be cash on delivery, and acceptance in the c of Helena, Montana.

Nebraska.

Kearney. Kearney now has about five mi of street railway, and will extend the prese system at least two miles west from the cou house to the canal and brick factories this se son. It is being arranged to run the cars electric motor from water power as soon as pra ticable.

Lincoln. The Lincoln Street Railway co pany is having a little controversy with t grading contractors over tearing up the trac on East O street. It is claimed that the bu ness of the O street line is unnecessarily d stroyed by grading three months before t pavers can possibly be ready to reach the h east of the Antelope. The company is rea however, to abandon O street as soon as the ca can be run via R street to the corner of Eleven and O streets.

New Jersey.

Asbury Park. The officers of the Seasho Electric Railway company are given in our pr ent Directory Supplement, in accordance wi report received from President F. W. Chil The Daft improved reinforce system is use The dynamo is 250 horse power, the total hor power of engines being 240. "This road h been entirely rebuilt and re-equipped electrical with new steam plant, pole line, motors, a dynamos, and has the latest and best appurt nances for electric operation. It is runni regularly, *economically*, and very satisfactory every respect."

Another communication says: "The Se shore Electric railway at Asbury Park has be

roughly overhauled and rebuilt, and is to-day e of the best constructed electric railways in United States." Tke pole line is built of low pine poles on each side of the street; 9x9 base, tapering to 7x7; planed, champerred, ndsomely tipped, and painted. The cross es running from pole to pole are No. 1 copper e, supporting a hanger weighing about six unds, which supports the longitudinal wires nging over the track on which the trolley runs. ey use also feed wires of No. 000 copper, ning parallel with tracks, but on poles at the e of the street, through which the main cur- t passes. This is known as the "reinforce tem." They have twenty motors, with maxi- m capacity of 15 horse power, and capable of ning twelve to fifteen miles per hour if essary. They are now constructing a special am plaut of four 60-horse power engines, de by the Phœnix Iron company of Mead- e, Pa., with counter shafting, and complete running five 50-horse power dynamos, so ar- ged as to cut in or out any particular engine dynamo that may be required without lessen- the power.

Gloucester City. The Electric Storage Battery npany has been incorporated by W. Shapleigh l others.

Newark. Mr. W. P. Craig is completing m 500 to 800 feet a day of the new cable d, and it will be in operation very shortly.

New York.

Amsterdam. The Amsterdam Electric Street lroad company has been incorporated by Mr. E. Tabel and others; capital stock, $250,000. e line will be four miles long.

Brooklyn. The Brooklyn City Railroad com- y has been experimenting with the Main or on its Fort Hamilton branch.

Hudson. The Hudson electric railway is to n operation September 1st.

New York. The New York board of alder- n have granted this company permission to five electric motor cars over the tracks on rd avenue, from Twenty-fifth to Thirty-ninth et, as an experiment.

The recent actions of the New York aldermen egard to electric railway and other franchises likely to be investigated and the "combine" osed. Specific charges have now been ught in the district attorney's office, for ery and corruption, against Alderman Dow- , who has been strong in his opposition to Julien storage car. The matter will go be- the grand jury, to whom Judge Barrett has ady delivered a special address on the ject.

Rochester. The Rochester City and Brighton et Railway company, of Rochester, N. Y., is sidering the advisability of introducing elec- motors on its lines. C. B. Woodworth, sec- ry of the company, recently said that he was ching the progress of electrical experiments street car lines, and when the practicability of motor from an economical standpoint was onstrated, he would favor its introduction in hester. The claims of Prof. Main have been cially considered. The inventor claims that storage battery system possesses many ad- tages. He asserts that the electrical appli- es, according to his method, are much more nomical, and that their weight is much less n those of other systems. The officers of the et car company say that no experiments will nade on the Rochester line until thorough s have been made.

Syracuse. The Third Ward railway (Thom- Houston electric) is to be open for traffic ' 15.

Ohio.

Columbus. The Newark and Granville Elec- Street railway company has been incorpor- at Columbus, with a capital of $100,000.

Lima. The Lima Street Motor and Power pany have purchased a 100-horse power gen- or of the Silvey Electric company, of Lima. motor was being made for exhibition at the cinnati Centennial exposition, and was being hed up for that purpose when sold to the or company. In addition to this will be the orse power motor, now being built by the ey company.

Pennsylvania.

Superintendent Aldrich, of the Carbondale electric road, has made a remarkable record with one of his cars, which is now running its six- teenth consecutive day without change or filing of brushes, says the Carbondale *Leader*, June 12. Ordinarily the brushes on a railway motor, with other systems, are expected to need changing or replacing at least once a day and many times oftener, and so this "feat" is something out of the usual line of occurrences and shows what the Sprague motor with judicious and careful handling can do.

Philadelphia. The Electric Car company of America (Mr. Wm. Wharton, jr., and others) will soon have their eight-wheel car running ex- perimentally on the Lombard and South streets railroad, as already mentioned. Several im- provements have been made since this car was exhibited last October. The car will have the advantage of being run over an entirely new roadbed. The old tracks have been torn up and new ones of a more solid and improved pattern have been laid, affording a perfect surface, and being of sufficient strength to support a train of steam cars.

Scranton. The Sprague Electric Railway and Motor company have just closed a contract for the People's railway here. The num- ber of cars to be equipped will be twenty full size new 16-foot cars, Broadway style. The total trackage of the line is 12 miles. This is the principal railway in Scranton, and covers almost the entire city. The steam plant will be of the most approved construction, and as complete in all its details as that at Richmond.

A road is to be built by the South Scranton Electric Railway company, and the contract has been awarded to the Metallic Street Railway company, of Albany, N. Y.

Vermont.

Rutland. It is predicted that an electric rail- way will soon be built here.

Virginia.

Manchester. A franchise has been granted the Manchester Railway and Improvement com- pany to operate an electric railway.

Richmond. The circulars for the Virginia Agricultural, Mechanical and Tobacco Exposi- tion, to be opened Oct. 3, are out, and one of the special features to attract visitors is that Rich- mond has "the longest electric railway on earth."

The Sprague company have just received an order for the equipment of forty new cars on the Richmond Union Passenger Ry. Co., to be completed by the 1st of October. This will make the total Richmond equipment eighty cars and about 37 miles of track, and it is expected that the number of cars will be increased to over 100 in the near future. The number of passen- gers carried daily averages about 12,000.

The report of the Richmond Union Passenger Railway company for the month of May shows 50,430 miles run and 242,282 passengers carried. The total operating expenses, including every- thing, was only 47 per cent. of the receipts.

The city council has passed an ordinance for the City Railway company to turn "the old horse line into an electric railway." This is likely to be done prior to the opening of the exposition.

Washington Territory

Seattle. The Seattle Street Railway company will issue $60,000 bonds for the purpose of con- verting the road into an electric motor line. When the new system is put in operation Pull- man cars will be substituted for the cars now used.

England.

London. It is reported that the Electric Trac- tion company will shortly have an engine ready for use on the underground railway. If elec- tricity can supersede steam on this particular system the boon to the traveling public will be enormous, says an English contemporary, and the dividends of the companies owning the line will be materially increased.

Japan.

A paragraph is going the rounds to the effect that the Mikado has commissioned an engineer to visit the United States to gain information with the intention of introducing electric rail- ways into Japan.

Additional New Projects, Etc.

Illinois.

Chicago. The West Side Street Railway con- ductors' and drivers' union seem inclined to kick against the authority of General Manager Pars- ons. Their list of complaints is not yet com- plete, however, but the walking delegate, *et al.*, are endeavoring to stir up a strike.

Massachusetts.

Boston. "First they would and then they wouldn't" is a phrase not inapplicable to the West End Street Railway company's frame of mind in reference to their proposed cable road. It had been fully decided to have a cable line, but now the news comes that "there is a great belief that electricity may yet be used instead of cables in Boston."

Colors are to be used to good purpose on the street cars of the Hub. The Roxbury cars will be repainted green as soon as possible; the South Boston and Charlestown cars, red; Cambridge cars a chocolate color, and the Back Bay cars some light shade.

Ohio.

Cincinnati. The Cin. St. Ry. company have thrown open their new Fairmount line its entire length. New cars, painted a peculiar pattern in black and red diamonds, are used. This com- pany has also equipped its Cumminsville route with new cars.

The Cincinnati Street Railway Employees' Mutual Aid society, No. 1, recently held its annual election, and the officers were chosen to serve for the ensuing year. This is one of the most flourishing mutual aid associations in the city, and is composed exclusively of street railway employees. The society in the past year paid but $400 out in sick benefits, and therefore has a handsome surplus in its treasury. The or- ganization is not controlled by any "labor" union. This society gave its centennial picnic at Reichrath's Park, Cumminsville, June 7.

The system of railway to be used on the now famous Montgomery pike, or what motive power, has not yet been decided, though prob- ably horse power will be chosen as the most economical.

The new route opened is peculiarly the result of the centennial enterprise of this city. It is known as the "Cross-town route," and is in- tended to afford speedy transfer to the centen- nial exposition buildings to eastern suburban residents who reach the heart of the town by means of the Mt. Auburn and Walnut Hills cable railways. In establishing the new route advan- tage was largely taken of tracks already laid, so that only a small portion of new track was put down. This road will be owned and operated by the Cincinnati Street Railroad company.

To the enterprising street railway president, Col. George Kerper, is due the credit of estab- lishing an electric road. It is on that portion of the street railroad system known as the Oak street route, connecting the city, by means of the Walnut Hills cable road, with Avondale. Horse power has been superseded by the Daft electric motor, the same as used in Los Angeles, Baltimore and Mansfield, Ohio. The first car operated by electricity was successfully run over this route two weeks ago, and the cars are now making regular trips. At night the cars are lighted by electricity from the same conductor supplying the power. The cables, two in num- ber, are stretched immediately above the track, at the height of an ordinary telegraph pole. The cables are supported on stout wooden posts, placed at intervals of 100 feet. The cars run at an average speed of ten miles an hour. Avon- dalians now have the choice of an electric or a cable road as means to reach the city.

Col. Kerper has secured the contract for the construction of a street railroad to Norwood, a suburb. The new line will follow what is known as the Cincinnati and Sharpsburg turnpike, owned by a private company, and construction of the road has been temporarily delayed by an injunction which the turnpike folks have ob- tained against the county commissioners, restrain- ing them from accepting Col. Kerper's bond. This road will also be operated by the Daft electric motor.

Mr. Martin has by no manner of means given up his pet project of giving cable transit to res- dients of Price Hill, by an east and west route.

Books, Periodicals, Pamphlets, Etc.

Scribner's Magazine contains very interesting articles on railways. The best writers have been engaged, and the treatises are "full of matter." These series of papers opened with "The Building of a Railway," in the June number, by Thomas Curtis Clarke. As an exchange says, it is written in a story-like, interesting way, without the use of technical terms, but with the clearness and comprehension that the author's experience would warrant. The illustrations are not the least part of the article; and great improvements in railway construction are suggested.

"Feats of Railway Engineering" is the subject of the second paper, by John Bogart, in the July number; with illustrations from drawings by Walter Shirlaw, Otto Stark, J. D. Woodward, C. C. Johnson, and others; engravings by Closson, John P. Davis, and others. The July number is the first number of Vol. IV. of *Scribner's Magazine.*

Table Talk for July contains its full share of original reading matter, and ends with an acrostic, which, "if read aright," will inevitably point out our next president.

Patents.

The following list of recent patents relating to intermural traffic is specially reported for THE STREET RAILWAY GAZETTE by Wm. G. Henderson, solicitor of American and foreign patents and trade-marks, Norris building, Fifth and F streets, Washington, D. C. A copy of any of the following will be furnished by him for 25 cents:

ISSUES OF JUNE 5, 12, 19 AND 26, 1888.

384,145, 384,146, 384,147 and 384,148. Street car motor—L. B. Gibson, Pueblo, Col.

384,214. Elevated cable and car propeller—H. Casebolt, San Francisco.

384,269. Elevated way—N. Newman, Springfield, Ill.

384,333. Pneumatic railway—T. W. Pitts, Wolsey, Dak. Ter.

384,368. Car starter—H. R. Keller, New Orleans, La.

384,435. Safety flange for railway rails—C. M. Erwin, Birmingham, Ala.

384,488. Street or station indicator for cars—W. P. Williams, Chicago.

384,562. Electric railway—G. H. Condict, Philadelphia.

384,576. Electric railway—R. M. Hunter, Philadelphia.

384,580. Apparatus for electric traction—E. Julien, Brussels, Belgium.

384,581. Eelctric railway car—E. Julien, Brussels, Belgium.

384,594. System for electric locomotion—H. A. Seymour, Washington, D. C.

384,685. Electric railway—S. D. Field, Yonkers, N. Y.

384,782. Bearing for street cars—H. L. Phelps, Athens, Pa.

384,908, 384,909, 384,910, 384,911 and 384,912. Electric railway—R. M. Hunter, Philadelphia.

384,921. Elevated railway—T. J. Mayall, Reading, Mass.

385,017. Car step—F. A. Stanwood, Chicago.

385,034. Electro motive railway—G. T. Woods, Cincinnati.

385,053, 385,054, 385,055 and 385,180. Electric railway—R. M. Hunter, Philadelphia.

385,097. Electric railway—G. H. Condict, Philadelphia.

385,195. Cable grip—F. H. Morse, St. Louis.

385,230. Driving drum for railway cables—F. A. J. Beigel, St. Louis, Mo.

385,246. Cable gripping apparatus for street railways—J. H. Dale, Philadelphia.

Patents Described.

The following are brief descriptions of patents relating to street railway interests issued during the past month, specially prepared for THE STREET RAILWAY GAZETTE by J. C. Higdon, mechanical expert and solicitor of patents and trade marks, rooms 55 and 56 Hall building, Kansas City, Mo. A printed copy of any of the following will be furnished by him for 25 cents (stamps):

SAFETY CAR—E. E. L. Woodward, Chicago, Ill. This patent covers a car having a detachable roof, which is adapted to be thrown off should the car be overturned.

STREET CAR HEATING APPARATUS—M. Cleve, Cleveland, O. This patent covers a water tank located by the side of the dashboard, water pipes located under the seats, and a vapor burner for heating the water in said tank.

CABLE RAILWAY—E. W. Wilson, Denver, Col. This invention uses a stationary cable, and the propelling power is applied by a motor, such as steam engine located on the car.

CHAIN GRIP—Wm. Heckert, Yonkers, N. Y. In this patent the grip consists of an endless chain carried by the car, and the cable is provided with projections which engage suitable recesses in said chain.

FARE BOX CHUTE—W. S. Wales, Syracuse, N. Y. The chute is located inside the box. A glass gate is located across the interior of the chute and a reflector is located back of said gate. Both box and chute are made with glass fronts.

Business Notes.

THE THOMSON-HOUSTON ELECTRIC CO., No. 178 Devonshire St., Boston, Mass., claim that forty-eight per cent. of the electric railways of the United States and Canada use their system, which embraces the Thomson and Van Depoele patents. This company is rapidly extending its motor business. The company has recently taken a contract for building a six-mile electric road in Wichita, Kan. The road will be opened with four cars. The company will install a second electric road at Scranton, Pa., and among other roads which it will equip are those at Syracuse and Brainerd, Minn.

MESSRS. A. J. HUTCHINSON & CO., builders of street and electric railways, 40 Broadway, New York, are extremely busy, and are negotiating for the building of several new electric roads.

THE PECKHAM INTERCHANGEABLE STREET CAR WHEEL, illustrated in our last issue, has been placed during the past month upon the following roads: The Brooklyn City, the Bushwick, and the New Williamsburg and Flatbush railroads, of Brooklyn, N. Y.; the Third ave. R. R., in New York; the North Hudson Co., of Hoboken, N. J.; the Jersey City and Bergen, and Pavonia roads of Jersey City, N. J.; and shipments have been made to to the Chihuahua Street railway of Chihuahua, Mexico.

ST. LOUIS' car works are booming. The car order for the three miles of electric road—Fisher system—to be built at Springfield, Mo., has been placed in this city. In this connection, one of the three St. Louis street car works notes contracts in hand for San Antonio, Los Angeles, Helena, Memphis and other points in the South and Southwest.

THE SPRAGUE COMPANY have just sold one twenty and one thirty horse-power motor to parties in Nebraska, to be used in operating machinery for making brick. This is the first application of this nature so far made with such large motors.

THE UNION INDURATED FIBRE CO.'S water-coolers are meeting with a large sale, and will be of special interest to railroads. They carry in stock three to six gallons, and are prepared to furnish all sizes up to 30 and 35 gallons, at short notice. We understand they have just receive an order from the Pennsylvania system for number of these large coolers for use in station and their pails and spittoons are replacing a other makes on this system as fast as new on are needed.

THE SPRAGUE ELECTRIC RAILWAY AND M TOR CO. have just closed a contract for People railway, Scranton, Pa. The number of cars t be equipped will be 20, full size, new 16-fo cars, Broadway style. Total trackage, 12 mile This is the principal railway in Scranton, an covers almost the entire city. Steam plant to b of the most approved construction and as com plete in all its details as that at Richmond.

The Sprague company closed the contract f equipping the Hartford and Weatherfield rai way.

Another contract by the Sprague company that of the East Side Street railway, of Brockto Mass. The first equipment will consist of s cars, with about five miles of trackage. This the road which was incorrectly reported as ha ing made a contract with the Thomson-Houst company.

Yet another contract was made with Preside E. H. Goodrich, of Hartford, Conn. Th equipment, although a small one, will have er bodied in it all the latest improvements of t Sprague system.

The dynamos and motors for the Salem, Mas road were shipped last week in June. The fir portion of the equipment will consist of six ca but with dynamo capacity for a large increas This road was also not piously claimed by a other company.

The amount of sales of the Sprague compa in stationary motors during the past month ha exceeded that of any other month during t existence of the company.

THE ENOS ELECTRIC SYSTEM CO has be organized under the laws of Maine by W. C. Ot of Nahant, Mass.; W. E. Plummer, Newto Mass., and others, with a capital stock $1,000,000. Its object is to push the claims the Enos overhead railway system.

THE L. M. RUMSEY MANUFACTURING C have sold a Knowles steam pump and 1,500 fe of hose to the Citizens' Railway Co., St. Lou for fire protection at the power house. T same company have shipped $4,000 or $5,0 worth of wood-working machinery, pipes, fittin supplies, etc., to the Missouri Lumber and Mi ing company, at Grandin, Mo.

THE SPRAGUE ELECTRICAL EQUIPMENT C of Chicago was incorporated June 12, with capital of $50,000. The company purpose furnish electric equipment for the propulsion cars on street, elevated and general railway sy tems; the building of street railways and the stalling of electric motors and dynamos f power and light. The incorporators are J. Barclay, Wm. H. Fairclough and H. J. Bav It will be distinctly a construction compa The Sprague Railway and Motor compan object is to sell motors, and the local compa proposes to install them.

The Street Railway Gazette.

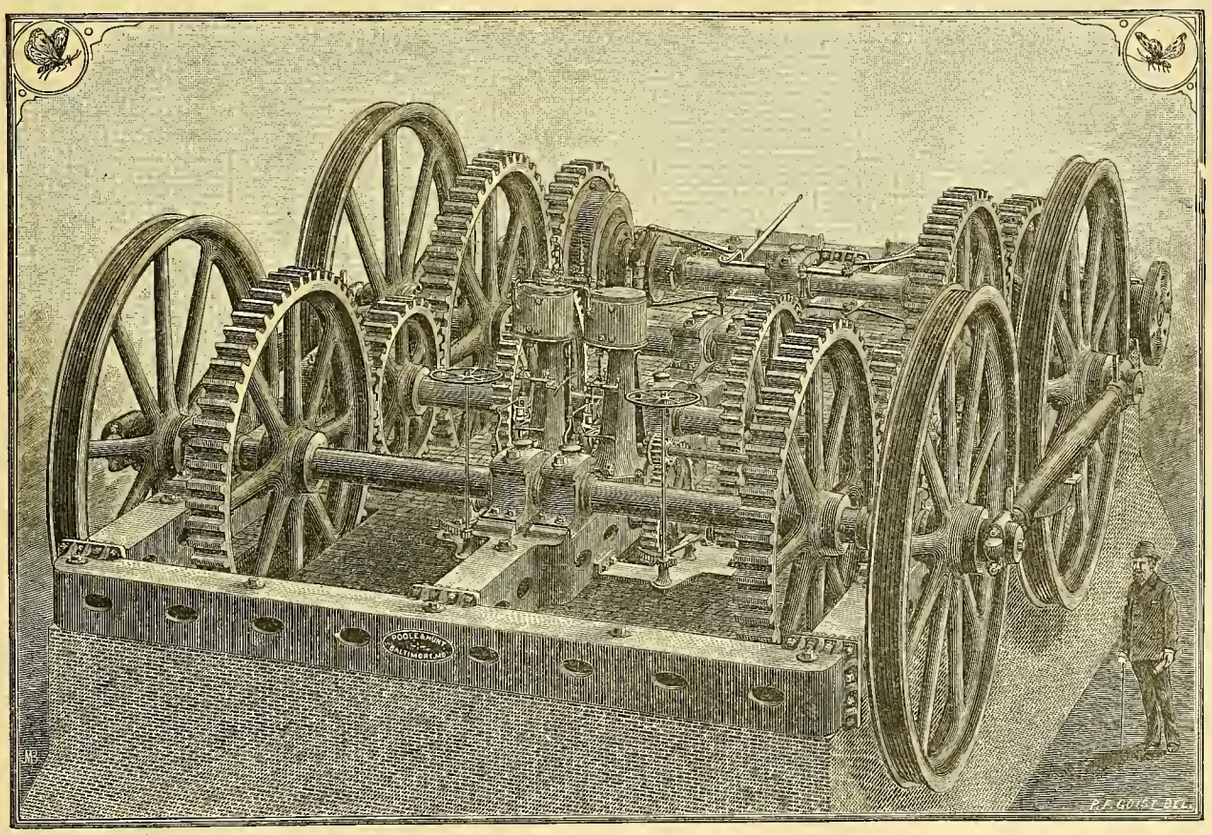
ɔL. III. CHICAGO AUGUST, 1888. NEW YORK No. 8

Poole and Hunt Cable Machinery.

The fame of Messrs. Poole & Hunt's cable ving machinery is as world-wide as cable rail- ys themselves. The accompanying cut illus- tes their present style of cable machinery. e smooth and almost noiseless working there- shows the wonderful accuracy and skill dis- yed in executing the designs, while the great e of many of the parts indicates the facilities their command, and conveys some idea of the ent of their works.

The Poole & Hunt driving plant must be seen operation to be properly appreciated. Any ties contemplating the adoption of the wire-

Messrs. Poole and Hunt's friction clutch, such as is used on all their recent cable machinery, has been recently described in the *American Machinist.* These clutches are the means whereby the engines are connected with the driving shafts. The capacity of a clutch is increased by the number of friction rings connected therewith. The new propelling plant of the Brooklyn Bridge Cable Railway consists of three Wright girder engines: the larger one is of 625 h.p , the next 400 h.p., and the smaller one 275 h.p. The clutch of the larger engine has 27 rings, that of the middle size 19 rings, and the 275 h.p. engine 13 rings.



e as a means of hauling street cars, would do l to see this machinery at work; and the fol- ing cable railway companies, among others, it: Chicago City Railway Co., Chicago, Ill., plants); Kansas City Cable Ry. Co., Kansas y, Mo., (2 plants); Third Avenue Railway Co., w York, N. Y.; North Hudson County Rail- Co., Hoboken, N. J.; Brooklyn Cable Co., ɔoklyn, N. Y.; Metropolitan Street Railway , Kansas City, Mo.; Grand Avenue Street ilway Co., Kansas City, Mo.; People's Cable ilway Co., Kansas City, Mo.; Inter-State Con- dated Rapid Transit Railway Co., Kansas y, Mo., (2 plants); Cable Tramway Co. of aha, Omaha, Neb.

Cable *versus* Electric Railways.

The barometer of public opinion, in regard to cable railways and electric roads, rises and falls in a peculiar manner. One month electric railways are uppermost in public estimation; then that esteem ebbs, and cable roads become the rage. Boston presents a strange spectacle of a street railway company (the largest in the country) halting between the wire rope and electricity. When Mr. C. B. Holmes visited the Hub, and spoke of the great advantages of the cable, they went in "heart and soul" for a cable railway, and actually procured the services of the famous engineer of Kansas City, Mr. Robt. Gilham, to give them a proper start and guidance. But as soon as Mr. Gilham arrived on the spot, and work was about to commence, a feeling arose against the cable, and the West End Co. set their minds strongly in favor of electric propulsion. They are somewhat like the one who exclaimed,

> "O how happy could I be with either,
> Were t'other charmer away."

San Francisco, the cradle of cable railways "will soon be a network of cable roads." The same may be said of Chicago, Kansas City and Cincinnati. The latter city, however, is going to have electrically propelled cars also. St. Paul and Minneapolis too have passed ordinances for several cable and electric railways, a cable road being already in operation at St. Paul.

The competition between the two systems of street car haulage is watched with keen interest. The electricians show pretty clearly on paper that electricity is by far the best and cheapest; and the Sprague people have proved by actual practice (at Richmond, Va.) that an extensive electric railway is thoroughly practical. The Thomson-Houston (Van Depoele) system has been in successful operation on many lines for a long time. The Daft system is also doing well. Bentley-Knight and others have put other systems in successful operation. For all that the wire-rope system is being extended rapidly; and

the two powers find staunch advocates. The *Mining and Scientific Press* (San Francisco), though strongly in favor of the cable system, does not venture to condemn electricity out and out, and only says electric railways "are no good" by innuendo. Thus, in its issue of July 28, our contemporary says, "In this city where cable roads originated, and where we have had the greatest experience with cables, there are no electric roads, though several experiments have been made. We are building more cable roads than ever in San Francisco."

These two "powers" are the chief subjects for discussion at the forthcoming street railway

CONVENTION AT WASHINGTON.

"Conditions necessary to the financial success of the cable power" is the title of a paper to be prepared and read by Mr. Wm. D. Henry, secretary and treasurer of the Missouri R.R. Co., St. Louis, Mo. And Mr. Calvin A. Richards, Boston, is to prepare a paper on the "Progress of electric motive power." Between the two, it is to be hoped that all there is to be known about these two powers will be made plain. Some of the papers read at the Philadelphia convention betrayed considerable carelessness, or rather indifference; and some of the tramway people in England were disappointed thereat. The fact is, the proceedings of that convention were watched by the whole street railway world with far greater interest than those who had prepared the papers there read and discussed had anticipated. We have special reasons for believing that the proceedings of the next annual meeting of the American Street Railway Association will be watched with still greater interest. During last month we had several special inquiries as to the actual cost of construction and operation of the principal cable railways. We received a similar inquiry from England the beginning of August, and although we furnish and publish from time to time all information publicly obtainable concerning the same, it is expected that many details and much "confidential" information not now fully known, may be presented to the members of the association next October.

The Ries New Electric Motor.

One of the most important problems connected with the successful equipment and operation of electric street cars is that of providing a satisfactory and efficient driving connection between the armature shaft of the motor and the axles or wheels of the car. Notwithstanding the rapid progress that is at present being made towards the practical introduction of electricity as a motive power upon street railways, the difficulties—electrical and mechanical—met with in dealing with this apparently simple problem have been, and still are, such as to render its thoroughly practical solution a matter of more than ordinary interest and importance to electricians and electric railway engineers.

We illustrate herewith an exceedingly simple and ingenious motor arrangement, devised by Mr. Elias E. Ries, of Baltimore Md. and forming the subject of a patent issued to him July 10, 1888, which seems to overcome all the principal difficulties heretofore encountered in this direction, and promises, in view of its extreme simplicity and peculiar fitness for the varying practical requirements of electrical transit, to find its way into general use for street car work.

By reference to the accompanying illustration, Fig. 1, it will be seen that Mr. Ries employs but a single motor to operate all of the wheels, and that the connection between the armature shaft of the motor and the driving wheels is a direct and positive one, that is to say, the arrangement is such as to dispense entirely with the use of counter-shafts, ropes, belts, sprocket wheels, chains, connecting rods, worm gear and the like, all of which are objectionable to a greater or less degree, and especially so for this class of service. In addition to these advantages, the construction employed affords several other novel features of considerable importance.

Mr. Ries obtains these results by supporting his motor centrally within a light but rigid frame that spans, and is journaled upon, the two axles of the car, in such a manner that its armature shaft extends in a longitudinal direction and is directly in line with the centre of both axles, as shown in Fig. 1. This armature shaft is provided at each end with a slightly bevelled driving pinion, which engages directly with the larger gears, located, respectively, one on each axle at relatively opposite sides of the armature shaft, in

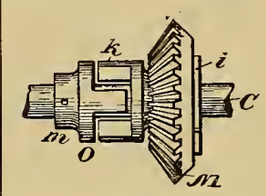


FIG. 2.

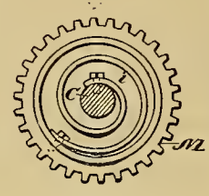


FIG. 3.

order that both pairs of driving wheels may revolve in the same direction.

The large gears may either be directly keyed to the driving axles, as in Fig. 1, or as shown in Figs. 2 and 3, the axles of the car may be each provided with a clutch *O*, having its fixed portion, *m*, secured to the axle *C*, and its movable portion *k*, secured to or forming a portion of the driving gear *M*. The gears *M*, in this case, are cast with a hollow interior portion, within which is placed a strong spring *i*, of few turns, whose ends are secured to the axle *C*, and the inner periphery of the gear *M*, respectively. It will be seen that by this arrangement a considerable amount of flexibility is provided between the armature shaft and the driving axles, since the tension of the coiled springs *i*, is such that in the ordinary running of the car the clutch *k* rests upon the "back stops" of the fixed clutch *m*, but when starting the cars under a heavy load, or on a steep grade, the armature revolves the gears *M* for the space of half a revolution, and with a gradually increasing tension upon the teeth of the driving pinions, until the clutch *k* rests upon the opposite faces or "front stops" of the clutch *m*, where they will remain until the car has acquired the proper headway. By this construction, the motor and its driving gears are not only relieved from sudden shocks and strains, but each axle is capable of accommodating itself to slight inequalities in its own load or speed, as compared with that of its mate, t same, to all practicable purposes, as if each we driven by a separate motor.

An important advantage of this method mounting, whether with or without the interm diate spring connection described, is that t tractive effect of all the wheels of the car a obtained directly from the armature shaft o single motor. Furthermore, the motor, by re son of its central location between the drivi axles is absolutely independent of the body the car, and not affected by the vibration swaying motion of the latter, and can be ma larger and more powerful than would be pos ble with any other method of suspension. Th method of mounting permits of ready access the motor brushes, avoids undue complicatio and peculiarly adapts this system, not only to n cars, but to the ordinary street cars in every d operation, which can be equipped without in a manner interfering with the body of the car, changing its running gear.

This form of motor and driving connectio is also specially adapted for use in connecti with pivoted trucks, Mr. Ries having designed slightly modified arrangement for this purpo The motor in either case is so braced that t armature shaft and pinions are fully able to sist any tendency to side thrust, and the ge are so formed and mounted as to work with t least possible friction, and permit the armatu to be readily revolved by the motion commu cated to it by the large gears under the influen of the momentum of the cars when descendi a grade or coming to a stop; a feature that is the utmost importance from a practical stan point, and one that is fully utilized in the el tric railway system developed by Mr. Ries.

The motor is supported by its field magn frame, within openings of elliptical shape in t side bars or frame, these openings being pr vided with a rubber gasket to give a certain d gree of flexibility to the motor, and relieve from the vibrations and shocks to which it mig otherwise be subjected in running over a rou or uneven track. At the same time the mot itself by reason of its axial support, has a cert amount of spring that enables it to accomm date itself very readily to sudden variations load, and owing to the fact that the points of gagement of the driving pinions, which latter of special construction, and gears are on a cent horizontal line, the slight vertical motion or ax torque of the motor, is readily permissible, a takes place without jar or noise. The suppo ing frame of the motor is journaled upon

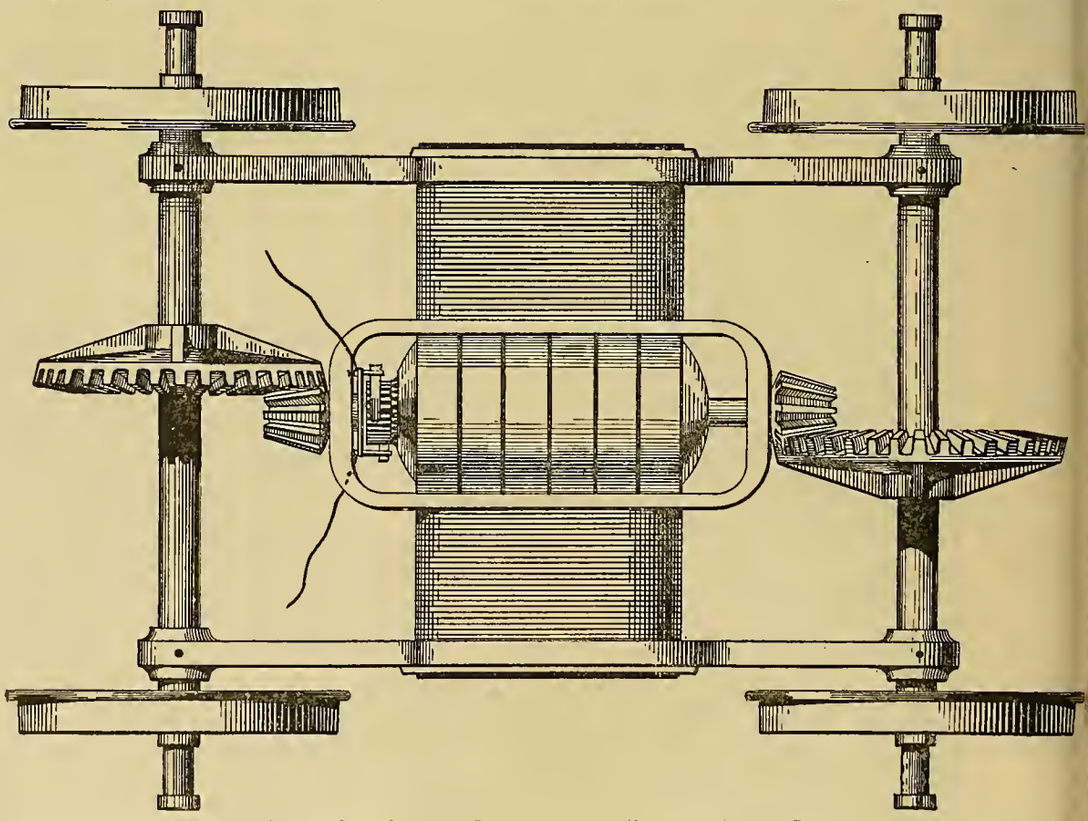


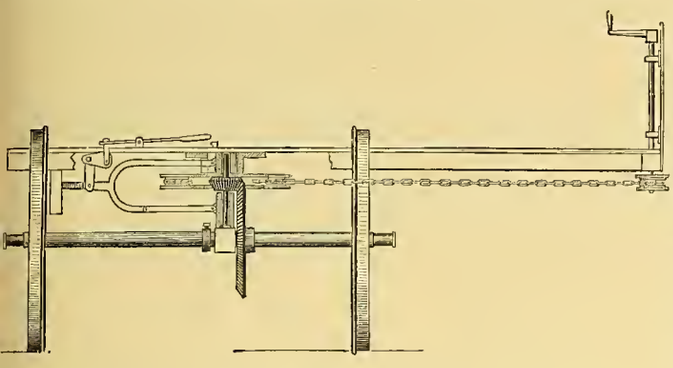
FIG. 1.—RIES DRIVING CONNECTION FOR ELECTRIC STREET CARS.

axles by brass bearings, and the length of the frame is adjustable to cars or trucks, the axles of which vary considerably in their distance apart.

Altogether, Mr. Ries has produced a most simple and efficient driving connection, that appears to be specially adapted to all the requirements of electric street cars, and which will doubtless receive considerable attention at the hands of those interested in the subject of electric street railways.

Farnham's Street Car Operator.

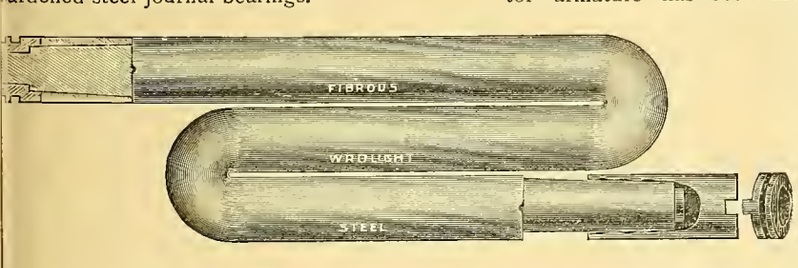
The accompanying illustration gives an idea of a clever invention for which letters patent have been issued to Mrs. M. L. Farnham, of New Orleans. The invention consists of a series of wheels, the first of which is a bevel cog wheel in two parts to adjust to the front axle by set screws, having a small pinion engaging therewith which is operated by a large sheave wheel by means of a chain passing around it which extends out under the platform, in front, and also around a smaller wheel which is screwed on lower end of crank shaft, thereby gaining what is stated in the prospectus of the inventress as two-horse power. Power of two horses is probably meant. She says:



Two-horse power is combined with brake by a simple device that can be adjusted to any car, improving use of brake; moving cars in either direction around car stables without the aid of horse power. For starting cars heavily loaded the inventress claims it cannot be rivalled, assisting in turning curves, replacing cars when off the track or switch, ascending steep grades. The power is combined with a brake which holds the wheels at each degree of advancement, while the power is given to assist in all emergencies. By means of the brake handle the driver has at command and easily produces two-horse power. Tests prove a child 5 years of age can produce the power without exertion.

Peckham's Patent Indestructible Fibrous Steel Street Car Axle.

This is claimed to be the strongest, toughest, safest, most durable and economical axle manufactured, and the only car axle combining a ductile fibrous steel body with interchangeable hardened steel journal bearings.



The special advantages claimed for the Peckham axles, over others, are greater strength and safety; a saving of twenty per cent. of power required to draw the car; a saving of at least fifty per cent. of cost of axles; and a saving of cost of turning journal bearings. Special testimony concerning them may be found in our Business Notes.

THE Adams & Westlake Company's employees held their ninth annual picnic Aug. 4 at Willow Springs, near Chicago. The number of excursionists was so great that three special trains were needed. Many prizes were distributed.

The Municipal Rapid Transit Problem.

Mr. Frank J. Sprague solved this perplexing problem in a paper read before the American Institute of Electric Engineers recently. As Mr. Sprague said, "More attention is now being paid to the question of tramway traffic than ever before. The reason is not only the comparatively high cost of operation under the present almost universal system of horses, but also because the public are beginning to feel and the street railway men are beginning to see that it is a system behind the times. Laying all humanitarian questions aside the public demand a better and a more rapid service. Railway men want to give it, provided they can do so for the same or less money than they are now spending. * * * For years an attempt has been made to replace the horse with motors of various descriptions—compressed air engines, fireless engines, hot water and soda motors, naphtha and petroleum engines, and steam engines. But we can safely say that the question has to-day narrowed itself down as between the cable and the various electric systems for surface work, and between electricity and steam for elevated or underground work.

"It has been said that an extended system cannot be operated by electricity, that the lines may break down, that a large number of cars cannot be operated simultaneously, especially when bunched up, that wires burn out, that brushes burn up. True, these things have happened, and in case of defective workmanship or carelessness they may happen again. Although electricity is a force of unknown nature, and we know it by its effects, it is folly to hold that whatever faults in machinery exist or accidents occur do not come within a very narrow and limited catagory; and powerful and mysterious as it is, and answering an impulse with the rapidity of lightning, it is at the same time the most tractable and law abiding agent with which we have to deal. There is not a freak of which it is capable which we cannot guard against. It has not an attribute of which we cannot make positive use. It has no power of damage which cannot be controlled. The development of its application, the mistakes which have been made and the accidents which have occurred are but the milestones and guideposts of the highway to success. Were it not for the occasional failures there could be no advance.

* * * * * * *

"The connection of the motor to the driving wheels has been attempted in a great variety of ways, and nearly every mechanical device possible has been used. Often the motors are carried upon the car body and connection made with the wheels, which should bear a variable position relative to the car, by means of friction wheels, sprocket wheels and chains, or by belts, ropes or wire chains with tightening devices. The motor armature has been mounted directly on the axle, and also hung on a frame between the axles, being connected to both wheels by cranks and side rods, necessitating equal speeds of revolution of the motor, armature and the wheels. These methods are all crude and unsatisfactory. They are makeshifts and ignore the most important and essential facts which have been developed in car and motor construction. There is to my mind only one good way to connect a motor, and this is to center the motor upon the axle, supporting it flexibly from the car body or the car truck, and driving by gearing with one or two reductions according to the service which is demanded. This is the only way in which an absolutely safe and positive connection can be depended upon, both for ordinary work and for the normal and sudden strains called for in emergency. Properly made, the friction of this method of reduction is very low, the motion is smooth and free, and reasonably noiseless. The proposition to couple the motor so that it shall make the same number of revolutions as the axle ignores one of the most important points which makes light weight in motors possible, and that is the high speed at which the armature can be run."

Mr. Sprague made frequent references to the electric railway at Richmond, Va., which is working most admirably (and greatly to the credit of the Sprague system), and which was described in the STREET RAILWAY GAZETTE for May.

Fig. 1 herewith, however, gives a special view of the characteristics of the curves of that road; they are dotted on both sides of the axis of X. Mr. Sprague explained the illustration of the curve operations as follows: "The ampere-turns on one leg of the field magnate are plotted as abscissæ. The curve *O A* gives the characteristic of the machine when run as a series dynamo on a variable external resistance at 856 revolutions. *B C* represents the equation of counter electromotive force with an initial electromotive force of 400 volts. I have allowed an increase in the actual resistance of the machine of 10 per cent. for heating and other causes. The speed of the armature, the miles per hour made by a car with the Richmond gearing, the tractive effort in pounds for one motor, and the horse power units are, for convenience, all laid off as negative ordinates. Equal units of horse power and torque are laid off as abscissæ so as to make the maximum points coincident.

"The first important curve which we have to get is the speed of the motor in terms of its current. We have the law that the speed is directly proportional to the counter electromotive force developed, and inversely proportional to the strength of the field. In other words, the speed curve *E D C*, in terms of the current, is plotted from the curves *O A* and *B C*, and the speed for any current is found by multiplying 856 (revolutions) by the ratio of the ordinates corresponding to that current.

"The next curve with which we have to deal is that of the work of the motor in terms of the current; that is, the curve *O F C*, which intersects the axis of *X* and at the same point as the curves of speed in terms of the current and the counter electromotive force.

"A third and most important curve is that of the work of the motor in terms of its speed, which is the curve *O D G* plotted from the curves *E D C* and *O F C*, with the horse power units transferred to the axis of *X* as abscissæ. For instance, following the negative ordinate for 30 amperes, we find, at the proper intersection, a speed of 630 revolutions of the armature, or 4.82 miles per hour of the car; and, in the intersection of the work curve, that 11.65 horse power is developed. These two valves give us the point *S* as one of the points of the work curve, and so on.

"Referring to the work required to be expended on a car, we have from the formula:—

$$\text{horse power} = \frac{w\,n}{335}\left\{\frac{k}{2000} \pm \sin \odot\right\}$$

where w = wt. in lbs.,
n = miles per hour,
k = resistance to traction in lbs. per ton on level,
$\odot$ = angle of grade,

the work which is required for any grade, speed and weight. Hence for any given conditions we can plot the equation horse power = $a\,n$, and by its intersection with the curve *O D G*, find at what speed the car will be moved by the motors and what current is required if we know the gearing. On the other hand, if we assume that a certain load on a certain grade shall be handled, and we elect that it shall be done with a certain efficiency of the motor, or on a certain part of the work curve, we can draw the car curve for this intersection and then deduce the speed of the car, and, from it, what must be the ratio of gearing to enable the car to be handled by the motors under these conditions. Four of such car curves are drawn—*O R*, which shows the maximum which could be moved; *O M*, which shows what can be done at 50 per cent. efficiency; *O N* and *O P*, showing the equations which are constantly in practice.

"In the actual computation 10 per cent. extra is allowed for losses from friction and so forth.

"With the Richmond gearing, and a car equation, horse power = 4.8 *n*, we would have a car weighing 14,700 pounds sent up a 10 per cent. grade at 4.82 miles per hour, and each motor would take 30 amperes of current. If the grade or weight were increased, the curve *O N* would be carried toward *O M;* or if the ratio of gearing is changed, then, with the curve *O N* in its fixed position, the weight of car or grade would be increased, although the speed of the car would be reduced. Other curves are shown: *L K* showing the tractive effort of the motor in terms of its speed, and *O H* showing the tractive effort in terms of the current; the tractive effort varying, of course, as the work divided by the speed.

"In the application of electricity we are limited to no one system; we have a choice which will permit us to meet any exigencies or conditions of traffic. There are two kinds of application. In one each car is perfectly independent of the other, receiving its charge at the central station and acting as an individual unit. The storage battery method is such a system. The other is a system of direct supply, and, unlike the battery system, where the energy of the steam is four times converted, it suffers only two losses. In this system the current is delivered directly to the line, from which the motors as they move along derive their current. There are several forms of conductors, center and side rails, the main tracks, conductors carried in conduits and overhead. Either a complete metallic circuit may be used or one conductor with the rail and earth return. The machines can be operated under three different systems—the series, multiple series and parallel circuit distribution. Of these various plans I shall discuss only three—the storage battery, the conduit and the single overhead wire system with underneath contact carried on the car, and for the systems of distribution the parallel circuit system only.

STORAGE BATTERY.

"The storage battery from the time of its first introduction to the public has offered a tempting solution to the application of electricity for surface transit. The great advantage of the battery system is that while most of the advantages of an electric system are retained, such as perfect control of the car, ease of manipulation, cleanliness and so forth, each car in itself becomes an independent unit not dependent upon any general accident to a system. As attractive a solution as the storage battery at first sight seems, there are many points of disadvantage in the present state of its development. One of the most important is the excessive weight of battery which is necessary under the conditions of service which are met with in this country, from 3,400 to 4,000 pounds being the ordinary weight. Not over ten per cent. of lead in these batteries is actually used for storage. On account of the weight and the room which the battery takes up, there has to be a radical change in the construction of the cars, and while old cars can be made use of by a great deal of patching, it is not advisable to attempt this. This change makes the present cars useless and likewise increases the cost of new car bodies.

"Then again, while the tracks as they exist may stand the additional weight of motors on a four-wheel car, the additional weight of battery, making the total weight on a given wheel-base double what it was before, will render it necessary on a great many tracks to relay the road bed, or to put in eight-wheel cars. Of course these objections are not so serious on a new road as they are on an old one.

"But I confidently expect to see, in the not so very distant future, the weight of battery necessary to handle a car reduced one-half; this, besides overcoming some of the objections which exist now, will halve the expense of handling them at the central station, and will also allow the present standard width of aisle to be maintained.

* * * * *

"As near as it is possible for us to get at a correct estimate, on a new road of moderate grades a storage battery system could be operated at about 80 per cent. of the cost of operation by horses. This is about double the cost of the direct system of supply on a large scale.

"But the storage battery is not going to stand still. Many men with abundant capital are striving for improvement, and I think there is but little question that batteries will be reduced in weight, increased in capacity and made far more efficient and long-lived.

UNDERGROUND CONDUIT.

"The conduit and overhead systems have one

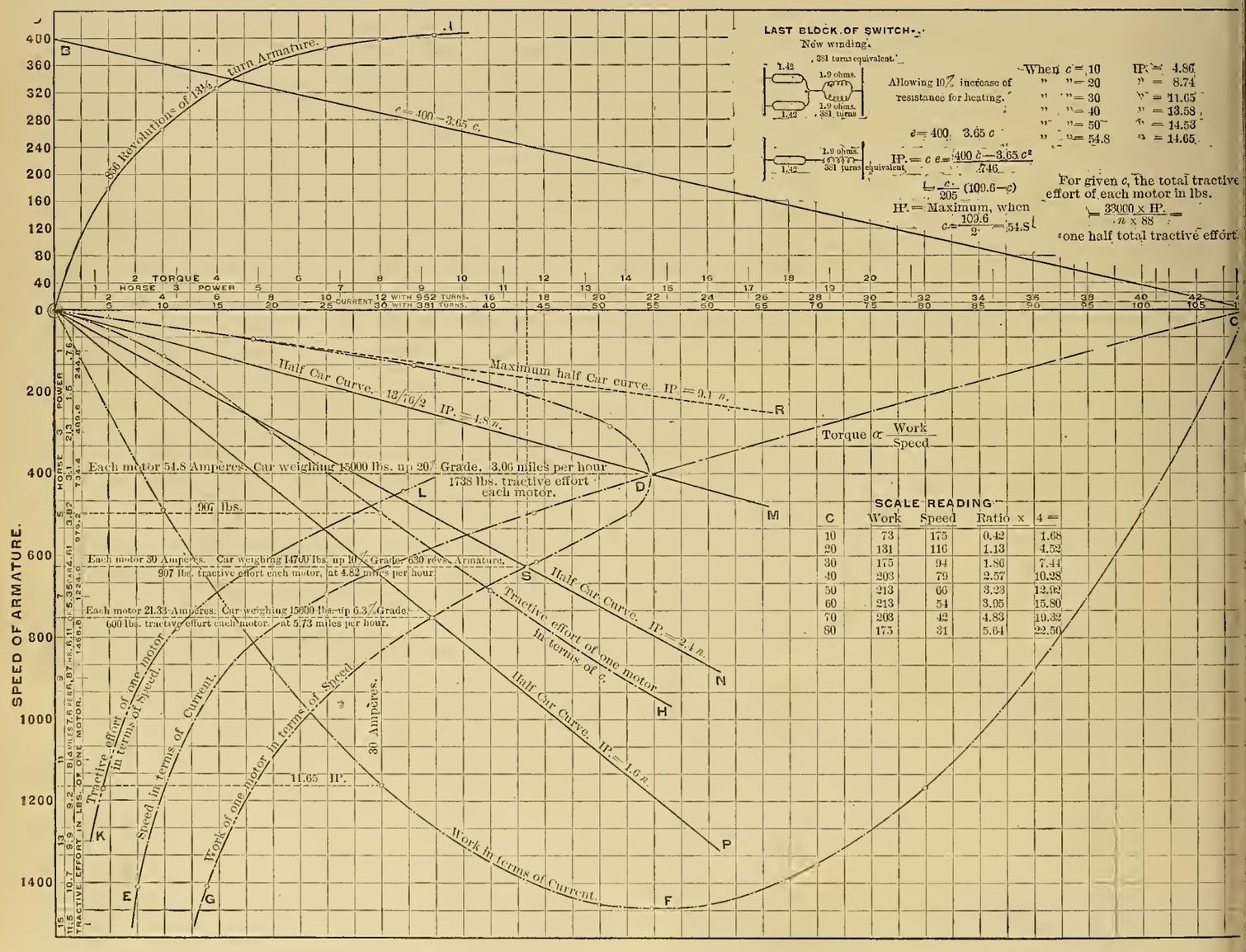


FIG. 1.—CURVES ILLUSTRATING CHARACTERISTICS OF ELECTRIC RAILWAY MOTOR.

point in common. Both are dependent upon central station, and the actual cost of operation (except for the care and maintenance of the conduit itself) would be about the same. There is, however, a great difference of investment. Both must have about the same amount of copper, and to be effective, about the same distribution. The difference of cost then is practically the difference between pole erection and conduit laying, and this will be from $25,000 to $30,000 per mile. * * * Recognizing the demand which exists in certain places for a conduit we have developed such a system which has many of the same elements of simplicity and reliability that our overhead system possesses.

OVERHEAD (WIRE) CONDUCTOR.

"For the immediate solution of the question of more rapid and cheaper transit in many places

he overhead system is most available. I am ware that a great hue and cry has been raised, specially of late, against any electric wires whatoever being used above ground. The feeling which exists is not entirely unreasonable; in fact, is easily accounted for by the most casual inpection of the condition of the wires of New ork city. But many of the objections which re raised against all overhead systems are not ecessarily inherent; they are very largely due o gross carelessness in construction engendered y a faulty municipal administration. We have n our cities little or no active control or overght of the wires which have been put up in our reets. Year after year, from the earliest teleraph days, those in control have granted to telgraph, electric light, telephone and electric ower companies innumerable more or less limed franchises for stringing or hanging wires rough our streets. These permits have often een granted without any restriction whatever; ey are often granted for a 'consideration.' he erection and maintenance of these lines eing a large factor in the cost of construction d operation of the companies, they have been t up with little or no regard to public convenice or safety—certainly with no regard to any sthetic tastes—and oftentimes with an utter norance of the proper methods of construction. re underwriters, in their wisdom, have deended an insulation to stand fire, forgetting, or parent ignorance of, the fact that protection om moisture and leakage is of far more vital portance. Hence we have that treacherous re known as 'underwriters' wire,' or more comonly among electricians, 'undertakers' wire.'

* * * * *

"In all improvements for public improvement have to consider the arguments for as well as ainst such improvements. It is not sufficient at we say that there are disadvantages attendg the introduction of the system, we must conler likewise the possible advantages; and this especially important when we consider the use the overhead line in a system for propelling street cars. * * * Several methods exist in which the wires can be erected. One in which span wires, at a distance of 125 feet apart, reach across the street from building to building, or from pole to pole, and has suspended from it, directly over the track, at a height of about 19 feet, a longitudinal wire of not more than a quarter of an inch diameter, this wire being termed the 'working conductor.' This should be of the very strongest character. It should have a high elastic limit, great tenacity, and resist corrosion and oxidization. Its conductivity is a matter of less importance, since not upon it, but upon the main conductor which supplies it do we depend for the main transmission of our current. We have found that the best wire for this purpose is that alloy known as 'silicon bronze'—a wire which can be drawn for a tensile strength of from 75,000 to 150,000 pounds per square inch; that is a strength higher than that of the best commercial steel. Such a wire it is almost impossible under conditions of service to break, and its life is very long. Samples of hard drawn copper wire, which possesses only from one-third to one-fifth the tensile strength of this wire, show, after months of severest usage, scarcely any signs whatsoever of abrasion, or reduction in size. This wire is of the same size whatever the distance run or the number of cars operated, and the main conductor may be stretched along the buildings, through a side alley, along poles, underneath the elevated structure, or buried underground. In the latter case there would be in a single track street only one longitudinal wire, and that one over the track, and it would be no larger than a single telegraph wire; and in the case of a double track, there would be only two wires stretched longitudinally along the street, and these would be as taut as harp strings.

"Switches and cut-outs are put in main, and working conductors in such a way that the different sections can be operated independently, and cut out automatically, or at will. The span wires can be as much above 19 feet from the ground as is desired. Of course, where a telephone or electric light light line crosses the street and may break and fall upon such a conductor, it would be necessary to have one or two guard wires above it.

"These guard wires can be very properly carried from the span wires themselves. Furthermore, if desired, the stretches between the span wires where the guard wires are used can be very much longer than 125 feet; they can be even as long as 500 or 600 feet—that is, two or three city blocks—in which case the two guard wires form a light, suspending structure from which, at intervals of a hundred feet, the middle wire is carried in a straight line.

"In very many cases it is unnecessary to have any span wires whatsoever. In those streets where the track runs near the curb a light pole with an ornamental bracket is all that is necessary. In a broad street where the tracks occupy only a small portion of the street, and are near together, a line of poles of ornate design with light arms projecting on either side, can follow the center of the street. Oftentimes there is a middle division or park, such as exists on the Boulevard in this city, which will afford space for the poles without interferring with anything. These same poles can be used for lighting the street.

* * * * *

"The question of 'electromotive force,' or electrical pressure, so to speak, to be used, is one of great importance. I do not favor going above 400 volts, and this on a continuous current circuit. This is less than one-seventh the electromotive force which exist on many of the arc light circuits in this city; and the current being of a perfectly smooth and continuous character is free from the danger which might be feared from a current of equal electromotive force of the alternative or pulsating character. In point of fact in Richmond, a very large number of our men have received the full E. M. F. from our line without any injury.

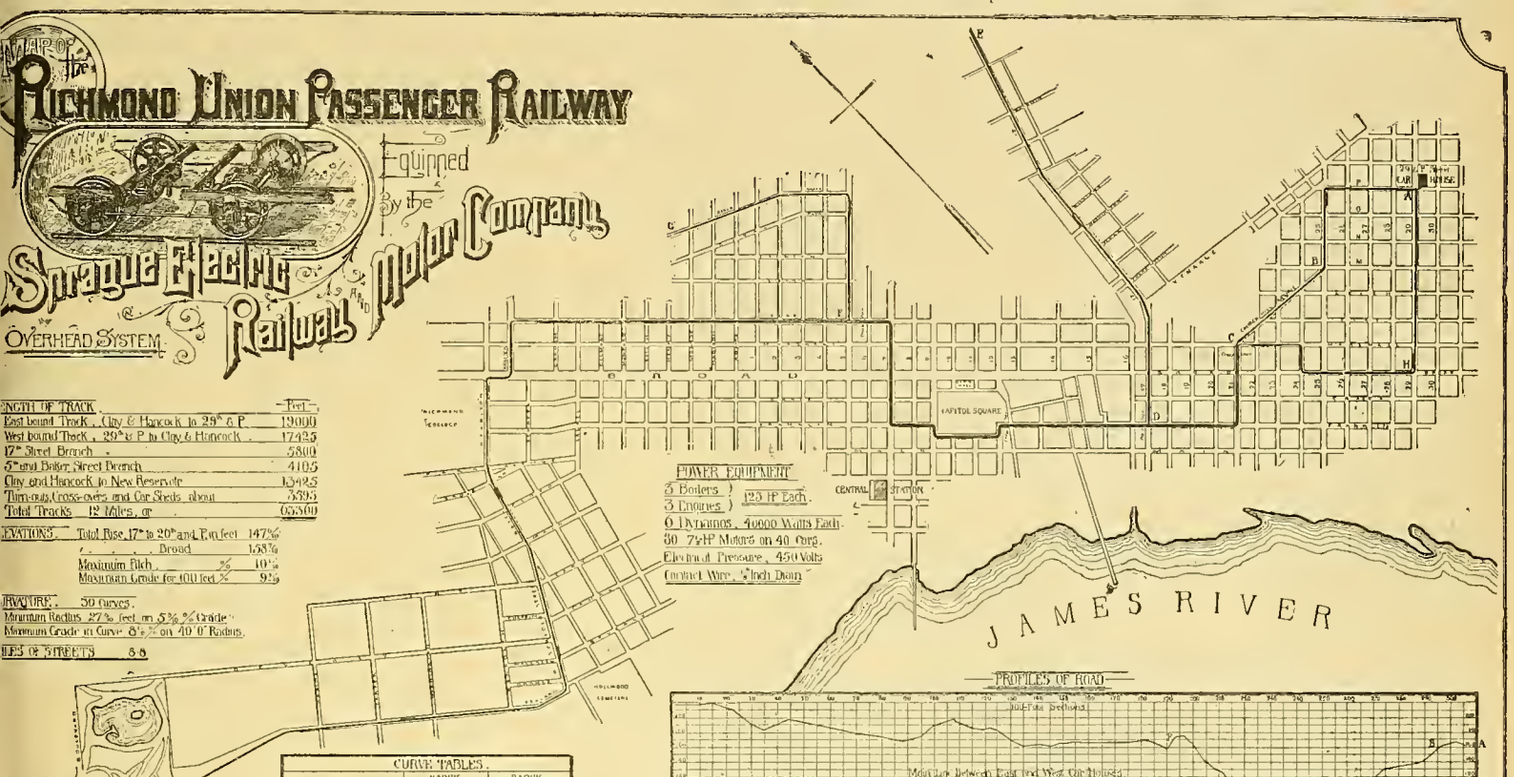


FIG. 2.—MAP AND DATA OF THE RICHMOND, VA., ELECTRIC ROAD.

TRACTIVE ELECTRIC ADHESION.

"Another thing to be noted, where the ground circuit is used, is the increase of traction due to the passage of the current from the wheels into the rails. Exactly what molecular action takes place has not been ascertained; it may be simply heating at the contact surface, but the fact remains that the traction is very largely increased. The magnetic condition of the wheels and tracks also has some function in this increase of traction. The wheels and axles are magnetized by the method of motor construction and mounting, and also by the passage of the current through them; the tracks are likewise magnetized by the current passing through them, and also by the rolling contact of the wheels. Yet, admitting all these aids, the results have been extraordinary. Sixteen-foot closed cars carrying picked loads of fifty-five to sixty passengers, and having a total weight of 15,000 pounds, are operated on the ten per cent. grade, often with a slippery and slimy rail, and on 27-foot curves, without the use of sand or extra help. * * * I have no hesitation in saying that with a clean track, and with proper gearing, these cars could mount a 15 per cent. grade depending on adhesion alone."

Rapid Transit of City Mails.

A Washington despatch of Aug. 6, to the New York *World*, says that Representative Cox introduced a resolution in the House authorizing the Postmaster-General to appoint three persons who shall constitute a commission to investigate the subject of the rapid transit of the mails in and through the city of New York and the adjacent postal districts, whether by the pneumatic, surface, or other systems, which said commission shall report to the Fiftieth Congress.

It is a wonder that New York city has done nothing in this matter ere this. Cincinnati has had a street car "mail line" in operation over thirteen months. The well-known president of the Mt. Adams and Eden Park Inclined Railway (Col. Kerper) was the first to make a contract with the Postmaster-General for taking street cars into the mail service. The Street Railway Association of the State of New York took the matter up at their fifth annual meeting, held Sep. 20, 1887, and the official report thereof has just been issued from which we extract the report of the Executive Committee thereon:

"UNITED STATES MAIL LINE.

"There has been brought to the attention of the committee the question of obtaining the designation by the Government of street railway lines as United States Mail Lines, in consideration of the carrying the mail in charge of its postmen upon the cars of street railways, the companies receiving what would be a fair montary renumeration for the service thus rendered the government. The cars are very often blocked by wagons and trucks, by stubborn men in charge of the same, who unreasonably seem to have an ill-feeling towards the street car companies. This ill-feeling is, doubtless, the result of the fact that the cars travel faster than their own vehicles, and that they are thereby put to inconvenience in turning out from the track, in order to let the cars pass. The public is seriously annoyed and inconvenienced by the delays thus caused.

"These drivers of trucks, cars and other heavy vehicles, would have a wholesome regard for a United States Mail carrying vehicle such as a car would be in an especial sense, if designated in the way proposed.

"Your committee has had under consideration the obtaining of the designation by the Government as United States Mail Lines of the several roads belonging to the companies forming this association. There has been, however, a difference of opinion as to the experiency of having our lines so designated, so that action has been deferred until the present meeting, in order that 'in the multitude of counselors,' there might be 'safety,' not to say wisdom, regarding the subject, which has seemed to many as of unquestionable benefit to our business."

A lively discussion followed, during which the Secretary, Mr. Wm. J. Richardson, read the following letters, which had passed between himself and Col. Kerper, a report of whose "mail line" in the STREET RAILWAY GAZETTE first drew attention to the matter:

Mt. Adams and Eden Park Inclined Ry.
Cincinnati, July 1, 1887.

WM. J. RICHARDSON, ESQ.,
Secretary, American Street Railway Association.

Dear Sir,—Our cable and street car lines have this day been designated by the Postmaster-General as United States mail lines. We arranged the matter through our postmaster. We receive $300 per annum, and agree to have a place on the front platform for letter carriers on duty, also for special delivery messengers. It affords us the protection of the Government in addition to the city. I believe a movement of this kind should be made by every street railroad company in the country. I have been at work on it since May 1st, and have had the hearty co-operation of our postmaster. Our cars all came out this morning with *United States Mail Line* on the front. With kind regards, yours very truly, G. B. KERPER, *President.*

Office of the American Street Ry. Association,
Brooklyn, N. Y., July 5, 1887.

GEORGE B. KERPER, ESQ.
Pres. Mt. Adams and Eden Park Inclined Ry.

My dear Sir—In reply to your kind favor of the first instant, would say that I should be glad if you would favor me with a copy of the order that your postmaster received from Washington, relative to the designation of your road as a United States Mail Line. This inquiry is based upon the request of the postmaster of this city. What concessions, if any, do you make to the Government in price less than that charged for the service heretofore, and what additional facilities are furnished?

I shall be glad to receive any information you may be able to give me concerning the matter, and I remain, Sincerely yours,
W. J. RICHARDSON, *Secretary.*

Office of the Mt. Adams and Eden Park Inclined Railway, Cincinnati, July 9, 1887.

WM. J. RICHARDSON, ESQ.
Secretary, American Street Ry. Association.

Dear Sir—Your favor at hand. Our postmaster will not permit a copy of his order to pass out of his hands. He says your postmaster can see the record or get it from the Department. My plan was to have the postmaster give us the data of expense per annum, and in addition he (the postmaster) wrote to know what saving could be had, and whether carriers and special delivery messengers could not be permitted to get on and off at any point on our lines. It cost the Government about $450. We now do the service for $300, giving them the right to get off and on at any part of the line. Yours very truly,
G. B. KERPER, *President.*

The meeting appointed a special committee, consisting of Messrs. Charles Cleminshaw (Troy), John W. McNamara (Albany), and G. Hilton Scribner (New York), to see the Postmaster-General and see what may be done in reference to the matter. The committee will no doubt report to the next annual meeting of the N. Y. Association (Sep. 18).

Of course the proposed government commission is to consider faster things than street cars. But until some great scheme is matured whereby letters can be sent flying to the various offices and residences as soon as they arrive at the general post-office, it may be well to make arrangements with the street car companies in order to secure better and quicker mail service than New York enjoys at present. The U. S. Mail Line (street car) answers well in Cincinnati. And New York may not be able to get anything better yet awhile. Let the Empire City (or the Government for it), make this little step in advance without delay, while waiting for something better. And why not have U. S. (street car) Mail Lines for Philadelphia, Chicago, Boston, Minneapolis, etc.?

ELECTRICITY, like every other useful element, is likely to be subjected to false accusations. And a hysterical woman in Brooklyn recently declared she had received a paralyzing electric shock while sitting in a street car propelled by electricty. The case was promptly and thoroughly investigated, and the weight of evidence shows it was a case of hysteria, and that electricity could not possibly have reached the woman.

European Aid Funds, Pensions, Etc.

The first of six subjects relating to which questions have been sent out by M. Nonnenberg, general secretary of the Permanent International Tramways Union, and to which answers have been returned by the principal tramway companies in Europe, is that of funds to aid tramway employees in case of sickness, accident, etc.

The *Tramways de Breslau* company make it compulsory on their employees to belong to a provident and sick aid society. The members thereof pay an entrance fee of one mark (23¾ cents) and contribute monthly at the rate of from 1 mark to 1.20 m. The variations arise from difference in salaries. One-half of the receipts is applied to benefit the members; the other moiety goes for expenses. The members and their families have medical attendance and medicine, and hospital accommodation when necessary; that is all they get during the first four days they are incapacitated. After the fourth day they get from 1 mark to 1.25 m. per day for a period of 13 weeks. In case of member's death the "Cash" pays 64 marks; 30 m. if a member's wife dies, and 15 m. in case of death of member's child under 14 years of age. The finances are controlled by a committee which is appointed by the employees, *i. e.*, members or participators of the sick fund. The company, "of their own volition," undertake to make up their employees' salaries complete every month, during illness. That is to say, they pay their men the difference between their regular wages and what they get from the fund while sick. After the 13 weeks have expired and the sick receive no further help from the sick fund, the company pay full salaries to their old employees who have always behaved themselves well. This full payment continues only for another term of 13 weeks, however; after which they drop to half pay, which continues as long as the parties are sick. According to the law of July 6, 1884, the *Tramways de Breslau* are members of the "corporation professionnelle des tramways," consequently all their employees are insured against accidents by the provisions of that law.

Les Tramways Bruxellois have no organized fund. The company pay their sick employees according to length of service: thus, one that has been in the service not more than one year receives quarter of his regular salary during 15 days of sickness; one that has served from one to two years gets half his salary for 15 days and quarter his salary for another 15 days; one that has been in the service from two to four years gets half his salary for 15 days and quarter for 30 days; while one that has served for four years or longer gets half his salary for 15 days and quarter his salary for 60 days.

The *Tramways de Cologne's* employees have a society established under section 60 of the law of June 15, 1883, to provide for the wants of sick members. Formerly each member paid 5 pfennigs daily, but the amount of contribution was reduced to 4 pfennigs (nearly one cent; exactly $\frac{952}{1000}$ cent, a pfennig being one-hundredth part of a mark). In 1887 the number insured was about 328; and the amount disbursed "figured" 7,600 marks, of which about 4,680 m. was paid in coin for aid, 950 m. for medical attentions and 1,190 m. for medicines, and 760 m. for hospital expenses; the balance (20 m.) was for sundries. The total amount of members' dues amounted to 4,420 m. in 1887; and the company, according to custom, paid into the "Cash" a sum equal to one-half the employees' (or members') payments. This shows a difference of 970 m. on the wrong side. The daily "indemnity" to which the men are entitled is 1.50 m., *i. e.*, when they are over 16 years of age; and 0.90 m. for younger persons. Since May 1st last, the members dues have been advanced to 5 pfennigs a day. They have no "pension" bureau.

The *Tramways d' Erfurt* pay to the sick fund a sum equal to one-third the amount paid by the beneficiaries.

The Grand Berlin Street Railway Co. place 50,000 m. annually at the disposal of the Board of Directors to supplement the employees' contributions to the "help" fund.

The *Tramways de Hambourg's* "assistance" fund is divided into two sections: 1st, those whose salary does not exceed 2.50 m. per day; 2d, those whose salary is higher. The weekl

ayments (dues) are 25 pf. for the members of he 1st class and 30 pf. for those of the 2d)utside of medical attention and medicines, etc., he "Cash" allows 9.10 m. per week to members f the 1st class and 11.20 m. to those of the 2d lass. Present number of members is 1,160. 'he company pays into the "Cash" 50% of the mount paid by the beneficiaries.

The *Tramways de Heidelberg* have a "Cash" /hich furnishes medical attendance and medi- ines free "up to the third day," and afterwards ay one-half of their salaries to the men, subject o certain restrictions not specified. The com- any contributes a sum equal to one-third what ; paid in by those benefited.

The *Tramways de Leipzig* have a fund which rovides medical attendance "gratis," as well as ıedicines, spectacles, rupture bandages, etc., nd pays sums equal to half the men's salaries or six months; after which, for six months ıore, quarter the amount of salary is paid dur- ıg illness. Two per cent. is the amount de- ucted from the men's salaries for this fund. 'he company pays thereto a sum equal to half ıe amount paid by the men.

The *Tramways de Magdebourg* have an aid so- iety to which the employees pays 3 per cent. of ıeir earnings, and the company pays 1½ per ent. thereof. When sick they receive an equiv- lent to 50 per cent. of their salaries, as well as ıedical attendance and medicines for themselves nd families, for 13 weeks.

The *Tramways de Lubeck's* employees are con- ected with an aid fund in case of sickness, the ayments of which vary according to the salaries f the employees, being divided into five classes: st comprises those whose daily earnings are 3 m. ınd above); they pay to the fund 63 pf. a week; d comprises those earning 2.40 m. to 3 m., who ay 51 pf.; 3rd comprises those whose day salary from 1.80 m. to 2.40 m., who pay weekly 39 pf; th class is composed of those earning daily from .20 m. to 1.80 m., who pay 27 pf. The 5th class ɔmprises those whose daily salary is less than .20 m., and who pay 18 pf. a week to the fund. 'he company pays a sum equal to one-third of ıe total contributions or dues. The payments ı case of sickness are made according to this ɔale: 1st class, 1.70 m.; 2d, 1.40 m.; 3rd, 1.10 ı.; 4th, 0.80 m.; 5th, 0.50 daily. This continues ɔr 26 weeks "at the utmost." Besides those ayments they have medical attendance and ıedicines free.

The *Tramways de Stuttgart* company pay their ck employees half their salaries for 13 weeks, ɔgether with medical attendance, medicines, ɔectacles, rupture bandages, etc. The list of ılaries paid by this company, according to their ɛport, is as follows:

(*a*) Depot superintendents, office employees, ıiefs of stables, road superintendents, mechanics nd saddlers, 4 marks.

(*b*) Conductors, drivers, receivers of the first ıd second class, superintendents of material, ɛc., 3.40 m.

(*c*) Stable superintendents, first blacksmiths, orse-shoers, third class receivers, etc., 3 m.

(*d*) Occasional receivers, regularly engaged rorkmen of the third class, harnessers, etc., 60 m.

(*e*) Day laborers and helpers, and stable boys ɛver 16 years old, 2.30 m.

(*f*) Car-cleaners and stable boys under 16 ıears, 1.50 marks.

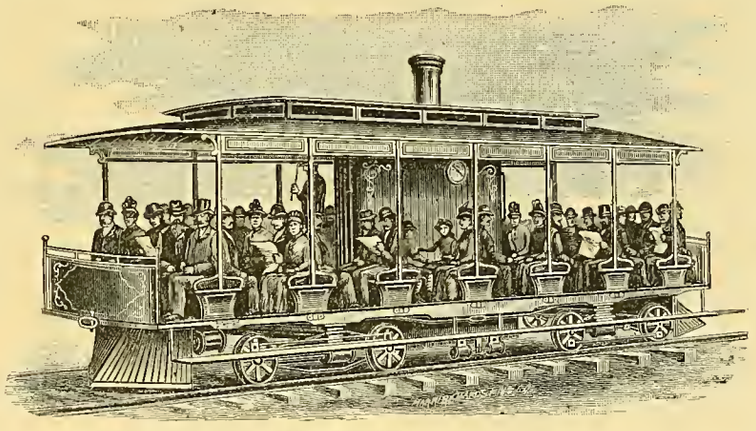
In Vienna they have a savings bank as well as d society and a pension fund in connection lith the *Tramways de Vienna Company.* The ɔmpany pays 1½ per cent. of the gross receipts f fares collected for transportation of passen- ɛrs, as follows: a sum equal to the whole mount paid in by the employees goes to the ɛnsion fund, and the sick aid society gets the ılance. The employees pay into the pension ınd 5 per cent. of their salaries, besides certain ims which they always give when they get their ages raised. After ten years of service they ɛe entitled to a pension in their old age, and (in ıse of death) their widows receive pensions and so children under 18 years. To the sick fund ıe men pay 3 per cent. of their salaries. When ck they receive (beside medical attendance and ıedicines) an amount equal to one-half of their ılary, for a period of 20 weeks. This "indem- ity" is made two-thirds of their salary in case they are wounded in the service of the company. If, after ten years of service, the men become in- valids, or if they become incapacitated through accident while in the company's service, they re- ceive an annual pension equivalent to one-third their salaries. Families of members, in case of sickness, receive medicines, etc., at reduced rates. The widow of a member who dies entitled to a pension gets a pension equal to one-sixth of his salary. His children under 14 years of age get the same.

The *Nouvelle Societé des Tramways de Vienna* established an aid society two years ago, provid- ing (*a*) medical aid and medicines gratis to mem- bers in case of sickness or accident; (*b*) financial aid in case of sickness in case this latter should keep from labor; (*c*) extraordinary aid in case sickness has resulted in distress to self and fam- ily; (*d*) paying expenses of funeral of deceased member, and (*e*) temporary financial aid extended to widows and orphans of deceased members. The aid fund now amounts to fl. 7,366.00 and an entrance fee averaging 1 florin and an average of 2 per cent. on the salaries of employees. The societé (or company) pays to the fund a sum equal to one-half of the contributions of mem- bers. The amount of assistance accorded de- pends on the term of service of the sick member; in no case will it be extended over 6 months. The married members receive their regular salary in case of sickness, while bachelors will have to be contented with 95 r. daily—the hospital tax. An annual meeting of the aid society is held, to which all members are invited to attend.

The *Societé des Tramways de Zurich* retains 2 per cent. from salaries of employees. The com- pany contributes one-tenth of payment of em- ployees. Members have right to medical attend- ance gratis for 75 days, also to medicines and a pecuniary assistance of 2 francs daily; this, how- ever, is not to exceed two-thirds of salary.

The Prosser Street Railway Locomotive.

The accompanying cut shows the general out- side characteristics of a new kind of motor for



hauling passenger cars in cities, either on the surface, underground or elevated, manufactured by the Palmyra Manufacturing company (of which Col. James H. Davidson is president, and Mr. Allen A. Griffith treasurer and manager), and they have one in operation at Palmyra, Wis. It comprises the new system of Mr. Treat T. Prosser, late of Chicago, for "utilizing the pro- ducts of heat," which has attracted the attention of the engineering world for some time. In January last the works at Palmyra were visited by Mr. Duane Doty, a gentleman of marked abilities connected with the Pullman palace car, and street car works, who declared that "Mr. T. T. Prosser's methods of utilizing the products of heat are what he claims for them, and his claims must startle engineers and builders of engines everywhere."

Mr. Doty suggested the construction of a street car locomotive embracing the Prosser system. Last month Mr. Doty again visited Palmyra and rode on such a locomotive. He expresses his astonishment in this way:

"After riding for several hours as I did to-day, with many others, on the new locomotive, seeing no waste of steam, fuel, or carbon particles pass- ing away in smoke, seeing no stoking done at any time, no water tank or tender, and feeling no jar or jerking motion, but moving like a boat in the water, starting and stopping with ease, hearing no noise, except of wheels on the iron rails; I must say that I have looked upon the most novel and useful invention of modern times, in my judgment, for the purposes for which it was constructed."

Unfortunately (or otherwise) no details of the system are given. And Mr. Doty "fears that any statement made, or description given, might not be accepted or believed." The company have opened an office at Chicago, where we had the pleasure of seeing the manager, Mr. Allen A. Griffith, who is solicitous for general inspec- tion of the new locomotive at Palmyra "What is the weight of it?" Mr. Griffith replied, "Be- tween 4,000 and 5,000 lbs." He stated that it can be operated with less than a dollar's worth of coal per day of from 10 to 12 hours. One is ordered for Kansas City, also for St. Paul and Minneapolis. And the company will endeavor to get one ready for the street railway exhibition at Washington in October.

Exhibition of Storage-Battery Cars.

One of the novelties of the great International Fair at Buffalo, next month, to thousands of the visitors, will be their first ride in a street car propelled by electricity, says the Buffalo *Express.* "This feature will be contributed" by the Buf- falo East Side Street Railway Co. and the Buffalo Street Railroad Co., "the purpose being to exhibit to the multitude the highest achievement yet reached in the use of electricity as a motive power." Col. Henry M. Watson, secretary of the first-named company and presi- dent of the other, ordered two cars, to be equip- ped with storage batteries, etc., from the Electric Car Company of America, Philadelphia, soon after the Elieson electric locomotive was sent back from Buffalo to England, some months ago. Mr. Wharton has undertaken to have two cars in Buffalo on or before the 25th inst. A railroad about three quarters of a mile long, with a turn- out, will be built (as soon as the Circuit races are over) from near the entrace of the main building to a point close by the horse sheds, and on this stretch of track the two cars will be operated, either alter- nately or both together, during the hours when the attendance is larg- est. Each car will be about 16 feet long and in general appearance will resemble the Cold- Spring cars now in use. The electricity will be generated by means of a new Edison dynamo, which will be placed in Machinery Hall. "A Philadelphia electrician, Mr. Condict by name, will have charge of the exhibit."

Electric Motors.

In addition to the lecture given on "Teleg- raphy," says a Newport paper, Mr. F. J. Sprague, a prominent electrician, and formerly an officer in the navy, lectured in the evening on "Electric Motors." By the aid of mathematical terms, the lecturer elaborately illustrated the qualities essen- tial to the transmisston of electrical energy in motors of various powers and constructions and described the features of a motor by which it is proposed to train the guns of the Chicago, and others of our cruisers, in a third of the time now taken by other means. He also described motors which could be utilized for hoisting ashes and controlling the rudder of a ship. By a series of excellent views it was made quite clear that elec- tric motors could be used almost for anything where power was necessary. Cars run on steep grades, hogsheads of sugar moved with facility, electricity substituted for steam in printing, roll- ing mills and elevators. The lecturer, in conclu- sion, described a proposed conduit and overhead system to operate 230 miles of railway in Boston, and was afterward thanked for his very able effort, on behalf of all present, by Commander Goodrich.

The
Street Railway
Gazette.

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Matter for publication should reach the Chicago Office by the 1st of each month. All communications should be addressed, THE STREET RAILWAY GAZETTE, Chicago, Ill.

Articles and papers on subjects relating to intermural transit always appreciated; the GAZETTE's columns are open for the expression of independent opinions, and the discussion of all matters connected with street railways—on the surface, elevated or underground. A special column is devoted to the publication of trade notes and items from manufacturers and dealers.

STREET railways, as investments, have enhanced in value where electricity has been adopted as propelling power. And some of our electrical contemporaries "fail to see a safer form of investment anywhere than electric railways well equipped and well manned."

BOB-TAIL cars are unpopular in New York, Buffalo, Minneapolis and other large cities. A bob-tail car, it is needless for us to say, is a car without a conductor, and where the passengers have to drop their fare into a box. They were abandoned in Chicago long ago.

FALSE statements in Chicago papers, concerning the city's street railways, are common enough, but the *Mail* beat its neighbors hollow one evening by reporting that Mr. C. B. Holmes was thinking of resigning the presidency, etc., of the Chicago City Railway Co. Secretary H. H. Windsor says the *Mail* article is "a tissue of lies from beginning to end."

ENGLISHMEN, as a rule, "are so conservative that a long process of education and hammering of the English mind is yet necessary to get it to see things in the same light as it your country," writes one of the proprietors of a popular tramway device in London, who has travelled much in Europe and elsewhere, in writing of the prospect of electric propulsion over there.

"VESTIBULED" electric trains is the caption of an article now starting the rounds stating that the Council Bluffs and Omaha Rapid Transit Co. are going to have vestibule trains on their electric railway between the two cities (across the river Missouri.) The announcement is premature: the Pullman company (who are building the cars) have not yet stated the cost of the vestibule arrangement, and the matter is undecided.

DIRECTORY returns will all come to hand, it is hoped, in time to enable us to make a complete revision of our Directory Supplement up to date next month. In our present issue the population of cities has been altered to what it was in 1887, and in several instances to what is is now; in every case the latest obtainable estimated population is given, whereby the sizes and importance of every city may be perceived readily.

EXHIBITIONS of street railway appliances are about to begin. When they may end is a moot question. The Richmond Exposition was to have a street railway exhibit, but arrangements were not made in time. The International Industrial Fair at Buffalo, N. Y., next month, has secured a couple of storage-battery cars to entertain and edify the crowds of visitors that are expected. But the first grand street railway exhibition (some particulars concerning which are given in another column) is to be opened at Washington on the 17th of October next.

THE Chicago City Railway (the South Side system) is now about 30 years old. From a small beginning of 6 cars and 30 horses it now comprises 125 miles of track, of which 35 miles are worked by cable. The present equipment consists of about 900 cars, 2000 horses, and three power-houses with ten steam engines, aggregating 5,000 h.p. On the third day of the recent Republican Convention (June 21), over 260,000 nickels were collected from passengers. July 4 exceeded this, it is said.

CONVENTIONS of street railway associations are close at hand. The Assembly General of the Union Internationale Permanente des Tramways will be held at Brussels, Sept. 6, 7 and 8th. The sixth annual meeting of Street Railway Association of the State of New York is to be held, Sept. 18, at the Fifth Avenue Hotel, New York, in Room D-R, opening at 10:30 a. m. The American Street Railway Association will hold its seventh annual meeting at Washington, D. C., opening on Wednesday morning Oct. 17. Further details will appear in our next number. The Ohio Tramway Association will hold its annual meeting in November, as usual.

LIBEL the cable no more, ye newspaper grumblers of Chicago, *et cætera*. In pressing Col. Lowry to build his cable road as rapidly as possible, the Minneapolis *Tribune* says: "The people living along First and Nicollet avenues demand the abolition of steam; but they do not want horse cars substituted for the present means of conveyance. The cable car system has given satisfaction wherever tried, and would undoubtedly prove satisfactory here. This system obtains in a number of cities with less population and wealth than Minneapolis. Cable cars are now even running up and down the hills of St. Paul, while the steam motor continues to spoil our straight, level and populous streets."

AUSTRIAN railways at the close of 1887 had reached an aggregate length of 14,032 kilometres, or 8,770 miles. The first line in Austria, the Ling-Budweis railway, was built between 1828 and 1832. The present railway exhibition at Vienna contains an interesting and comprehensive collection of all and every apparatus, carriage or car, used by Austrian railways from their first beginning until the present time. The most interesting division is perhaps the one in which the rolling stock from first to last is shown. The clumsy engine of the North railway, dated 1841, and the post-coach-like carriage of even an earlier date, look strange side by side with the magnificent steam engine, "1888," and a saloon carriage having an outside terrace for the use of passengers and supplied with all the latest improvements as to safety and comfort.

FARES have been returned by some good-natured people in Kansas City, as reported in a previous issue of the GAZETTE, when an accidental delay had occurred on one of the cable railways there. They don't do that in Chicago; the 5 cent does not guarantee any particular distance to ride in the car, and the unwritten agreement in the metropolis on Lake Michigan is that when a passenger going in a given direction pays 5 cents he or she is to ride therefor to the terminus of the cable road, if nothing happens, or get off at any intermediate point he or she pleases; but if the cable happens to become out of order, and the cars come to a stand still, the passengers have to wait until the cable is righted and the cars put in motion, or get out and take what ride they have had for the fare—the railway people do not return the fares and let the people ride any distance for nothing.

Judge Hawes vs. Sumner C. Welch, &c

Technically it is "the people" that prosecut the manager of the accident department of th Chicago City Railway. But Judge Hawes mus have the credit of having made this little prose cution a big case. During two or three adjourn ments of the "investigation," it assumed sensa tional proportions. Now the matter has droppe into its proper level—thanks to the commo sense wisdom of State's Attorney Longenecke Prosaically stated, the case now has reached th interval which precedes the final act in this lega "comedy of errors."

In our last number it was stated how Judg Hawes had ordered S. C. Welch to jail for si months and refused to grant an appeal, becaus the judge feared he could not be convicted the charge (or charges) preferred against hi before an impartial jury. His honor made sur of keeping Welch behind the bars for a full ha year anyhow; but to his horror the Appelat Court ordered the victim's release next day "on writ of error." That equals error No. 1.

In the course of about a week afterward Attorneys Hardy and Hynes (for S. C. Welc and the Chicago City Ry. Co.) discovered a cur ous little trick to fasten the grip of the law upo Mr. C. B. Holmes, together with Lawyer Hard both of whom had been exonerated by Judg Hawes (in his elaborate "opinion" and decisio at the end of his "investigation") of everythir except "passive acquiescence"—in a conspirac that never existed, according to all publishe evidence. The clever judge said a good de that was entirely at variance with that exoner tion, it is true; and he was evidently doubl minded, and the exoneration, it seems, was on a well constructed sentence to hide his real pu pose. At all events Messrs. Holmes and Hard were not "held over" to the grand jury; but th "order of the court" was entered in the court minute book, July 11, thusly: "People v Welch.—Sumner C. Welch held to Crimin Court, bail $3,000.00 and C. M. Hardy and B. Holmes held to Criminal Court, no ba required; this order not to be enforced wit out further order of Court." Mr. Hard declared that that entry in the minute boo had been made "by somebody with malice pr pense." Judge Hawes was seen and they aske him, "What are you going to do about it?" H honor said it was an error of the clerk, and, ta ing a pencil from his pocket, he drew a cro over the objectionable minute. That was error

Judge Hawes brought the case against M Welch before the grand jury July 30. In doi so his honor still held on to "certain agents a servants of the Chicago City Railway Co.," a as a matter of fact the grand jury were aske after all, to return indictments against Mess Holmes and Hardy, but they declined to do s What scheme Judge Hawes may have had draw them in at this junction has not been d covered; but that there was a tug-of-war ov the matter between the judge and State's Att ney Longenecker (who has charge of the prosec tion of the case) became known in a peculi way. On July 31, while the grand jury we considering the matter, "a lively tilt" occurr between Judge Hawes and State's Attorn Longnecker in open court, over a matter th had nothing whatever to do with the grand ju at the time; but in closing its report of t "set-to" between the two great lights of the la the Chicago *Tribune* said: "It is whispered the outside that the display of warmth on t part of both legal functionaries was the result a difference of opinion regarding the Wel bribery case." That was another mistake.

When it was discovered that State's Attorn Longenecker refused to let Judge Hawes lead h by the nose, there was a feeling of great reli and it is expected that S. C. Welch shall ha some degree of fair play when his case comes a proper trial. As we have maintained throug out, there is not a particle of evidence th Welch ever bribed anybody; but a lawyer nam Starkey (who is now in Canada, but is expect to attend Mr. Welch's trial) seems to have brib a juror after a verdict had been given in a c tain case, and possibly Welch may have be more or less cognizant thereof, that is, if a thing was really given to the juror as alleg The circumstances, as related by the juror,

simply incredible; but it is a matter that should be thoroughly investigated; and the grand jury, very properly, returned indictments against Welch and Starkey. We await the result of the trial with confidence.

In leaving this matter where it belongs, it may not be out of place to say a word about the enterprise of a section of the daily press The sources from which reporters get their information were thoroughly poisoned before Judge Hawes started with his so-called "investigation." The Chicago *Times*, *Daily News* and *Mail* promised startling revelations from day to day, but they never came. And it is wonderful how the "press" stuck to the false notion that had been stamped on their minds. The *News*, to out-do its contemporaries, had a lot of special cuts made, giving representations of S. C. Welch in prison, before Judge Hawes sent him there; and three or four of those artistic productions appeared in the earlier editions of the *News* next day, but they were entirely out of place in the evening issues, inasmuch as Welch had been set at liberty early in the afternoon. Then again, the indictments were returned against Welch and Starkey Saturday afternoon, Aug. 4, when Mr. Welch was out of town, and he did not return to Chicago until the following Monday evening. The *News* forthwith published a representation of Welch as if he had flown into Canada; but on Tuesday he walked into court with his bondsmen and gave security for his appearance at the trial, when it comes. In the meantime Sumner C. Welch is looking after the developments of certain claims which several lawyers are cooking against the Chicago City Railway Co. And they heartily wish that their active opponent was either in jail or in Canada. But to their dismay Mr. Welch is still at his post.

The Connelly Gas Motor.

The Connelly Gas Motor which we have mentioned from time to time in these column is now running regularly on the Brooklyn Annex Railway, Brooklyn. Many prominent street railway officials have inspected its operation and pronounce it the most perfect independent motor yet produced. It generates its own gas only as needed, and practical running has verified the claims made as to its economy. Most ingenious mechanism is employed to transmit power from the engine to the car at any desired speed, yet permitting the engine to run at a uniform rate. This has been the great stumbling block in all previous efforts to adapt a gas engine to this purpose. Another important achievement is the concentration of the wear upon two parts, which are interchangeable and can be replaced at trifling cost.

We are informed that the policy of the Connelly Motor Co. is to furnish motor cars complete, at a fixed rental, the cost of operating, including rental, not to exceed half the cost of operating with horses. This plan would provide new rolling stock without requiring any investment. We shall publish an illustrated article on the Connelly system in our next number.

CABLE RAILWAY PRACTICE, Article VI, by Mr. Edward J. Lawless, is held over until our next number.

MR. C. B HOLMES, was away from Chicago when the rumored report was hatched that he was going to sell his shares in the Chicago City Railway Co. On his return he laughed and declared he is there to stay.

483,485 Canal street, New York, is the address given by a certain advertiser in the U. S. Official Postal Guide. It must be a very long street to run up its numbers to the hundreds of thousands! What is meant, no doubt, is two numbers, 483 and 485, instead of 483,485.

The rapid increase in electric railways is shown by the fact that there are at present twenty one bills before Congress praying for franchises for electric railways in the District of Columbia alone.

No better index of the state of business can be found than our Business Notes.

The Brighton Electric Railway.

(From the Electrical Engineer, London.)

Was it not Whewell who first wrote about the martyrs of science? Probably, however, there is a class of men fated to suffer more from their fellow-men than those who are pioneers of pure science, and this is the pioneers of applied science. Archimedes fell under the sword of a common soldier; Galileo fell into the hands of the inquisition. The former lost his life; the latter quibbled, and saved it. In these latter days it is not the life of a pioneer which is at stake; it is his money. The uneducated mob attempted the ruin of Arkwright. We had almost added that an educated mob has ruined a pioneer of electrical engineering. Many readers of the *Telegraph* interested in electrical progress were no doubt astonished to read the other day that another attempt was to be made to do away with the Brighton electric railway. A special meeting of the town council was convened for last Wednesday to consider a recommendation of the Works Committee that the proprietor of the electric railway should be required to remove his plant. It is quite time someone indulged in a little plain speaking on this and cognate subjects. A good deal of opposition has been encountered by electric light contractors to the erection of machine rooms, because of the noise of running machinery. There is some reason for this, and dwellers in private houses may not be blamed for describing a nuisance by its proper name and demanding that every effort should be made to reduce the noise to a minimum. The continued opposition at Brighton is not of this kind—it has no legitimate origin, and proceeds from those whose real object is hidden. Many of our readers do not know Brighton, but they may know that it is almost a suburb of London, a suburb by the sea. Of late years a large number of wealthy people luxuriate in a house at Brighton and would reserve the whole place to themselves. They hate excursion trains and excursionists as the proverbial devil hates holy water. They would make Brighton a second Belgrave square, where corduroy should be unknown and no one permitted to visit who did not put on a dress suit for dinner. Hence anything that tends to popularize the place and attract visitors is an eyesore to those whose aim is exclusiveness. We do know Brighton, and maintain that we are as well able to judge of the allegations made against the electric railway as the *Daily Telegraph*. The *Telegraph* tells us that "the ground is wanted for the new work on the Madeira road." We say distinctively it is not so, and that the contemplated improvements are not on the ground of the railway at all. The Madeira road is a *cul-de-sac*, and never will be an aristocratic resort like the Hove end of the Promenade. The sea wall, from thirty to fifty feet high, bounds one side of the road, on the other is the shingle, and along the edge of the shingle the electric railway runs. The only interference the railway has committed is the removal of a few capstans half-a dozen yards. The ordinary roadway has been improved, by being widened and leveled. The fact is that the opponents of the railroad think any stick good enough to beat a dog with. They have been consistent; and though for a while the supporters of the railway were the stronger, the strain has been too continuous and the supporters are disheartened. Years ago, when "electricity" was the "coming wonder," Mr. Volk, of Brighton, a well-known electrician, had the idea that electricity was applicable as a motive power, and he obtained permission to make this experimental railway. It was the first in England, almost the first in Europe. Electricity was the unknown force then with which the world was to be revolutionized. The few did not want the revolution and preferred to remain "as you were." Notwithstanding the opposition, the line was laid and operated successfully. Mr. Volk was a working electrician, believing in his work, and not only labored but put his whole savings into the line. It was successful and everything promised fair. Nature, however, in the shape of storms, shattered the line and did hundreds of pounds' worth of damage. The opposition, too, had not been idle, but persistently attacked the line at every opportunity; instituted legal proceedings, and ultimately the losses, one way and another, brought the owner into the bankruptcy court. Some friends made strenuous efforts to counteract the opposition, but in the end, from all we hear, the result will inevitably be the destruction of the Brighton line. For the moment, however, a respite has been given, the result of the special meeting of the town council being that it is not deemed expedient to reopen the question of the removal of the railway until the improvements on the Madeira-road lately sanctioned are completed. It might be explained also that the residences above the Madeira-road are wholly out of sight of the railway, so that it forms no bad feature in the land, or rather seascape, as seen from drawing-room windows. The machinery, too, is in what may be termed a cave excavated in the hillside, so that it creates no nuisance.

Such, briefly, is the history of the first electric railway in England. Promoted and constructed by the energy of one man, satisfactorily worked against all difficulties brought forward by pride, prejudice and ignorance, it remains in the unsatisfactory condition we have described. Is it too much to hope that the supporters of the railway will not hesitate to continue their efforts, and obtain some arrangement whereby the founders of this line may be relieved from the worries and anxieties of these constant attacks. It is admitted that the line has been and is an attraction to the eastern end of the town, and we contend that whatever proves an attraction to the town, is beneficial to the business portion of the town, and this is far more important than that a few moneyed men should have the exclusive right to a mile of beach and a sheltered promenade.

American Street Railway Association.

EXHIBITION OF STREET RAILWAY SUPPLIES AT THE WASHINGTON CONVENTION.

"I have always felt that an exhibition of improvements in devices pertaining to the construction of street railways would be the most valuable part of the annual meetings of the Street Railway Association, and have so expressed myself frequently to members of the Association, all of whom agreed with me," wrote Mr. F. Brownell, president of the Brownell & Wight Car company, recently. We have much pleasure in announcing that the Executive Committee of the Association have made arrangements for a full exhibit of street railway cars and all devices and supplies for operating them in connection with their Washington convention next October.

The following is Mr. Secretary Richardson's letter pertaining thereto:

Office of the American St. Ry. Association,
BROOKLYN, N. Y., August 9, 1888.

Editor STREET RAILWAY GAZETTE.

My dear sir:—I desire to inform you, and through you the street railway community, that this Association has this year provided unlimited accommodation in connection with the hotel (Willard's) at which the annual meeting will be held in Washington, commencing the third Wednesday in October (the 17th), 1888. The inside accommodation secured is Willard's Hall, and that will be in the exclusive charge of Henry Hurt, Esq, president of the Washington and Georgetown Railroad company. A diagram of the Hall, as it has been spaced off for the occasion, is sent herewith. Application should be made direct to Mr. Hurt, at Washington, specifying the size and the character of the exhibit; that it may be duly classified and properly displayed.

The hall has been secured for the entire week, in order to provide for the proper reception and shipment of exhibits. The outside accommodation will be the streets on either side of the hotel, so that car manufacturers and those with exhibits too large for display in the hall can be accommodated on the street. There will, of course, be no charge for space to any exhibitor at this exposition.

All dealers in street railway supplies of any description who desire to take part in this exposition should communicate at their early convenience with Henry Hurt, Esq., president of the Washington and Georgetown Railroad company, Washington, D. C.

On behalf of the Association.

WM. J. RICHARDSON, *Secretary.*

Messrs. Burnham, Parry, Williams & Co., Baldwin Locomotive Works, Philadelphia, say, "We will endeavor to have a motor ready for exhibition at that time."

Messrs. Ries and Henderson, of Baltimore, will make a greater show than they did at Philadelphia last year.

We are authorized to state that the Thomson-Houston Electric Co., will exhibit their electric railway system.

The Pullman Palace Car company will send a couple of cars.

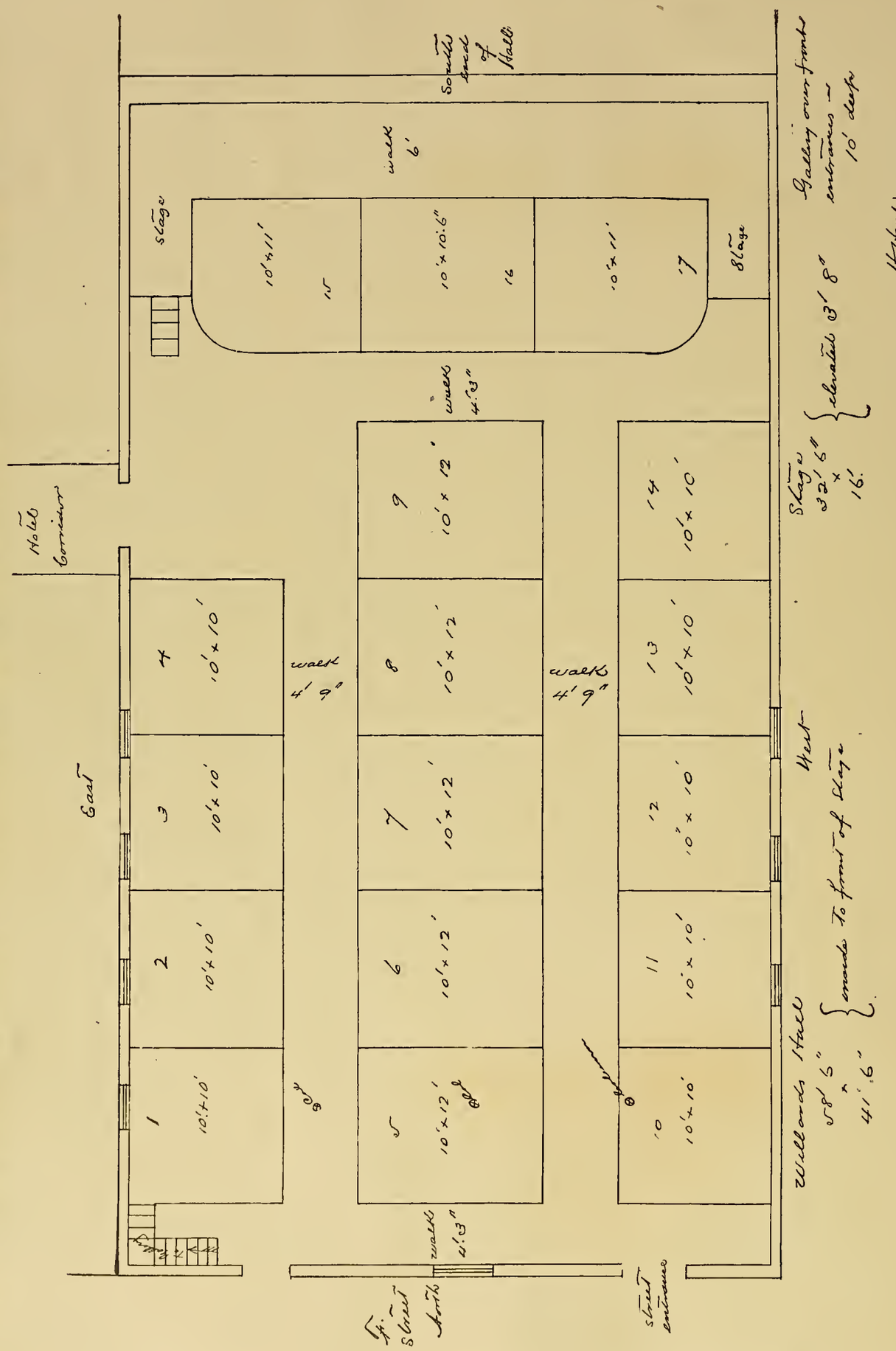
The Palmyra Manufacturing Co., will send a Prosser Locomotive, if possible.

Mr. Wm. Wharton, jr., will be there with two or three storage battery cars. What has been done in this department is told in our Business Notes, under the Electric Car company of America.

Major Blodgett will exhibit the Railway Register company's registers without failure.

We shall be glad to hear from other prospective exhibitors. And in congratulating the manufacturers and dealers of street railway supplies, let us observe that such an auspicious opportunity may not occur again for many years. The American Street Railway Association may continue arranging for similar exhibitions at all future annual meetings, but this is at Washington, which enhances its importance fifty-fold.

Exhibition Spaces, Willard's Hall, Washington, D. C., During the Seventh Annual Meeting of the American Street Railway Association Opening October 17, 1888.



What is Electricity?

What electricity really is, nobody knows. : has been usual to call it the electric *fluid*. lectricians of the present day ignore that term s inapplicable. Symmer proposed a "two-fluid" ieory, presuming there are two kinds of fluids, nd that they neutralize one another when com- ined, but have their condition disturbed by fric- on. Franklin proposed, instead, a "one-fluid" ieory, saying there is a fluid distributed uni- ormly through all substances, but which becomes nequal by rubbing. That is, it was supposed iat by rubbing two different substances together, ome of the electric fluid passed from the one to ie other, and hence the extra quantity was alled the *positive*, and the reduced quantity the *egative* electric fluid. But they could not tell hich was the negative, or which the positive. nd, as already stated, the fluid theory is now bsolete.

The molecular doctrine, first distinctly upheld y Faraday, is the orthodox one now-a-days. nd it is supposed that an electrical condition is ie result of a certain peculiar state of the mole- ules of the bodies rubbed, or of the æther which believed to surround the molecules. A recent uthority says, "There is much to be said in avor of this hypothesis, but it has not yet been roven."*

The sum and substance of all that has been aid and written about electricity is, that by doing ertain things, there are certain results. And ecent electrical developments have aroused the ariosity and favorable attention of the world general, and of the civilized countries in articular; so that students in various branches electrical applications are becoming numerous. ls found that electricity is produced by pre- ssion, compression, heat, chemical action, hysiological action, contact of metals, and other eans, as well as by friction. Even by rubbing a ece of paper between a positive and negative ubstance — such as the hand of a healthy person, ith a silk hankerchief interposed, and a brick all, or any other non-conductor electrical ad- esion is produced. The electrical transmission energy was discovered quite accidentally.

This story, says one of the leading electrical riters of our time, "is romantic, but disappoint- g to a true lover of science, who would prefer believe that a grand discovery was the logical utcome of the working of a powerful intellect, nd not the result of accidental meddling on the art of an ignorant workman." And, in fact, ere is another version of the story, giving more edit to "powerful intellect," and showing that e result was attained along a scientific path, eliberately taken. But it is the usual way for inventors" to tumble into a discovery rather an find it out by pursuing a scientific path.

Anyhow, it was not until 1879, at the Berlin xhibition, that railway cars was first operated the electrical transmission of power. The ectrical exhibition at Paris, in 1881, afforded opportunity to demonstrate, before the world, e applicability of the electrical transmission of ower for multifarious purposes. And now the rrent from dynamo-electric machines, is used r driving motors for sewing machines, lathes, aners, drills, hammers, rock-drills, saws, pumps, evators, etc., as well as street railways.

Some half a dozen companies are now specially gaged in equipping and directing the opera- on of electric railways, and over a hundred ies will be electrically propelled in all proba- lity before the end of next year.

The Broderick and Bascom Rope Com- ny have been supplying ropes to cable ilways hardly a year yet. Since December last ey have supplied cables to the following roads. t. Auburn Cable Ry. Co. Cincinnati, 44,000 ft. ncinnati Street Ry. Co 27,000 ft. ble Tramway Co., of Omaha, Omaha 47,000 ft. oples Ry. Co. Kansas City 34,000 ft. . Louis Cable & Western, St. Louis 35,400 ft. issouri Ry. Co., St. Louis 37,000 ft. tizens Ry. Co 53,000 ft. This is really "pretty good record for a new ncern." Not one of their ropes has yet worn t. They have sent us a piece cut out of a pe that has been in operation four months. t a wire in the rope is yet broken, and it shows t little signs of wear.

*Dr. Silvanus E. Thompson, (1885).

The New Ries Electric Railway Patents.

Mr. Elias E. Ries, the well-known Baltimore electrician, has recently taken out four patents on electric railways. Mr. Ries is an advocate of the underground conduit plan of operation for large cities, and the patents just issued cover broadly several new departures and important improvements in this class of electric street railways. The difficulties that have so long opposed the introduction of the conduit system on anything like a practical scale, viz., the lack of perfect insulation of the conduit conductors under all conditions of the weather, the interruption to traffic by reason of defective drainage, and accumulation of slush or water in low-lying portions of the conduit, the difficulty of "cutting out" sections of the conductors and of making connections or repairs while the line is in operation, etc., have been entirely overcome, he claims. In addition to these electrical requirements, Mr. Ries has devised his conduit with special regard to economy and simplicity in construction, compactness and durability, sufficient mechanical strength to safely withstand the heaviest street traffic, and capacity for long continuous service without attention or repairs of any kind.

These patents describe and illustrate conduits of various kinds adapted for different conditions of city and suburban traffic, one form being of such shallow depth that, while retaining all the advantages of the deeper conduits in the matter of drainage, etc., it can be readily and securely placed in position complete in the space between the street surface and the top of the cross-ties on lines of railway already in operation, without interruption to travel, and at a cost but very little in excess of that of a good overhead conductor system, the inventor maintains. He employs an ingenious arrangement of current collectors, which entirely obviates the objectionable "flashing" due to defective contact, and permits the placing of the conduit conductors very near the street surface, an advantage of the utmost importance not only because of the economy in cost of construction that this plan presents, but because it permits the extension of a cheaper form of the same conduit to suburban roads at a cost less than that of an overhead system of similar capacity. Double insulated conductors are employed throughout, and no portion of the track rails or conduit structure forms any part of the electric circuit, thus rendering the system absolutely safe. As the conductors in a conduit system can be made larger than permissible in an overhead system, the electro-motive force of the current is materially reduced, that employed by the Ries system being about 300 volts. The issue of the patents referred to, in view of the active interest at present manifested by railway men in the subject of electrical transit, will doubtless give a considerable impetus to the commercial introduction of electricity as a motive power on our crowded streets.

What it Takes to Feed a Locomotive.

It will perhaps interest some readers to know how much fuel a locomotive burns. This of course depends upon the quality of fuel, work done, speed, and character of the road. On freight trains an average consumption may be taken at about 1 to 1½ pound of coal consumed per car per mile. With passenger trains, the cars of which are heavier and the speed higher, the coal consumption is greater. A freight train of 30 cars, at a speed of 30 miles per hour, would therefore burn from 900 to 1,350 pounds of coal per hour.—From "American Locomotives and Cars," by M. N. Forney, in *Scribner's Magazine*.

Cables disordered or breaking cause much grumbling, and naturally if not righteously so. The new driving machinery and cable on Brooklyn bridge "took a rest" when thousands of people were waiting to be carried, after their days work, from New York to Brooklyn, August 2, stopped at 6:40 p. m. sharp. The new North Chicago cable almost seems to know when the crowds come, and it has stopped most provokingly a little after six p. m. more than once.

President Henry Whitney, West End Street Railway Co., Boston, is said to have become a confirmed convert to electricity for street car propulsion.

Urban Rapid Transit.

By Col. S. W. Nickerson.

It goes without saying that increased facilities for rapid transit are urgently needed in our large cities. "Time is money," and every moment saved in passing to and fro, within a city, makes that city more productive, richer, and its inhabitants happier.

The horse railroad was a step in the right direction, and though not developing much speed, its convenience recommended it for short distance travel. It is still entirely adequate for the traffic of small cities, though doubtless animal power will be superseded by electricity. The cable road has proved itself (under circumstances favorable to it) to be an improvement over the horse railroad, and to be another step in advance. It meets all the wants of cities of the second class, if the streets are not too crooked, and the intersecting streets, on which there is also passenger traffic, are not too many. A great per cent. of the power generated is expended in moving the cable, overcoming its friction at curves and angles, leaving but a comparatively small part of the power for traction purposes. The cable road seems to be particularly successful on broad, straight streets, and on heavy grades, though it occupies much the same relation to rapid transit that the canal does to the steam railway.

When, and I think the time has already come, in climates without ice or snow suitable for its use, electricity, stored on the street car it propels, or carried from a generating station by an overhead wire to the car, is adopted as a motive power, its adoption will give results superior to the cable.

But for obvious reasons no form of *surface transit* in the crowded thoroughfares of a great city, can be made *rapid transit*—accelerated surface motion can be attained, but nothing more. Facts are facts and we must meet them as such. Let us try to do so.

The *speed* necessary for *rapid transit* can only be attained *under* the surface or *above*. I am no advocate of the underground plan; and I think *above* the surface is the proper place to solve the rapid transit problem. And until the growth of a city warrants the erection of enormous viaducts of masonry through blocks of buildings, spaning intersecting streets by great arches, there is only one way above ground, *i. e.* elevated railways over the streets. And to the sentimentalists who complain of injury to the beauty of a city, it must be answered that utility must be put before aestheticism and that the comfort of the people and the saving of their time are of paramount importance; reminding these critics, at the same time, that there are many objections to life in great cities, of which "L" railroads are not the greatest, the advantages of which more than offset the disadvantages.

There were in New York city, in 1886, about 84½ miles of track, operated by the Manhattan company, which carried 115,109,591 passengers during the twelve months ending September 30th, of that year. During 1887 were added a few more miles of track, mainly sidings and switches, and about 160,000,000 passengers were carried. Indeed, the number of passengers now seems to be only limited by the capacity of the roads, being at present at the rate of about 200,000,000 passengers, and there is a want, loudly asserted by the people, for more facilities for passenger traffic, because of the inadequacy of the "L" roads and the surface roads together, to accommodate the public. As we read, a committee of twenty-five of the leading public spirited citizens and capitalists of New York were in session at the Murry Hill Hotel, considering the means of additional rapid transit; and they seem to favor more "L" roads, if viaduct roads cannot be had. So much for these roads in New York city.

The Brooklyn elevated road carried over its 13 miles of tracks 10,158,665 passengers during the same period. It appears that in November, 1887, 37,691 was the average number of passengers carried per day, against 33,380 in the previous November. During the last three months of 1887, 3,472,019 passengers were carried—a rate, if continued, that would give a passenger traffic of about 15,000,000 passengers per year, and there is good reason for expecting this increase, in a single year of nearly 50 per cent. will be exceeded during 1888. Such figures in-

disputably establish the popularity and utility of these roads; and that they *pay* handsomely, at the present low rates of fare, we shall now see.

From the point of view of the capitalist we find the actual cost of constructing and equipping the 80 odd miles of "L" roads in New York was $22,683,253.14, which is now represented by $24,367,645 of stock, paying six per cent. dividends annually; and more than $30,000,000* of bonds, upon which six per cent. interest is annually paid. In other words the operation of a system that cost say $650,000 per mile of track equipped and including stations, is now paying six per cent. interest and dividends on over $1,300,000 per mile. Yet the Manhattan company has a surplus.

The Brooklyn "L" road is now paying six per cent. on $3,500,000 of its bonds; and has been paying three per cent on the remaining $1,250,000 of its bonds, which latter rate becomes five per cent. after July 1st, 1888. On September 30th, 1886, a deficit for the nine months past of $38,036.16 was shown; but as the road showed a surplus, for the quarter ending December 31st, 1887, of $6,378.70 it is evident, since the floating debt is small, that the road will soon be paying dividends on its $5,000,000 of stock. The return from "L" roads built honestly would, therefore, be very great, and is large upon even the present basis of high capitalization.*

Turning our attention now to their effect upon property, for I fancy I can hear the objections to "L" roads still declaring that property is injured by them, we shall see that not only do they benefit property along their line and elsewhere, but that they also actually benefit the surface railroads—paradoxical as this last statement may seem. That we may not become confused, and for convenience, we will consider the effect upon real estate first; and that upon the surface railroads subsequently.

The testimony of the real estate owners shows that the elevated roads have greatly enhanced the value of property—"with the exception of a few cases, but the whole amount of such depreciation would not equal a tenth of 1 per cent. of the value it has added to other properties." Moreover, large owners of valuable property upon Broadway—that great artery for the circulation of our greatest city—distinctly favor an elevated road in that thoroughfare, if certain improvements in the style of road built and in the motive power were to be made. Thus, Mr. O. B. Potter, as appears in the New York *Tribune* of March 30th, 1887, says:

"I am in favor of an elevated road in Broadway provided there be no wooden crossties, but light steel ones which will not obstruct the light; that the motor shall be cable or electricity, if it shall be demonstrated that this is a feasible power to be used; and that the tracks shall be placed over the middle of the street and the columns at the curb. Such a structure, to my mind, would afford precisely the kind of rapid transit which Broadway needs; it would make it possible for business men to go up and down Broadway with rapidity and ease, whereas it is impossible to do so now in the surface cars in that part of the city where it is most needed by business. I own a good deal of property in Broadway and I think such a road would benefit the property and the street, making it a greater business thoroughfare. A structure built as I have described would not interfere with light or with traffic, and it would be almost noiseless. I think it would greatly help to solve the rapid transit problem in this city, and I believe that a majority of the property owners favor such a road."

Nothing can speak like figures. The following statement says a great deal in small compass: The period between 1876 and 1879, being that in which the L road system was in its infancy, is compared with the later period from 1881 to 1884:

	Valuation.	Increase.	Per cent.
1876	$892,428,165	--	
1879	918,134,380	$25,706,215	28
1881	976,735,199	--	
1884	1,119,761,597	143,026,398	14

* Some bonds have been recently issued, the exact amount of which I am ignorant, but it is sufficiently accurate to say the bonds and stock of these roads are *more than half 'water'* The earning capacity is so great however, that the bonds are above *par*, while the stock is a little below.

In the face of such figures it cannot be denied that "L" roads benefit property.

We come now to a portion of our inquiry of special interest to the readers of the GAZETTE. At the outset, permit the positive assertion to be made that the surface railroads are actually benefitted by rapid transit. This assertion may seem ridiculous, but it is founded upon principles now clearly demonstrated, and is overwhelmingly proved by facts.

So far from the "L" roads diminishing the traffic of the horse railroads, it is the fact that five of the latter roads carried in 1886,—116,864,443 passengers, or 1,754,852 more than the elevated roads. The important principle is thus brought out by the experience in New York that the amount of travel on city railroads increases in proportion to the facilities furnished and it can be readily shown by statistics that not only does the travel increase with the natural growth of the city, but that the rate of growth of the travel, as well as the absolute growth, increases, while also the average length of the trips increase. These considerations show the difficult nature of the problem. If the passenger traffic be divided into short distance travel and long distance travel, i. e., distances over a mile, it will be found that, with greater facilities for the latter, the more there is of both, in other words, give people speed and ease in travelling long distances, and they will wish to move, and do move, short distances oftener. Moreover, "L" roads relieve surface railroads of the long distance passengers whom they carry with no profit or at a loss, while they increase the number of short distance passengers whom they carry at a profit. It is conceded that a long route gives no profit to a surface railroad at the ordinary five cent fare, unless several sets of passengers can be carried on each car in the course of its trip; the cars makes in effect a succession of short trips, one beginning where its predecessor ended. But we will not pursue this line of thought farther; it is enough to say that surface railroads — both those parallel with, and those running across the directions of the rapid transit lines — should treat the latter as friends, not as foes; should aid them, rather than oppose them.

It is incontestable, however, that the "L" roads built in New York are very cumbersome and have many objectionable features; that they are not the safest kind of roads possible to construct — though they have enjoyed a wonderful immunity from accidents, considering the number of trains and of passengers; that the smoke poured forth from their locomotives into the air, and the cinders they scatter are annoying, to some extent even injurious; and that they obstruct the light, air and space somewhat. Let us, therefore, pass to a consideration whether the objectionable features cannot be wholly or largely eliminated; and whether the roads to be erected in the future cannot be great improvements over those now in use.

The opponents of "L" roads now ask "Why didn't they do all of this when the Brooklyn roads were built?"—thinking to score a great point, and add, "They were built long after those in New York—several years after." The reply is, because it was intended to run cars across the Brooklyn bridge from one city to the other interchangeably—a precious idea in theory, but utterly impossible of realization, because of lack of the necessary switching facilities and space, as any practical railroad man would at once see. Now these New York and Brooklyn "L" roads are nothing but ordinary standard gauge steam railroads running upon iron bridges supported by iron posts—in some cases the posts are in the street, in others on or near the curb, there being about fifteen miles of single post structure, or 'one legged' road in New York city. In 1878 a commission appointed by the authority of the city of Brooklyn, the chief consulting engineer of which was no less a person than Gen. Newton, until recently and possibly still commissioner of public works of the city of New York, after a careful, painstaking and intelligent investigation, rendered an elaborate, broad-minded and able report, favoring a system of road other than those in successful operation in New York (or any mere modification of them like that in Hoboken and Kansas City)—a system in which a central rail, supported by girders leaning towards one another and meeting at the top, bo most of the weight of the train, there being ligl rails below the main centre rail on either sid upon which ran balancing wheels. It was thoug such a system would give greater safety from d railment, for the cars which were "double dec ers" or two-storied, rested on the structure muc as a pair of saddle-bags rest on a horse's bac and that other valuable advantages would b gained.

What are these advantages—essential requisit of the "L" road for to-day? Has a syste embodying them been developed and i details perfected; or is the general plan f vored in this report, while it was in a crude for (as shown by a piece of track at the centenni exhibition), yet unimproved? Most emphatical it can be truthfully stated, that the valuable fe tures of that road have been incorporated wi others, while its crude ideas have been develope and practically worked out with the most elab rate attention to detail and a provident cautio almost philanthropic, so that now a system exis having all the desiderata of safety, speed, conv nience, economy in cost and operation, with oth important but minor requisites, ready for the u of, and to benefit mankind. It is a syste whose structure is better adapted to bear burden though the rolling stock is lighter with less po sibility of derailment (the centre of gravity bei much lower, and for other reasons), so made th speed as it increases decreases the lateral sw or oscillation, and so also decreases the pos bility of derailment, the car floors being near the street and thus easier to reach, yet leavi the street as unobstructed as now, and costi withal but three-quarters the sum for which t New York roads could be reproduced; and ha ing electricity as the motive power, does aw with smoke, cinders, and oil drip—the electrici being carried by means of the centre rail (us instead of an overhead wire, as well as to bear thr fourths of the weight of the train) to the motors a tached to the forward truck of every third car the two side balancing rails being insulated a furnishing the electric circuit. It is this syste whose operation is so noiseless, and which o structs space and light and air but one-half what done in New York, that is to be contemplat hereafter where one is asked to sanction t erection of elevated railroads.

It is true there have been many elevated pla invented, some of which have merit enough the public and superficial eye, and some to t skilled and penetrating eye even of the engine to give them some vitality, and to form t foundation of extravagant claims of excellence there is but one system actually combining the essential requisites, and backed by amp capital ready to build and equip a road, the se eral component parts of which will be guarante by the strongest companies in our country their respective fields of manufacture, includi electric motors. There is a best of everythi

It would be interesting, perhaps, to disc the details of the above system, and I may do at some future time, but perhaps I have alrea wearied your patience too much.

"PALACE" street cars for suburban tra are being constructed at the Pullman works, w longitudinal seats (back to back) along center car, and a smoking compartment with se around the sides and ends. Each of these c will hold about one hundred passengers—o third being in the smoking compartment.

CLAIMS are numerous just now against t Chicago City Railway Co. It was expected t the faithful hustling watch-dog of the accide department would have been muzzled ere t and the lawyers anticipated a walk-over with t 45 suits at present pending against the compa One party only asks the modest sum of $4 four ask $500 apiece, two want $1,000 each, t want $2,000, one wants $3,000, eight claim $ 000, one asks for the odd sum of $6,000, six mand the respectable sum of $10,000 each, c asks for $12,000, one wants $15,000, while 13 for $20,000 apiece, and four request $25, each, and one goes so high as $30,000. It be noticed that the "damages" claimed aver much less than the sums generally claimed breaches of promises of marriage.

reat Improvement in Cable Railways.

From 12 to 14 months wear is hitherto considered fair average life of a cable hauling street ars. And this rate of "mortality" of cables is s noticeable as that man's span of life is threecore-years-and-ten, no matter what system is sed. A great improvement is about to be announced. The next issue of the STREET RAILWAY GAZETTE will contain an important article n the stretching of cables.

CORRESPONDENCE.

CINCINNATI, August 1st.—George B. Kerper, resident of the Walnut Hill cable and other nes of street railway here has bought the Iain street line of Findlay, O. Mr. Kerper has lso come into control of the Wyoming Place ailway of Findlay, and now has a controlling nterest in pretty much all of Findlay's fifteen iiles of street railway. To the STREET RAILWAY GAZETTE reporter, Mr. Kerper said that e would build a two mile extension north on the Iain street line this fall. He contemplates uilding about six miles of new lines next year.

It is just a year since smoking was entirely rohibited on all cars of the Cincinnati Street ailway Company. Several of the lines here otably the Walnut Hill and Mt. Auburn cables, in smoking cars for the convenience of the ublic. Not so the Cincinnati company; smokig is not permitted upon any part of any f its cars.

The Cincinnati Street Railway Company has ot the right of way to build an electric line in ayton, O. Work was begun upon it last month, it two other street railway companies of that ty, who saw in the stranger a formidable rival, once placed a couple of injunctions upon it. he electric people got a dissolution of the inctions and at midnight a force of workmen ider Reed Weizenecker, the civil engineer of is city, began laying tracks along Main street, er the disputed territory. About noon, the ext day, when all but three hundred feet of the acks of the electric line had been laid, the rival mpanies again stopped proceedings with an inction, and for several days there was lively rambling in the courts, and the citizens, be it id to their credit and good sense, are in favor so progressive a step as an electric road, and course are on the side of the Cincinnati people.

The projected "cross town" route to enable e patrons of the cable roads quick means of aching the Centennial Exposition, has been andoned, and instead the Cincinnati Street ailway Company has placed a greater number cars of a special and tasty design on the ads already reaching the Exposition grounds.

The thousands of strangers who have been in incinnati the past few months, attending the ational Conventions of the Labor parties, the eeting of the Elks, the K. of P. conclave, Oddllows cantonment, the Exposition and the fall Babylon, often expressed their appreciation of e street railroad facilities and the cheap fares. n the occasion of the four great parades held ere this summer, the participants were astoned at the magnanimity of the railroad comanies, everyone of whom stopped running rs during the progress of the parades.

Geo. B. Kerper, before the summer is over, ll be the best known and most popular man in e Ohio Valley. He is one of the fifteen Comissioners of the Centennial Exposition, and as ch every fifteenth day he acts as officer of the y of the Exposition. To those familiar with e Colonel's bald head, and the humor that rks beneath the two hairs that, Bismarck-like, and sentry on the very top of his cranium, it ll be almost needless to say that the "Kerper ays" are memorable ones, and not likely to soon forgotten.

A NEW electric motor has been brought out Dr. O. Lugo, of New York, which is claimed have a higher efficiency, proportionately to st of construction and weight, than any herefore devised. It consists of an armature comsed of a number of bobbins having core and le pieces, surrounded by field magnets consistg of similar bobbins. It is based upon the ct that if two solenoids, with cores and pole ces, are placed parallel and energized, there ll be an attraction between the pole pieces and e coils.

Our Card Basket.

MR. JULIUS S. WALSH and family are at Eureka Springs, Arkansas.

MR. JOHN J. BRODERICK, president of the Broderick & Bascom Rope Co., is in California.

MR. SIDNEY S. SHORT was met in Cleveland the middle of July.

MR. MCHOSE (McHose & Lyon) was met in Springfield, O., the latter part of July.

MR. HORACE A. KEEFER was met in St. Louis last month.

MR. JOSEPH D. BASCOM spends his vacation fishing in the Northwest.

MR. C. B. HOLMES is reported to have purchased, for $250,000, all the street railways except three in Davenport, Ia., Rock Island, Ill., and Moline, Ill., with the view of consolidating them and operating all under one management.

MR. WINFIELD SMITH, president of the Cream City R.R. Co. is in Europe; but will return before October.

SECRETARY WM. J. RICHARDSON shortened his vacation considerably in order to complete adequate arrangements, as soon as possible, for the street railway exhibition in connection with the seventh annual meeting of the American Street Railway Association at Washington next October.

CAPT. HALLETT, consulting engineer and sales department manager of the Hazelton Tripod Boiler Co., is at Denver, Colo., combining business with pleasure.

MR. WILLIAM W. ARMSTRONG reports that he will at once erect a manufactory to build electric cars at San Francisco, Cal.

MR. C. H. MACLILIE, of Chicago, Ill., has entered the service of the Sprague Electric Railway & Motor Co., through its New York State agency (Mr. E. E. Higgins, manager), and will work in Eastern New York. Mr. Maclilie is well known in this section, being formerly connected with the "Electrical World;" and more recently with the Hauss Electric Co., in the capacity of general selling agent. He is a young man of excellent business connection, and will be a decided acquisition to the young and energetic agency with which he is connected.

MR. JOHN C. HIGDON, the mechanical expert and patent attorney of the Kansas City patent agency, is now located in Washington, D. C., room 29, St. Cloud Building (opposite U. S. Patent Office). Mr. John E. Higdon is in charge of the Kansas City office (rooms 55 and 56 Hall Building).

MR. CLIFT WISE, who recently resigned his position as chief engineer of the Kansas City cable railway, in order to undertake the engineership of the St. Paul cable railway, is now located at St. Paul, Minn.

MR. J. C. ROBINSON, the expert tramway builder and manager, has returned from his "Southern trip" and is taking a few days rest with his family at New Orleans. He proposes visiting Chicago about the 20th inst.

THE HON. KIRK HAWES, judge of the superior court of Illinois, started August 8 for a month of much-needed rest with his family, at St. Clair Springs, Michigan. That was where Mr. Sumner C. Welch was reported to have been when he was telegraphed for from Chicago, August 4.

CHARLES CROCKER, president of three or four cable railway companies in San Francisco, Cal., is dying rapidly. He is 66 years of age, and has been ailing for a year. His life has been prolonged hitherto by eating coarse diet; and he laments the irony of fate, which has given him millions of money, and compels him to eat bran like a horse or die.

PROF. DAVID SWING, Chicago, writes to his *Dear Journal* from Cincinnati, saying: The traveler who would know the togographical truth and beauty of Cincinnati must take a car which will carry him up to some hill summit. All these peaks are reached by inclined planes, up and down which are carried the street car, its horses and passengers. The dumb brutes walk on the platform with a manifest gladness that steam is going to help them up a hill a thousand feet long and fearfully steep. Upon several of these peaks are rather elegant beer gardens, from which those whose eyes are not befogged by twenty glasses can see the entire city and several miles of the Ohio river.

NEW PROJECTS, PASSING EVENTS, &c.

ALABAMA.

Mobile.—Engineer Charles Perry is now surveying the Spring Hill dummy line. As soon as his labors are completed the work of construction will begin, and will be rapidly pushed to completion.

ARKANSAS.

Little Rock.—The City Electric Railway began running trains July 4. The equipment is to be increased forthwith.

CALIFORNIA.

San Francisco.—The Howard Street Cable Railroad Company is pushing its ambitious and important undertaking. With a force of 250 men under the supervision of George W. Douglas, the superintendent, work was commenced at Nebraska and Twenty-fourth streets a few weeks ago, and prosecuted with vigor to such an extent that one track is now complete as far as Seventeenth street, and the other is more than half finished. All the steel yokes, rails, switches, revolving wheels, etc., are being manufactured at the rolling mills at the Potrero. To propel the nineteen miles of wire rope necessary for the road two engine houses will be erected, one on the corner of Howard and Tenth streets and the other on Broderick and Oak streets. Each will be constructed of brick and iron, three stories in height. The one on Tenth and Howard streets will have a frontage of 135 feet by a depth of 165 feet. The house on Broderick and Oak streets will be much larger. This will have a frontage of 225 feet by 138 in depth. The entire cost of the work is estimated at $1,600,000. The work on the Howard street line is naturally slow, in consequence of the company keeping the horse-cars running on the side of the street where the work is going on.

CONNECTICUT.

Meriden.—The night of July 10 the first electric car in this city made a trial trip. Soon after 12 o'clock the car to be used was drawn out of the car sheds and placed upon the track in front of the office, and the party took their places. Those in the car were President George R. Curtis, Secretary C. L. Rockwell, of the electric road; James D. Frary, of Bridgeport, formerly of Landers, Frary & Clark, of New Britain; D. W. Crippen, and four representatives of the local press as invited guests. Messrs. F. H. Strieby, F. H. Reed and W. C. Reed, representing the Daft company, managed the car. The car moved with great ease up grades and showed its capabilities. A local paper has this to say of the trip: In every particular the trial showed that the Meriden gentlemen to whose enterprise the city is indebted for the road, had made no mistake in adopting the plan that they have. The first trip was made under the difficulties of new machinery, a new motor and new car, and it would not have been more than was to be expected if some hitch had occurred under the circumstances. Yet there was not the slightest difficulty in any particular. The fact shows pretty conclusively the excellence of the system, and Meriden can shake itself by the hand in congratulation.

DAKOTA.

Watertown.—The grading of Mr. Chas. Joscelyne's motor line is progressing rapidly. The city council July 23 renewed the twenty-year franchise which was granted last year. Mr. Joscelyne has purchased iron and equipment at at Detroit.

FLORIDA.

Ocala.—Mr. D. A. Miller, having organized a street railway company, has applied for a charter to construct a line and operate it with horses, steam, or electricity.

ILLINOIS.

Chicago.—The wire-rope of the South Side loop of the North Side cable railway has given much trouble, in various ways, since it has been in operation. During the small hours of August 3d, a new rope 1½ inch diameter (instead 1¼ inch) was put in. This is same size and quality as the Brooklyn Bridge cable.

The $100,000 bond was deposited with the city treasurer July 19, by the Chicago and South Side Rapid Transit company, and a batch of condemnation suits have been instituted to secure properties for their alley elevated railway.

Work will be begun at once on the West Side cable railway.

The Chicago Electric Motor company has been incorporated. Capital $30,000; for the manufacture of electric machinery and appliances; incorporators, R. H. Garrigue, J. C. Seroggs, J. H. Caswell, and H. S. Tiffany.

INDIANA.

Indianapolis.—The fact that Gen. Harrison, the Republican candidate for the Presidency, lives here, throws everything else to the shade for the time being, else the victory of the Chicago syndicate (with Mr. C. B. Holmes at its head), who recently purchased and took possession of the street railway system here, would have excited greater admiration than it has perhaps. As reported in previous issues of the GAZETTE they met with curious opposition and were restrained from proceeding with their extension by the city authorities. On July 18, the Superior Court decided that they have the exclusive rights to all the streets of the city and can lay tracks and run cars upon as many of them as they please without asking permission of the city council. The court gave the city attorney a severe rap by saying: "The argument of the city attorney that under such a construction the company would enjoy an unlimited monopoly of the streets would have been used to better advantage before the council in 1865 than before a tribunal of law in 1888." The company will finish the Market and Alabama street lines, and the council will doubtless content itself with amending the ordinance so as to have something to say in similar cases in the future.

President Holmes surveyed the ground, with Superintendent Shaffer, July 20, and decided to spend $100,000 in improvements forthwith.

The Chicago syndicate which now owns the Indianapolis street railway system includes S. W. Allerton, who has $250,000 of stock; Cyrus H. McCormick, $200,000; Marshall Feld, $100,000; and S. B. Cobb $100,000. There are several blocks of from $10,000 to $25,000 held by other Chicagoans, mostly Board of Trade men.

IOWA.

Council Bluffs.—The Council Bluffs and Omaha Rapid Transit Co., who have contracted for the Thomson-Houston electric system for their railway across the Missouri River, are negotiating with the Pullman company for vestibule trains.

Des Moines.—The forfeiture of the horse railway franchise having ousted the narrow gauge company from the field, as stated in the July GAZETTE, the Capital City St. RR. Co. have obtained exclusive rights for electricity for ten years, and they have closed a contract with the Thomson-Houston people for the equipment of 8 cars with electric motors, forthwith (seven more cars to be supplied later). The overhead (single wire) conductor will be used. Length of road is seven miles, to be in operation by Sept. 1st.

Mr. Frank A. Sherman, secretary of the Des Moines St. Ry. Co. (narrow gauge) informs us that his company will not tamely submit to being ousted, and will contend for their rights in due course.

KENTUCKY.

Louisville.—The electric railway here is to be pushed to completion as rapidly as possible.

LOUISIANA.

New Orleans.—The Streets and Landing committee July 23d, refused to approve the granting of a switch track to a railroad company on Tchoupitoulas street on the grounds, for one thing, that it would obstruct the street cars.

Mr. Delavigne brought up a resolution to have the tracks of the New Orleans City and Lake RR. Co. on Catlin's lane replaced in the center of the street, and proper gutters made.

ELECTRIC RAILWAYS.

Since the committee on streets and landings has taken up the question of electric street railways it proposes going deep into it. It proposes investigating the various modes of electric propulsion for street railways. The pole question is also a serious one, as some of the members of the committee believe that the council has no right to grant permission to put up any more poles in violation of the Hart tower ordinance. Another point suggested by members of the committee is the fact that the electric motor will very much cheapen the cost of operating street railways, and in view of the benefit to the companies, whether the city should not be remunerated proportionately.

MASSACHUSETTS.

Boston.—The Sprague Electric Railway & Motor Co. have closed a very important contract with the West End Street Railway Co., of Boston. The present equipment will consist of twelve miles of track and twenty cars, and everything is to be as complete in all its details as possible, with ornamental iron poles, etc., etc. This is considered one of the most important contracts ever made for electric railway equipment.

Crescent Beach.—The Thomson-Houston improved motor is working admirably on the new electric railway here. The road was inspected the first week of this month by a large party of capitalists and electricians, who are specially interested in the now rapidly developing department of electric railways. An explanation of the system was given by Mr. G. W. Mansfield, and three cars were handled in various ways to show the convenience and flexibility of the system.

Lowell.—The Lowell Horse Railroad Co. placed a new automatic switch in front of the station on Merrimack street, July 20.

South Framingham.—The Union Street Railway Co. had a hearing July 30 before the selectmen, and asked permission to use electricity as a motive power on its cars between South Framingham and Saxonville.

MINNESOTA.

Anoka.—The Anoka Street Railway Co. obtained articles of incorporation from the Secretary of State, July 24. The capital stock is $25,000; the incorporators, J. Hildreth, Anoka; James Carney, E. J. Clough, Minneapolis; Fred S. Wardwell, Herbert Warren, St. Paul.

Minneapolis.—The Minneapolis & St. Paul Rapid Transit Co. has been incorporated, with $500,000 capital stock, made up of $100 shares, with power to increase the same to any amount deemed advisable by a two-thirds majority of the board of directors.

The elevated railway project between this city and St. Paul is not making much headway.

"The Minneapolis Street Railway Co. are entitled to receive due credit for their efforts to improve the transit service," says the Minneapolis *Tribune*. But it proceeds to find fault with Col. Lowry for not proceeding with his cable railway without delay. Col. Lowry, however, says:

"The ordinance requiring us to abandon the use of steam on the motor line is not in operation until November, 1889. By that time we expect the city to have completed sewers along First avenue south and Nicollet avenue, and we shall then construct a cable line. If by any chance the necessary street improvements are not finished and the people or the city council demand the abolition of steam, we shall put on horse cars. The sooner the streets are put in condition the earlier we shall begin the construction of a cable road. But we can do nothing until the public work is completed."

St. Paul.—The St. Paul cable Ry. Co. will build 5⅓ miles of new cable road. Mr. Clift Wise, late of Kansas City, is chief engineer.

The St. Paul and Minneapolis electric railway ordinance failed to pass the St. Paul city council Aug. 7th. One vote to make the necessary two-thirds was lacking, the voting being 11 for it, and 6 against.

Col. P. F. Barr, vice president of the St. Paul City Railway Co., after much discussion and disappointing short-falls, has succeeded in having the grinding 3 cent clause in his cable ordinance repealed. Mayor Smith fixed his signature to the repealing ordinance July 24. Work of construction will now go on rapidly.

MISSISSIPPI.

Meridian.—The street railway tracks are being extended.

Natchez.—The Natchez street railway has extensions in prospect.

MISSOURI.

St. Louis.—A storage battery car is expected here from Philadelphia about Aug. 15. Engineer Wm. Jens was perfectly satisfied with the 22 foot car he rode on in the City of Brotherly Love recently. The car expected in St. Louis will be 16 feet long. The weight of all the electrical apparatus and machinery is 5,800 pounds a that of the car 9,200 pounds, a total of 15,0 pounds. A speed of twenty miles an hour possible, but the car will give the most effici service at about eight miles an hour. A candle power incandescent light, the rays which are intensified by a reflector, will be position as a headlight. The brake, wh is a powerful and efficient one, operates all eight wheels of the car at once, speed checking its motion. In the event of accident the brake there is an electrical arrangement which the car can be brought to an almost stant standstill. The electrical gong, wh sounds a warning, the throwing off of the bra and the manipulation of the sand-box. are worked by a pressure of the foot of the dri upon different levers, which are within e reach on the platform, thus doing away with necessities of his taking his eyes from off road in front of him. The cells in which electric current is stored are of the type known "23 C" of the Electrical Accumulator compan make.

NEW JERSEY.

Newark.—The Daft Electric Company wh is the new applicant for favor in this city, say Newark paper, will start a striking innovati inasmuch as the motors instead of being s outright will be rented to the consumers of po at a fixed sum per month, which will include service of energy required and all necessary pairs which otherwise fall upon the purchas of the motors and are considerable in the cou of a year. By this arrangement it will be p sible to furnish power throughout a large cir in the city for running fans, printing presses, vators, sewing machines and machinery of kinds requiring from one-half to fifteen-ho power.

NEW YORK.

Brooklyn.—On Sunday, Aug. 5 there was a up, as it is significantly called, on the Brook and Cross Town Railroad, which embraces th lines, the longest of which is eight miles lo The company employs 400 men, operates cars and has 600 horses. A driver took his to the barn four minutes ahead of time previous Tuesday and was discharged next c The conductor of the car was also suspended four days. The grievance committee of Knights of Labor demanded immediate re statement of the men or else they would st and "tie-up" the road. They did so. The po broke the "tie-up," and in doing so broke heads of several strikers who attacked the serve men who took out the cars. On Mon the strike was ended; the company agreeing re-instate the discharged driver and suspen conductor.

The Brooklyn street car companies have ur consideration the adoption of an electric register, by which a fare will be rung up wh ever a passenger places his foot on the step the car, says an electrical exchange. There s to be, however, numerous practical objection a device of this kind, and it will doubtless req many modifications before it comes into gen use.

Three new engines have recently been pla to operate the Brooklyn Bridge cable rail Their sizes and capacity have been erroneo stated in some publications. The correct figu are these: The three engines were built by Wm. Wright, of Newburgh, N. Y., they are the girder type; the larger one is of 625 hp., 30" cylinder, with 48" stroke; the second en is of 400 hp., has 26" cylinder, with 48" stroke; smaller one is of 275 hp., has 22" cylinder, with stroke. The larger fly-wheel is 20 feet diam weighing 50,000 lbs.; the next is 20 feet diam weighing 40,000 lbs.; and the small fly-whee 15 feet diameter, weighing 16,000 lbs. The driving plant consisted of two horizontal engi each with 26" cylinder, 48" stroke, with a wheel 18 feet in diameter, weighing 30,000 The great increase of traffic, already attained especially in prospect, made the increase engine power necessary. Between 8 and o'clock in the morning from 8,000 to 10,000 ple ride on the cable trains of three cars Brooklyn to New York every day, and in evening, between 5 and 6 o'clock, a somew greater number pass from New York to Brook

During the intervening hours of the day an average of about 2,000 passengers are carried either way. Taking the average for every twenty-four hours, over eighty-six thousand passengers are carried on the Brooklyn Bridge cable railway daily. The total for the month of April last was 2,593,104, while four years previously (April, 1884) the number of passengers for the month was only 752,220. "Still there's more to follow."

Buffalo.—The two street-railway companies have been arranging new terminal facilities at the Driving Park entrance by virtue of which they expect to handle the large crowds with the utmost celerity, no matter how great the pressure, during the forthcoming International Fair.

New York.—"Bobtail" (prohibitory) ordinances are in the municipal mill. All "bobtailers" are to be done away with, if certain people can have their way. The first line was dealt with July 31, when the Common Council passed the following ordinance in short order:

Whereas, The Twenty-third Street Railway Company is authorized by its charter to maintain its railroad in the streets of the city of New York, "subject to such reasonable rules and regulations in respect thereto as the Common Council of the city of New York may from time to time by ordinance prescribe;" and

Whereas, In the opinion of the Common Council of the city of New York the operation by said company of horse cars without any conductor has been and is detrimental to the public health and safety;

Therefore, Be it ordained as follows:

SECTION 1. It shall not be lawful for the said Twenty-third Street Railway Company to operate any cars upon any portion of its route in the streets of the city of New York without providing for the operation and management of such car a conductor as well as a driver.

SEC. 2. For every trip or part of a trip made by any car operated by the said Twenty-third Street Railway Company in violation of the provisions of the foregoing section of this ordinance, the said company shall be subject to a penalty of $50 for each trip or part of a trip which such car shall so make, to be recovered by the Corporation Attorney as in the case of other penalties.

SEC. 3. The Commissioners of Police are especially instructed to carry into effect and rigidly enforce the provisions of this ordinance.

SEC. 4. All ordinances or parts of ordinances inconsistent or conflicting with the provisions of this ordinances are hereby repealed.

SEC. 5. This ordinance shall take effect Aug. 20, 1888.

The railway company in question will stand firmly against such a radical change in their proper ordinance. And if the Twenty-third Street company can maintain their ground nothing further will be attempted; but if they fail, then all street car lines in the Empire City will be obliged to put conductors on their cars, as they do in Chicago.

Rochester.—A commission has been appointed to fix the value of property to be acquired by the electric railway at Rochester, for its tracks.

NORTH CAROLINA.

Ashville.—The Ashville Electric railway is to be built at once.

OHIO.

Akron.—The Sprague electric system is to have extended application, beyond the 10 cars on 6½ miles of track originally contracted for.

Cleveland.—The Sprague Electric Railway and Motor Co., after a very thorough investigation of different systems by the officers of the Railway Co., have been awarded the contract to equip the Cleveland electric road. This is to be a very complete equipment, consisting of 8 miles of track, 16 cars, iron poles, etc.

PENNSYLVANIA.

Easton.—A fight against the Traction Electric Railroad is to be carried on to the bitter end. At all events a dispatch on the morning it was opened says: A big force of men worked last night and early this morning, and had the Traction Electric Railroad ready for travel. At 8 o'clock fifty-five people boarded the first car to take the first trip over the line through Third Street. They cheered all along the route, and their shouts were responded to by several hundred people, who lined the sidewalk to witness the event. Nothing has attracted so much attention in this city in many years as the running of this road through Third street. A property owner on that street, who is put down as one of the "kickers," said this morning that the fight against the road will be continued in all the higher courts.

Erie.—An exchange says: The Belt Line Street Railway company, recently organized in this city by eastern capitalists and a few citizens of Erie, has applied to the city councils for the right to lay tracks along the street, and to erect poles upon which to place wires for the overhead electric system. The street car company at present running their cars with horse power, have also made application to the city authorities for power to construct lines to be used for operating their cars by electricity. Neither company has yet been given the authority asked for, though it is probable it will be given.

TENNESSEE.

Chattanooga.—All travel on the street car lines of this city, was abandoned for several hours one forenoon recently, because the drivers struck in a body and the company demanded sixteen hours' work per day and required each man to keep his car clean. This demand was refused and every driver abandoned his car. The strike ended in three hours, as new men were about to take the places of the strikers, and they all returned to work, but half a dozen were discharged for being ringleaders in the strike.

VIRGINIA.

Danville.—The Danville Electric Motor Co. has been incorporated, with a capital stock of $30,000, and will proceed at once to build its road, etc.

Manchester.—The Manchester Railway & Improvement Co., whose franchise was reported in our last number, have closed a contract with the Sprague Company for ten cars and an electric plant to operate 3½ miles of track on heavy grades.

Richmond.—The Richmond electric road carried 17,108 passengers on July 4, 1888.

WASHINGTON TERRITORY.

Seattle.—The West Street, Lake Union & Park Transit Co. will shortly purchase the plant for the road, including electric motors, cars and railroad iron. Current will be generated by a dynamo located at the central station, which will be at Lake Union. The line will be built to the west side of Lake Union, and will be extended ultimately to the canal. The road will be running in the fall.

Tacoma.—Mr. G. W. Thompson, President of the Central Land Improvement & Investment Co., has received a franchise for a street railway, to be operated by electric or other power.

WISCONSIN.

Milwaukee.—$1,000,000 is asked for the Milwaukee City Railway by President Peter McGeoch, of the New York syndicate including Thomas F. Ryan, W. H. Hollister, Howard Mansfield, and R. B. Dodson, who have been negotiating for the purchase of the company's lines, etc, but the deal has not been consummated yet.

ENGLAND.

London.—Storage-battery cars of great power are to be used to haul the underground trains, the steam locomotives to be transferred to open lines connected therewith. It is feared that the storage-battery system will not be equal to the occasion just yet.

The North Metropolitan Tramways Company report that their gross receipts for the past half-year amounted to £170,586, and the total expenditure £123,663, leaving as net profit £46,923. The balance, £46,923, together with £2,692 brought forward from the last account, is carried to net revenue account, and the sum available for division, after providing for debenture interest (amounting to £4, 353) is £45,261. Out of this sum it is proposed to appropriate £43,400 to the payment of a dividend to the proprietors, at the rate of 8¾ per cent. per annum, being 8s. 9d. per share on the 99,200 fully paid-up shares. The balance carried forward is £1,861. The company has 40 miles open. The total number of passengers was 24,052,570, and the receipts £164,930. The total number of passengers carried from the date of the opening of the lines (9th May, 1870) to 30th June last is 519,201,015, and the gross traffic receipts during the same period amount to £4,257,130; of this sum there has been paid in dividends to the shareholders £942,462. The total number of cars running was 265, against 249, which ran a total mileage of 3,452,700, being an increase of 238,000. The average receipt per passenger was 1.64d., being a decrease of 0.11d. The average receipts per mile were 11.46d., being a decrease of 0.40d. The total working expenses to traffic receipts were 72.40 per cent., being a decrease of 2.32. The stud, consisting of 3,008 horses, is in a satisfactory state. The company has reconstructed this half-year 3¾ miles of tramways.

The directors have entered into arrangements (without involving the company in any expense) with two companies—namely, the Elieson Electric Co., and the Electric Traction Co., for working cars on the Romford Road and Barking Road respectively, with a view of testing by practical commercial results the capabilities and fitness of their engines for tramway purposes.

At the next meeting, a resolution will be submitted for the approval of the shareholders authorizing the directors to exercise the borrowing powers of the company to the further extent of £35,500.

FRANCE.

Paris—It is reported that an important scheme has been laid before the Municipal Council of Paris for an underground railway, running from the Bois de Boulogne to the Bois de Vincennes, a distance of about 8 miles. The route to be traversed is by the Champs Elysées, the Rue St. Honoré and the Gare de Lyon. The proposal is to excavate the tunnel without opening the surface of the ground, except at certain stated points. The tunnel will literally be an iron tube 19 feet in diameter. The line will be worked by electricity, the current being taken off from a central rail. It is intended to establish a two-minutes service, and to maintain a maximum speed of 12½ miles an hour. The estimated cost of the whole scheme is 36,000,000 francs, of which 22,000,000 are provided for the construction of the tunnel and the permanent way. If the concession is granted before Oct. 1, the authors of the project gurantee to complete the section between the Bois de Boulogne and the Place de la Concorde by the 1st of July, 1889, and also to extend a branch to the exhibition buildings. So far as can be judged from the details available, it appears that the scheme has been well thought out and is one that should command success. On the other hand, it is quite sure to meet with a strong opposition in the Municipal Council, and the chance of its becoming *un fait accompli* is very slender.

Books, Periodicals, Pamphlets, Etc.

Scribner's Magazine for August contains the third of the series of railway articles, "American Locomotives and Cars." The author, M. N. Forney, Secretary of the Master Car Builders' Association, is one of the most widely known railroad men in the United States. He has written from a very full knowledge, and has used a crisp and lucid style, which makes an intricate subject perfectly clear. The opening pages of the article are a brief historical narrative, embracing the stages in the development of the modern "Decapod" from the primitive locomotive built by Peter Cooper. How steam is generated and how it propels a locomotive are then explained. The question of the number, size, and position of the driving wheels with reference to the speed and pulling capacity of the locomotive is carefully discussed; the half-hundred attachments in the locomotive cab by which the engineer works the machine are indicated, and the care which must be taken to keep it in perfect order is described. A brief account of the development of the passenger car from the old stage-coach concludes the article. Among the forty illustrations are a number of antique types of locomotive, a selection from the best modern patterns, and views of a round house and large locomotive works which are both accurate and picturesque. Blum, Woodward and Burns are among the artists who made the drawings.

Réponses au Questionnaire of great interest to street railway companies have been printed by the executive committee of Permanent International Tramways Union, for discussion at the Assembly General at Brussels next month. The

book of questions and answers is accompanied by an "*album*" showing the various kinds of rails, etc., used on the European continent.

The Young Idea is the title of a charming and edifying monthly periodical, now (July) in the 7th number of Vol. II. It is profusely illustrated; contains poetry, prose, fiction and puzzles—a good-sized magazine, all for 50 cents a year. The number before us contains a portrait of one of "Our Authors" who teach the young idea how to shoot, Mrs. Eliza*beth Day*ton, whose *nom de plume* is "Beth Day." She is a poet of no mean order, having drawn her inspiration through the hardships of "frontier" life in Wisconsin, and made her literary debut with "Selling the Farm," which was published in the *Inter Ocean* in 1880. Her sanctum is at Wrightstown, Wis. Her opening chapters of "The Little Weaver" appear in *The Young Idea* for July. The magazine is published by Grant C. Whitney, Belvidere, Ill.

Table Talk, each issue, displays wonderful skill in having its contents fitted to the month. The present number opens with one of Mr. Whitton's pleasing poems, "An August Day," accompanied with an apt illustration. "Summery Reflections" follows.

Patents.

The following list of recent patents relating to intermural traffic is specially reported for the STREET RAILWAY GAZETTE by Wm. G. Henderson, solicitor of American and foreign patents and trade-marks, Norris building, Fifth and F streets, Washington, D. C. A copy of any of the following will be furnished by him for 25 cents:

Issues of July 10, 17 and 24, 1888.

385,727. Electric motor for street-cars—W. S. Salisbury, Chicago.
385,754. Slack-cable stop—F. B. Graves, Rochester, N. Y.
385,787. Electric-railway system—E. M. Bentley, New York.
385,800. Car-starter—R. O. Gercke, Augusta.
385,902. Electric railway—E. M. Bentley, New York.
385,903. Switch on overhead lines in electric railways—E. M. Bentley, New York.
385,928. Electric railway—E. W. Heald, Wilmington, Del.
385,930.—Grip gear for cable street railways—J. Helm, Omaha, Neb.
385,964. Electric signal for railways—E. A. Sharp, Rogers Park, Ill.
385,980.—Gripping mechanism for cable street railways—J. Walsh, Jr., Philadelphia.
386,064. Railway-rails, building-blocks, paving-blocks, etc—H. F. Ferris, St. Louis, Mo.
386,085. Electric railway—E. E. Ries, Baltimore, Md.
386,086. Driving mechanism for electric railway cars—E. E. Ries, Baltimore, Md.
386,087. Combined electric railway and wire-conduit—E. E. Ries, Baltimore, Md.
386,120. Elevated suspension-railway—R. C. Forsyth, Chicago.
386,178. Cable railway—P. F. Barr, St. Paul.
386,184. Electric railway—R. A. Chesebrough, New York.
386,282. Tunnel construction for electric railway—G. T. Woods, Cincinnati.
386,344. Cable grip beam and supporting device therefor—L. Pfingst, and S. A. Bemis, New York.
386,486. Street or station indicator for cars—I. H. Miller, Quincy, Ill.
386,543. Compound electro-motor for electric railways—A. J. Hardman, London, England.
386,581. Current receiver for electric railway cars—J. A. Enos, Boston, Mass.
386,784. Overhead wire for electric railways—W. H. Knight, New York.

Patents Described.

The following are brief descriptions of patents relating to street railway interests issued during the past month, especially prepared for the STREET RAILWAY GAZETTE by J. C. Higdon, mechanical expert and solicitor of patents, room 29 St. Cloud building, opposite U. S. Patent office, Washington, D. C. A printed copy of any of the following will be furnished by him for 25 cents (stamps):

GONG BELL—J. P. Connell, Keninsgton, Conn. This patent covers small details for operating the hammer of the gong.

GRIP DETACHER—H. C. Grawe, St. Louis, Mo. In this patent the slot is provided with an elevation which is engaged by the passing grip, to detach said grip from the cable.

PASSENGER-CAR AND STATION—A. K. Mansfield, New York. The car is arranged with two stories, while the platforms at stations are also "double-deck."

WHEEL-GUARD FOR CARS—P. Portois, San Francisco, Cal. The guard-frame is suspended from end of car, and a pivoted arm depends therefrom and travels in the grip-slot.

CAR-AXLE—S. Gissinger, Pittsburg, Pa. This axle is divided at center of its length, and covered with a tubular sleeve which forms an oil reservoir.

CABLE GRIP—J. T. Hodgins, St. Louis, Mo. This patent covers an attachment for old grips, by means of which the cable may be raised by the gripman.

MANNER OF SPLICING CABLES—J. Collins, San Francisco, Cal. The object of this patent is to make a simple and effective inlaid splice without having to permanently remove the soft core of cable. The method consists in dividing the strand ends or tucks back to their union with the cable, cutting off even with the surface of the cable one of the divisions of each tuck, laying up the remaining divisions so as to form a splice-strand occupying the vacant score of the cable, cutting off the soft core of the cable at points beyond each end of the newly-formed splice-strand and taking out from the cable the ends of the severed section of core back to each end of the splice-strand, wrapping the ends of the divisions of the splice-strand with said core, and finally inlaying the core-ends and the divisions about which they are wrapped into the heart of the cable.

CONSTRUCTION OF CABLE RAILWAYS—Wood & Fowler, Los Angeles, Cal. This patent covers small details in construction of the roadway, besides a slot-rail comprising a web having at the the top a narrow flange, and having a broad flange at the base projecting from same side as top flange.

CABLE RAILWAY GRIP—G. P. Cater, San Francisco, Cal. This patent covers and claims a gripping-shoe having pins in its ends for engaging the jaws, which latter are hinged to the frame.

RAILWAY CAR—E. Verstraete, Chicago This patent claims a car for use upon electric-road; the same being arranged with an extended housed-in platform at each end, each platform being closed at the end and provided with sliding side-doors.

CURVE FOR CABLE RAILWAYS—W. A. Phillips, San Francisco. In this patent the main cable is carried around the curve regardless of the grip-slot, and a supplemental endless chain or cable provided with projections is arranged to engage the grip shank and move the car around the curve.

STREET-RAILWAY TRACTION DEVICE.—D. H. Hardy, Lake View, Ill. This patent claims an upwardly-open conduit situated below the level of the rails, an open rack located within the opening of the conduit, and a toothed-wheel or gear mounted on the car and engaging the teeth.

Business Notes.

PECKHAM'S patent street car wheels and ax are highly spoken of. The Peckham wheel, has been already described in the GAZETTE, constructed in two parts, so that when worn c or broken the web portion can be renewed anc duplicate web put on at any place, and by a ordinary laborer. It has been used on t Houston, West Street and Pavonia Ferry Ra road about eighteen months, and the following Superintendent Edes' testimony concerning t wheels and the axles:

415 EAST 10TH STREET,
NEW YORK, July 10th, 1888.

MR. E. PECKHAM, President Peckham Stre Car Wheel and Axle Co., 239 Broadway, N.

Dear Sir: In answer to your inquiry as how we are pleased with your street car whe and axles, I will say that it is now some eighte months since we commenced using your int changeable wheels, and that they are giving p fect satisfaction, and fully sustain your claims them; the axles, which have only been in some two months, are doing nicely, and I cann see any reason why they should not also rea your expectations. I consider your wheels a axles to be thoroughly practical, and a boon the street car business.

Yours respectfully, H. W. EDES, Supt. Houston, West Street and Pavonia Fe Railroad Company.

Prospectus, price-list, copy of warranty, et may be obtained of the Peckham Street C Wheel and Axle Co., 239 Broadway, New Yo

THE SPRAGUE ELECTRIC RAILWAY A MOTOR CO. have just sold one of their 20 H. combination motor and pump to Stein, Block Co., Rochester, N. Y. They are for the purp of operating the elevators in the new and eleg building now being erected by the above fi Sprague electric railway contracts are specifi under Boston, Mass., Cleveland, O., etc. As go to press word comes that the Sprague Co. still adding to their already long list of roads, last one being a contract to equip the Sandus (Ohio) Street Railway.

THE New York State agency Sprague Elect Railway & Motor Co. has been fortunate in curing the services of Mr. C. H. Maclilie, of C cago, Ill., to act as its representative in East New York. Mr. Maclilie is a trained salesma thorough business man, and has held import and responsible positions in the electrical fie Mr. Higgins is to be congratulated upon his s cess in securing, in so short a time, an effici and able staff of representatives; and his agen though among the youngest of the Sprag branch houses, is rapidly pushing to the fron

THE CINCINNATI CORRUGATING CO.'s cent nial card says: "Wood met the simple needs primitive days, and felt roofings meet the si pletons of the present; but the wonderful crease in the use of sheet metal roofings, sidin ceilings, etc., demonstrates their superior va and favorable prices compared with all other m terial for purposes indicated." Of course, tl have some of the superior iron and steel to —plain or corrugated. The company's office at 100 Eggleston avenue, Cincinnati, O.

PATENT LAWYER J. C. HIGDON has taken his permanent residence in Washington (Ro 29 St. Cloud building, opposite U. S. Pat Office) says a circular letter just received. It at the same time stated that the old office (K sas City patent agency) will remain at the location, room 55 and 56, Hall building (te phone 1912), in charge of reliable and thoroug competent men (attorney, draughtsman, etc.).

MRS. M. L. FARNHAM, of New Orleans is inventress of a "street car operator," descril in another part of this number of the GAZET Her address is P. O. box 1100, New Orleans.

The Street Railway Gazette.

VOL. III. CHICAGO SEPTEMBER, 1888. NEW YORK No. 9

The Zimmerman Street Car Heater.

During a severely cold winter, a few years since, Mr. J. Zimmerman, president of the Zimmerman Machine Co., Cincinnati, had occasion to stay in Chicago while superintending the construction of certain machinery at the Stock Yards. And in traveling to and fro in the cold street cars, the idea "struck" him that a heating apparatus might be devised to make the cars fairly comfortable—to transform the passenger ice boxes, as it were, into cosy travelling parlors. Owing to pressure of other business, Mr. Zimmerman has not devoted sufficient attention to mature a hot-air furnace which he has invented for heating street cars, until recently. In the present issue of the STREET RAILWAY GAZETTE, he places what appears to be a most valuable invention on the market.

Mr. Zimmerman makes three kinds of heaters; (1) the "Gem," for bob-tail cars; (2) the "Princess," for the medium sized

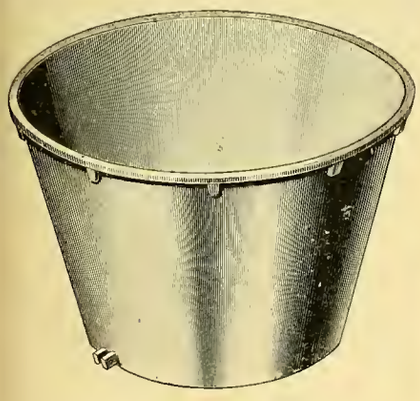


FIG 3—ZIMMERMAN HEATER.

cars; and (3) the "Peerless," for the larger cars. We avail ourselves of the opportunity here to describe the "Peerless" and its parts.

Fig. 1 shows the Zimmerman heater in position in the car. Fig. 2 represents the cast-iron floor ring, 24 inches diameter, which has a flange resting on the floor of the car, together with a lower flange perforated with holes through which air is admitted to circumscribe the heat, that is, to prevent the ring and the register from becoming too hot; and while it does that, the air is thoroughly warmed as it enters there-through into the car. Fig. 3 shows a casing which rests in the floor ring and supports the furnace; it is 20 inches diameter at the top, and 10½ inches deep. Fig. 4 shows the inverted cone-shaped fire-pot, which is set in the casing, and supported by lugs, as shown in the cut. Fig. 5 represents the register, which is round and measures 20 inches in diameter; it is provided with an opening in the center for the stove pipe, and it has feet which rest on the flange of the floor ring; a portion of it can be lifted out to afford access to the furnace. The furnace is provided with a fire grate (Fig. 6) which is operated (shaken or dumped) by a lever (Fig. 7) from underneath the side of the car (outside). The smoke pipe runs directly from the furnace through the roof of the car. A perforated Russia iron pipe of larger dimensions encircles the smoke pipe, and through these perforations warm air is admitted plentifully into the car. Four recessed rings (Fig. 8), placed equidistant, surround the perforated piping, and ten strips of hard wood (about 1 inch by ½ inch) are fixed vertically in the recesses of these rings, evenly spaced all round, ash and walnut alternately; and the vertical strips are

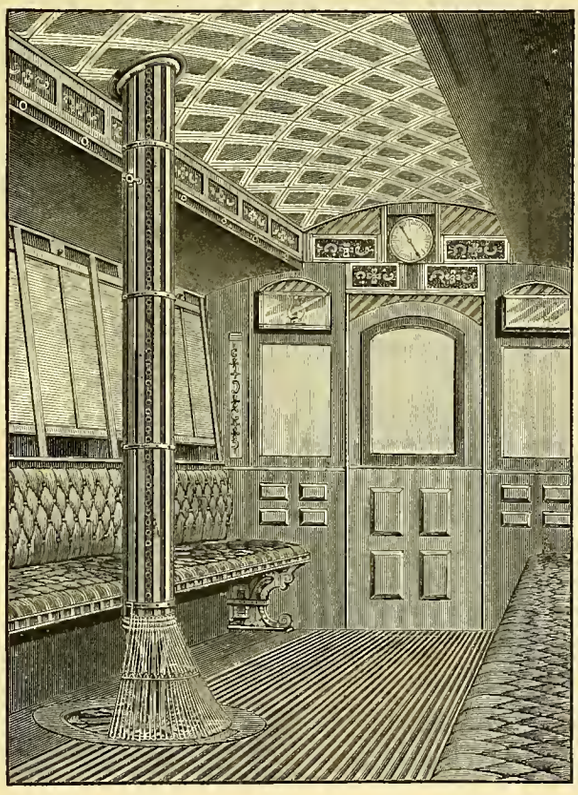


FIG. 1.—ZIMMERMAN "PEERLESS" HEATER.

secured in place by nickel plated bands outside the recessed rings. Fig. 9 shows section of a guard that supports the wooden strips. A bell-shaped portable wire guard, for preserving the register from passengers' feet, and preventing snow, ice or dirt from getting in contact with the furnace or its heated parts, and also to keep ladies' dresses and skirts from coming in contact with the register, completes "the bill."

The principle is that of a hot-air furnace, having all its advantages without its drawbacks. In this the air is in constant circulation, and therefore always fresh; it comes in from underneath the car, heated in its passage to any required temperature. The device takes up no seating space whatever. The fire, as explained, is below the level of the car floor; the piping therefrom passes in front of the seat up through the roof, and the diameter of the whole is only seven inches. The vertical wooden strips which are firmly fixed around the piping, may be hugged (or cuddled, as they say in Scotland) without the slightest danger of the party being burned. In a word, it is perfectly safe, being absolutely fire-proof. There is no gas, odor nor smoke. It burns hard coal or coke.

The "furnace" of the "Peerless" is capable of holding from 20 lbs. to 25 lbs. of coal at a time, and from 40 lbs. to 75 lbs. (according to the amount of heat required) will suffice for one car during a day of eighteen hours. One man can attend to the fires of from 50 to 75 cars. A car has run ten miles in very cold weather with only one firing, that is, without replenishing. These heaters have been thoroughly tested in Cincinnati, in St.

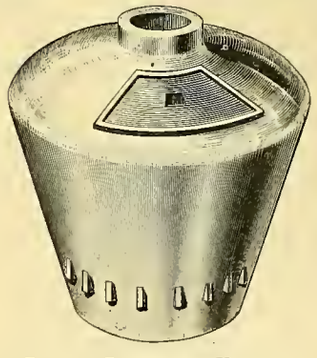


FIG. 4.—ZIMMERMAN HEATER.

Louis and in Chicago. One of them will be exhibited at the forthcoming street railway exhibition at Washington; and probably there will be one fitted in a car. It can be fixed in any car with but very little preparation; the cutting of a hole in the floor, for the furnace and its casing, together with a little hole in the roof for the pipe, being all the alterations necessary.

The Zimmerman street car heater only requires to be seen in order to be admired and appreciated. In addition to its being perfectly safe, wholesome and odorless, it is extremely handsome, being elegantly finished in brass and nickel plate. The very appearance of the "Peerless" suggests warmth; and it is very ornamental as well as useful. It is sure to be in great demand in cities where Jack Frost bites the people while they are unprotected by artificial climates, such as these heaters can readily produce.

It may not be out of place to add here that Mr. Zimmerman has made very successful experiments in producing pure gas from coal oil, which he describes in our advertising columns as "The new and coming fuel," for the use of which

his "Princess" heater is particularly adapted. Gas generated in that way will keep up a good and well-regulated fire, and dispense with the pipe passing from the furnace to the roof; but whether that may be a real advantage or not we are inclined to doubt, inasmuch as the pipe, especially the elegant style devised by Mr. Zimmerman, seems to make the car look warm and homely, and thus tends to increase the comfort of passengers.

The Lineff Electric Railway.

The Lineff system has obtained special prominence by the report of Mr. Gisbert Kapp, of which the following is a condensed reproduction:—

To the Chairman of the West Metropolitan Tramway Company (London)—

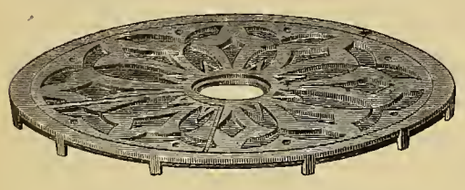


FIG. 5.—ZIMMERMAN HEATER.

Dear Sir,—I have examined and tested the electric tramway line on the Lineff system, which has been laid down for experimental purposes at the Chiswick depot of your company. The car is a small open car, fitted with a 4 h.p. (nominal) Immisch motor. The transmission of power from the motor to the car wheels is by means of a countershaft and two Renold's chains, and, in this respect, does not differ from that used on other electric cars. There are, however, two special appliances peculiar to the Lineff car. The one is a movable dash board at each end of the car, which upon striking an obstacle automatically reverses the direction of rotation of the motor, and causes the car to run back; and the other is a magnetic brake.

The object of the dash board and automatic reversing gear is to more quickly stop the car, if through the negligence of the driver it should run into an obstacle. In this case the dash board causes the brake to go on, and the motor to be reversed. The putting on of the brake is a good feature, but I do not consider the advantages of automatically reversing the motor sufficiently great to compensate for the complication which the arrangement entails.

The magnetic brake can also be put on by hand, being actuated by the same switch lever by which the driver controls the speed of the car. I consider this brake an extremely valuable feature of the Lineff car. When the car was fully loaded and running at full speed, the distance traversed after cutting off the current and putting on the brake was only 9 ft. It is needless to say that no hand-brake could affect a stop

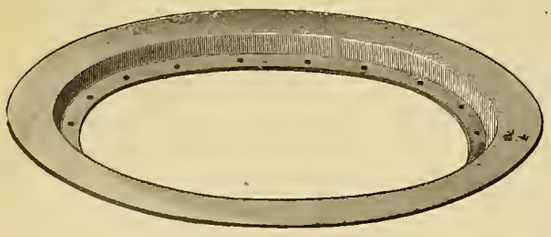


FIG. 2.—ZIMMERMAN HEATER.

in so short a distance. As it is, however, not always necessary to stop so quickly, the switch controlling the brake-magnet should be provided with intermediate contacts and resistance coils, to enable the driver to stop more slowly if desired.

The Lineff tramway system belongs to that class where the current is supplied to the car by means of a conductor placed underground, but whereas, in other systems, the metallic surface of the conductor is exposed along its whole length, and a contact brush or slider rubs along it to take the current off, but in the Lineff system nearly the whole length of the conductor is insulated, and the current is taken off at certain points, about three feet apart. At these points are fixed small saddle-shaped contact pieces, over which trails the bight of a metallic rope, suspended from shoes which pass through the slot of the channel, and are attached to a flexible beam under the car. The rope consists of a stranded wire cable protected with gun metal ferrules, which can be easily renewed when worn. It is insulated from the shoes which pass through the slot, and the connection between it and the main controlling switches is also insulated. The rope in passing over the contacts collects the current, which is thus led to one of the main controlling switches, and from there to the motor, returning through the framework and wheels of the car to the rails. The great difficulty with all underground conductors for tramways is their insulation. A cable protected by insulation over its whole surface may be buried in the ground, and no escape of electricity can take place. If, however, the insulation is removed at certain points along the cable, so as to expose at intervals the metallic surface, electricity can escape at those points, and it is evident that the escape will be the greater the more the conductor is bared. A conductor only partially insulated cannot be simply buried in the ground, but must be supported on insulated brackets clear of the surrounding ground or masonry. Even if so supported, a certain amount of electricity is lost by leakage, and, generally speaking, the loss will be in proportion to the metallic surface exposed. Now, in other systems of underground conductors, the metallic surface is exposed from one end of the line to the other, and the leakage resulting therefrom must obviously be very much greater than with Mr. Lineff's arrangement, where nearly the whole of the conductors may be covered by insulation, and only a few inches of metallic surface are exposed at intervals. It is doubtless due to this arrangement that the insulation resistance, even after a very severe test, was found to be as high as 10,000 ohms, being at the rate of 1,000 ohms per mile. With this insulation resistance, the loss of current over a double line between Kew Bridge and Hammersmith would not reach two amperes, and the power wasted would amount to about three-quarters of a horse-power, or about one per cent. of the power required to work an eight minutes' traffic over this line. I know of no other underground system which comes anywhere near this in perfection of insulation.

FIG. 6.

Another advantage of the Lineff conductor is the facility with which crossings can be arranged. The conductor consists of iron piping, with a copper conductor inserted. The saddle-shaped contacts are screwed into the pipe, which is subdivided into sections, each sufficiently short as not to be influenced by changes of temperature. Connection between adjacent sections is made by short pieces of insulated cable, and it is thus an easy matter to arrange for two conductors to cross each other without interference.

The direction of motion is controlled by a reversing lever, and the speed by a switch lever. Ordinarily, during the journey, the driver has therefore to attend to one handle only, by which he controls the speed and puts on the brake.

Having carefully examined and tested the Lineff system, I have come to the conclusion that it is superior to other systems employing an underground conductor, and that it will be found suitable for suburban lines having a heavy traffic.

Mr. Kapp looked into the experimental Lineff railway for the purpose of ascertaining the electrical condition of the Lineff system as constructed at the place mentioned, and to examine the whole apparatus. All resistances were taken by a Wheatstone's bridge and mirror galvanometer, whilst current and pressure were measured by Miller's patent ampere and volt meters, newly calibrated.

Experiment was made by measuring the resistance between the rails, which carry the return current, and the central conductor, which carries the outgoing current. During these tests the car was placed in the shed, and that portion of the conductor which is within the shed was disconnected, so that leakage by current through the switches and various connections in the car should not interfere with the test. The insulation resistance of the whole conductor was found to be 25,400 ohms. As this insulation resistance necessarily depends to a certain extent upon the state of the atmosphere, and must be lower in wet weather, determined to test it under the most unfavorable conditions possible; and for this purpose ordered an attendant to play into

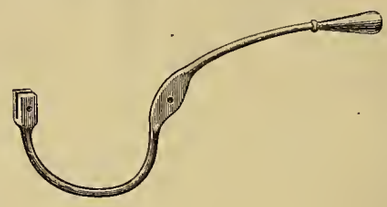


FIG. 7.—ZIMMERMAN HEATER.

the central channel from a water hose, and another attendant to throw buckets of water over the slot all along the line. Under this treatment, which was intended to imitate a heavy shower, the insulation and resistance gradually diminished until it reached 10,000 ohms, after which point there was no further reduction.

Thompson's Gravity Rapid Transit Railway.

Another bid is made for public opinion in favor of elevated roads in streets of our large cities. This time the novel project hails from Philadelphia. The Forsyth suspension system, described in our July number was no sooner commented upon by the press in general, and the scientific press in particular, than other inventors in the same line woke up afresh to perfect various "systems." "It has, however, remained for Mr. L. A. Thompson, of Philadelphia, to perfect the working details for the operation of a city railroad on this plan," says the *Scientific American*, "for which letters patent have been granted to him here and in all the principal countries of the world."

FIG. 9.

The operative features of such a construction, observes our contemporary, have had numerous illustrations in various switchback railways and coasting tracks at seaside resorts and other places, not to mention the famous switchback road at Mauch Chunk, Penn., which was used for many years to convey coal from the mines to the banks of the Lehigh, and where the inclines are extensive. In the application of this system to city "L" railways, the locomotive is dispensed with. Hence the railway structure may be very light and simple, offering but little obstruction to the streets. At the stations there are two undulations in each track, a car approaching the station being carried up and over the slighter elevation of the first undulation, where it stops to discharge and receive passengers, after which

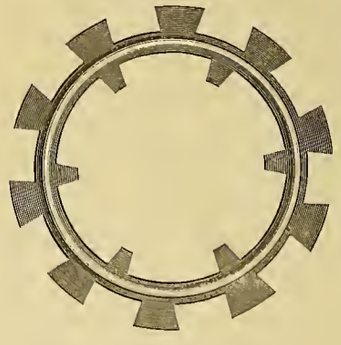


FIG. 8.—ZIMMERMAN HEATER.

it is carried up over the higher undulation beyond, and allowed to proceed on its way to the next station under the action of gravity alone, whereby a high velocity is imparted to the car. Attached under each car is a cable gripping mechanism designed to work automatically. As the car arrives at the end of each long incline,

and without at all checking its speed, its gripping mechanism comes in contact with the moving cable, driven at the station, by which the car is kept continuously on its journey till the desired stopping place is reached, which is on a slight incline, when the cable is released. As the car stands on an incline, it starts of itself by the action of a lever. The speed which the cars may be expected to attain will depend upon the grades adopted. It is calculated that an average speed of from ten to twelve miles an hour, including stops, can be readily obtained without having the tracks higher than they at present are in many places on the elevated railroads in New York City. Each car will be provided with a suitable brake mechanism to enable the train hands at all times to have complete control of its movement, and there are devices for preventing any retrograde movement of the car while ascending inclines. At each station elevators will lift passengers from the sidewalk to the platforms.

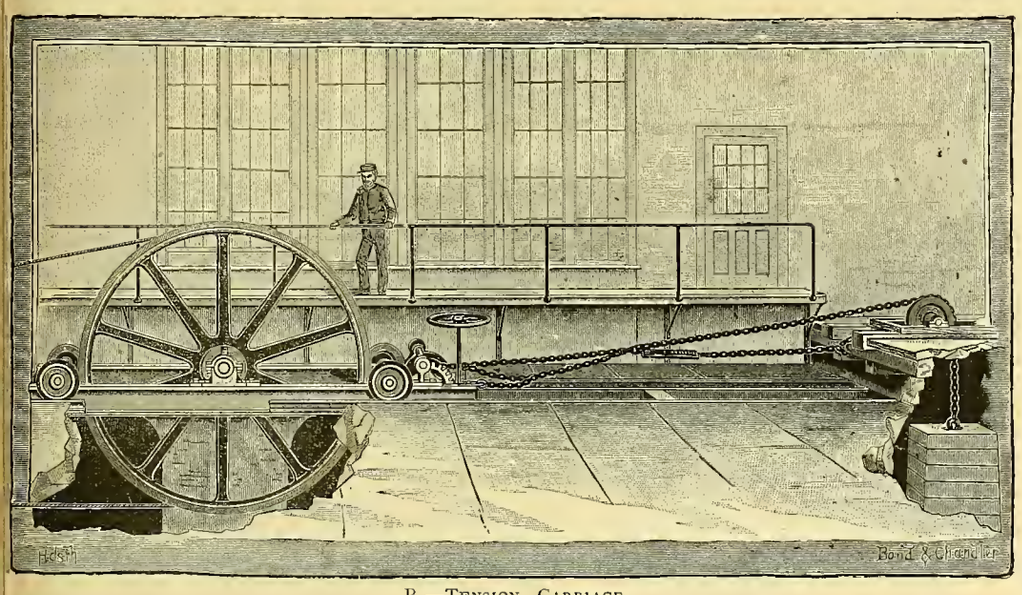
The grip is entirely automatic, taking hold of the running cable while the car is in motion (but at reduced speed), and releasing itself automatically at top of incline. The attendant, by application of a brake, stops the car for passengers to alight or get on.

Cable Railway Practice.

By Edward J. Lawless.

ARTICLE VI.

The question of how to drive cable machinery is also agitating the minds of many mechanics



P.—Tension Carriage.

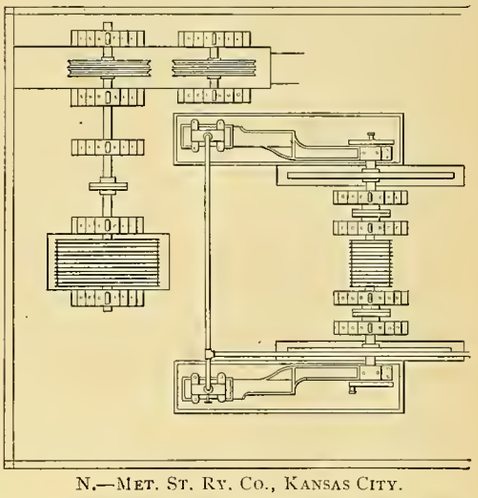
interested in cable lines; shall it be by gear, by belt, or by cotton ropes?

The advocates of the two latter systems claim that better results are obtained from wear and tear of the machinery and engines, all vibration and trembling being done away with; and that it is much easier on the cable as owing to variable loads any sudden strain thrown upon the cable the belt or ropes will take part of. Certain it is that the rope and belt drives, particularly the former, where in use on cable roads, give great satisfaction; and all noise is abolished.

The accompanying cut N shows machinery for a cable line driven by cotton ropes. A grooved drum is placed on the engine-shaft around which the ropes pass to a larger drum on the same shaft to which the cable drum is attached. The grooves in these drums are narrow at the bottom so that the greater the strain on the ropes the tighter they hold. These ropes are usually about 2½ in. in diameter, made of cotton thread, the number of ropes required being according to the horse-power of the engines. Each rope is independent, that is there should be a separate one for each groove. Care must be taken to have them a uniform length when spliced. The great trouble about this method is the large amount of room it takes up in the power house. It was first adopted on the Geary St. line in San Francisco in 1880, where the same ropes that were first placed in position are in use to day. The same method of driving was adopted by the Sutter St. R. R. of San Francisco in 1884 and the same ropes are still in service.

The gear drive, however, seems to be the favorite, and has been generally adopted by cable lines. The accompanying cut O shows a simple arrangement of machinery for two cables, driven by gear which works very satisfactorily. The gear should be very carefully and accurately made, about 18 in. face and 6 in. pitch, speed moderate. It is desirable to make these gear wheels in halves which, in addition to the bolts, should be fastened with heavy wrought iron links. It will be observed in the drawing that clutches are placed on the same shaft to which the drums are attached. These clutches are very desirable for the following reasons: Where two or more cables are in operation, any one can be stopped without detaining the others. In case of a strand or damage to cable, it can be stopped quicker, and in the exact place you desire, by disconnecting the clutch than by stopping the engines. The clutch, however, should not be disconnected too suddenly, or damage is likely to be done to the tension carriage. Back of the drums a place should be provided for the tension carriage which regulates the tension and takes up the slack of the cable as it stretches. It is very desirable to have this tension-way long. It certainly should be capable of taking up one hundred feet of slack cable. As forty feet are required to make the splice (in some cases more) which has to be cut out within a certain time, it can be readily seen that when it becomes necessary to renew this splice very little over the required amount of slack is left to make a new one. There are two kinds of tension carriages in use: the compound carriage commonly called the "Root carriage" (Henry Root inventor) and the single carriage. The former consists of a carriage containing the tension wheel and to which is attached the weight for regulating the varying tension of the cable during operation placed on a carriage which runs on the tension track and which is used for taking up the stretch of the cable only. The Root tension car is shown by cut in June Gazette, p. 76. The smaller carriage travels on the larger, its movement being limited to two or three feet, while the larger is held in position by heavy iron dogs that engage in a rack which prevents it from moving forward but permits slack to be taken up without trouble. The method of taking up slack with this carriage is very simple and effective, one man being able to control it. A heavy "block and fall" is brought into requisition, one end of which is attached to the carriage, the other to some secure fastening in the tension-way: the end of the rope is then passed two or three times around a capstan fastened to the shaft of the tension wheel and as the shaft revolves the carriage is pulled back where desired.

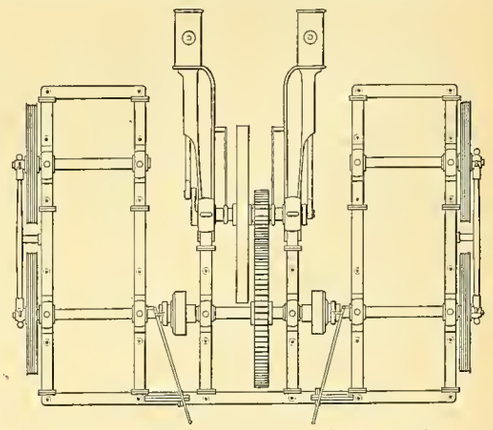
The other is a single carriage containing the tension wheel, which travels on the tension way. To this carriage is attached a heavy chain which passes over a sprocket wheel into a pit containing the necessary weights for regulating the tension. It is impossible to tell, except by actual experiment, what weight will be required for tension. It will depend on the length and size of cable used, the grades, curves and location of power house. Three thousand pounds, however, is an average weight to start on. The pit or well in which this weight travels should not be less than twelve feet deep. The accompanying cut P shows a pit and arrangement of weights which has proven very satisfactory. The estimated total weight required is divided into four sections.



N.—Met. St. Ry. Co., Kansas City.

Three plates each weighing about one thousand pounds, but of different sizes, are placed near the top of the pit on shelves about five inches apart; below these the main weight travels. Attached to the bottom of this weight is a safety chain to prevent any sudden strain from pulling the weight out of the pit. In addition to these weights and to prevent the carriage from moving too far forward, and limit the amount of slack cable in the conduit, a short chain is used, fastened at one end to the tension carriage chain and at the other to a heavy coil spring capable of standing a strain of 20,000 lbs. before compressed, which spring is secured to a heavy beam or iron braced against the walls of the tension way. This chain and spring should be so arranged that it will not come into action until all the weights are picked up as shown in the drawing. As that part of the chain that passes over the sprocket wheel wears more or less from constant friction it is advisable to have the chain double at that point and pass them over two sprocket wheels one securely fastened to the shaft, the other, an idler so as to equalize the strain; attached to and between the sprocket wheels is a rack with which a heavy dog engages so that the cable can be slacked immediately without dropping the weight to the bottom of the pit. The slack is regulated by the chain passing over another sprocket wheel attached to the tension carriage and which wheel is turned by gear.

The number of engines and their size will depend upon the number of miles of cable to be operated, the estimated travel and conditions of the line. One hundred horse-power per mile of



O.—Met. St. Ry. (Fifth St. Line), Kansas City.

double track is a safe calculation to make. It is advisable to have an extra engine in reserve which should always be ready for immediate use in case anything should get wrong with that in operation. These engines should be made so they can be reversed immediately should it become necessary to back the cable as sometimes happens. It should be remembered that the

engines and machinery are subject to a great deal of vibration and constant strains, both sudden and heavy, consequently the foundations should cover considerable area and be very strong and substantial.

The fly-wheel should be heavy in order to give a steady motion to the cable, and not have the starting of a heavy load felt on the whole line.

The number of boilers will depend on the horse-power developed. An extra battery should be kept in reserve, and change of batteries made every week when the idle one should be thoroughly cleaned and washed.

It is essential to have a steam gauge in the engine room, and if possible a water gauge, so that the engineer can have a constant check on the fireman. The heater, pumps, and steam connections about complete the equipment of the power house. (*To be continued.*)

The Connelly Gas Motor for Street Cars.

In our last number we promised an illustrated description of the Connellymotor, and the following illustrations are most helpful to understand it.

Figure 1 is a side elevation of the car showing countershaft for transmitting power to the car axle.

Figure 2 gives a front view of the car with portion of cab removed, exposing engine, storage tank, main shaft and gearing.

Figure 3 is a cut of the compound gas engine, showing the high and low pressure cylinders placed at right angles to each other, the upper one being the high pressure cylinder.

The fuel tank is a double cylinder, the inner one containing the naphtha and an absorbent material; this is surrounded by a jacket of water, which is connected by pipes to the water jacket about the high pressure cylinder.

The circulation of the water from the cylinder to the radiator is continuous, and it performs a double service, cooling the cylinder of the engine, and warming the naphtha producing evaporation. Air is drawn through the absorbent material, thoroughly carburetted and supplied to the engine, compressed, and then ignited by an electric spark. The low pressure cylinder next receives the charge and becomes a motive cylinder during the first half of the outstroke, when, the pressure being gone, it acts as a pump during the last half of the outstroke, drawing a fresh charge of gas into the high pressure cylinder. The exhaust passes through the pipe under the floor of the car to the condensing tanks, and then by a pipe out above the roof of the car.

Figure 4 shows the device for transmitting power to the main shaft at any rate of speed with the engine running continuously at a uniform rate, and the success of the motor is really due to this novel, ingenious simple mechanism.

The main shaft is set parallel with a disk 2 ft. in diameter placed on the face of the fly-wheel. On the shaft is a loose friction pulley 12 in. in diameter that engages with the face of the disk. This loose pulley is prevented from revolving on the shaft by a tongue and groove, but it may be moved up and down on the shaft at the will of the driver, by means of two screw rods, which pass through the pulley and revolve with shaft.

When it is required to slow up or stop the car the friction pulley still in contact with the disk is run down to near its centre. To reverse the car, the friction pulley is run down below the centre of the disk while the engine is permitted to run all the time at a uniform speed in the same direction. The engine requires no attention after being started, and regulates its own speed whether the car be running or standing still. To start the car the contact of the pulley with the disk is always made near the centre, so that the car is started with a gentle motion, and with an enormous leverage. In rounding curves, or in ascending steep grades the contact may be maintained near the centre, thus securing sufficient power under all conditions. The friction pulley has a loose band that revolves slightly when the contact is first made, thus avoiding all danger of flattening the friction pulley.

Figure 5 shows the hand levers placed on the top of the main shaft, and which serve to hold the friction pulley firmly against the disk, or release it and also to move the pulley up or down on the shaft.

In the transmission of power by friction, it is necessary that the contact pressure should vary in proportion with the power transmitted, this is accomplished automatically by means of a right and left screw nut operated by an eccentric extension and the hand lever, so that any movement of the lever in either direction to vary the speed, changes the pressure of contact correspondingly, thus securing maximum pressure on grades or curves, and minimum when running at full speed. This is the most important feature of the device, as it would be impracticable to run at full speed with the same contact pressure that is required when starting on grades or curves.

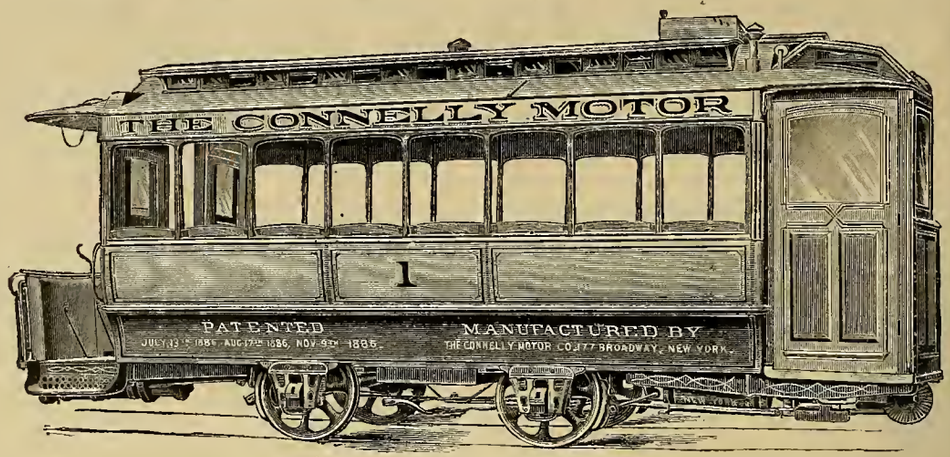


FIG. 1.—THE CONNELLY MOTOR.

on the disk. The main shaft transmits power to a counter-shaft under the platform by cut gears.

All the machinery works in perfect harmony, the transmission device communicating power to the cars without noise, shock or jar. The engine emits no smoke, nor odors, and is practically noiseless. The brake chain is wound up on a shaft that is on the same line with the countershaft, and with which it is connected by a cone friction clutch. A short hand lever sets this clutch so that the brakes are operated by the engine. Less than one gallon of naphtha per hour is required to operate the motor. The cost per day (14 hours) for fuel, at five cents per gallon, would be seventy cents.

The engine, is equally well adapted for general use, and the company propose building all sizes from 2 to 15 horse-power.

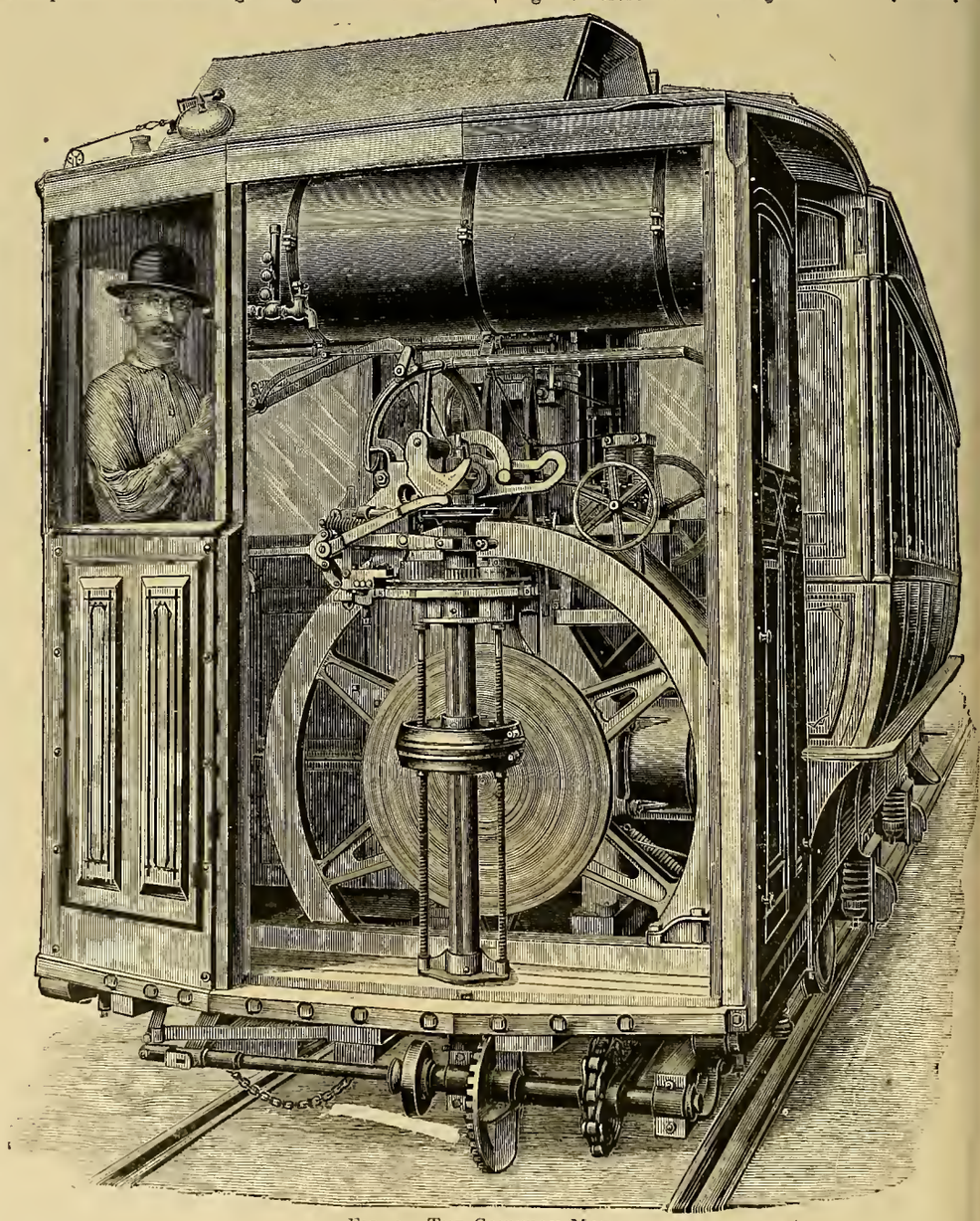


FIG. 2.—THE CONNELLY MOTOR.

Figure 6 shows small spur wheels on the ends of the screw rods, which mesh into cogs on the inner surface of the grooved pulleys, shown in Figures 4 and 5. By checking these pulleys with a friction brake, the screw rods are made to turn, and so carry the friction pulley to any point

An Electric Mountain Railway.

A correspondent of the London *Daily News* writes from Lucerne concerning the electric mountain railway—the first of its kind, as the *Electrical Engineer* (London) observes—which has recently been opened to the public at Burgenstock, near Lucerne, under the superintendence of Mr. Abt, the Swiss electrical engineer. A bed has been cut for the most part out of the

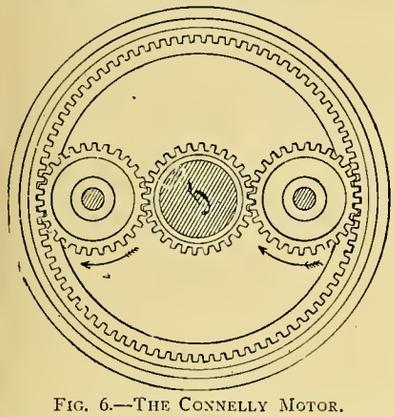


FIG. 6.—THE CONNELLY MOTOR.

solid rock in the mountain side, from the shore of the Lake of Lucerne to the height of the Burgenstock—1,330 ft. above its level, and 2,860 ft. above the level of the sea. The total length of the line is 938 meters, and after the first 400 meters a gradient of 58 per cent. is maintained for the rest of the journey. A single pair of rails is used throughout, with the exception of a few yards at half distance to permit the two cars to pass, although only one car is at present used. The motive power, electricity, is generated by two dynamos, each of 25 h.p., which are worked by a water-wheel of 125 h.p., erected upon the river Aar, at its mouth at Buochs, three miles away. The loss of electricity in transmission is estimated at 25 per cent. Only one man is required to manage the train, and the movement of the cars is completely under his control. One

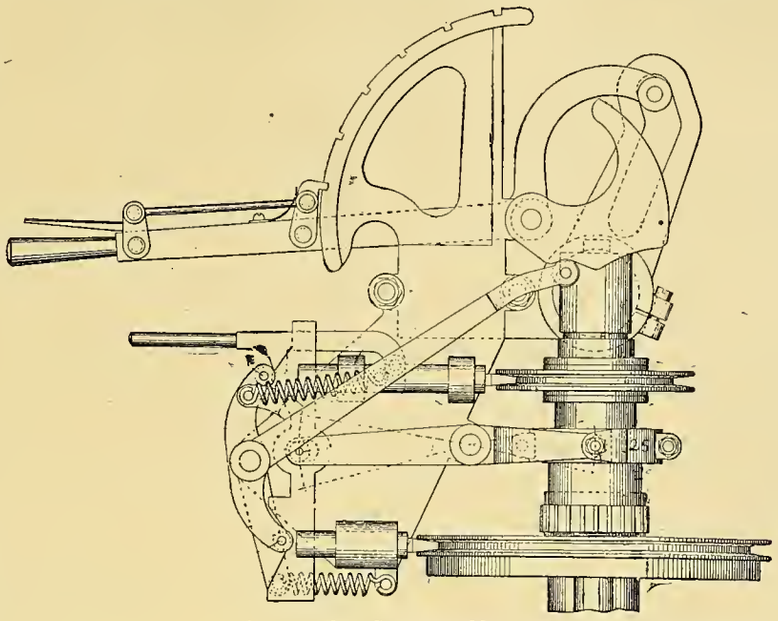


FIG. 5.—THE CONNELLY MOTOR.

dynamo is sufficient to perform the work of hauling up and letting down the cars containing 50 or 60 persons. A finger moving along a figured disc before the man at the water-wheel enables him, by means of a millimetre screw, moving at the rate of a millimetre to every metre of the railway, to see the exact position on the line at any given moment of the journey, and he can increase or slacken speed accordingly. In addition to this advice, the cars themselves give him a signal at stated points, after leaving the stations, by ringing a bell at the machine room. The most complete safeguards are used to prevent the cars breaking loose by means both of brakes and cog-wheels for ordinary use, and a steel anchor in case of accident, which will effectually prevent the car running backward. This interesting undertaking has been carried out at a cost of £25,000. The electric power gained at the stream by the water-wheel also lights the whole of the hotel buildings and its grounds by electricity, and when the railway is not working, another dynamo pumps up spring water 1,000ft. for use in the establishment. The prospect is almost equal to that from the Rigi, and the Burgenstock will, doubtless, henceforth claim a much greater share of attention than hitherto.

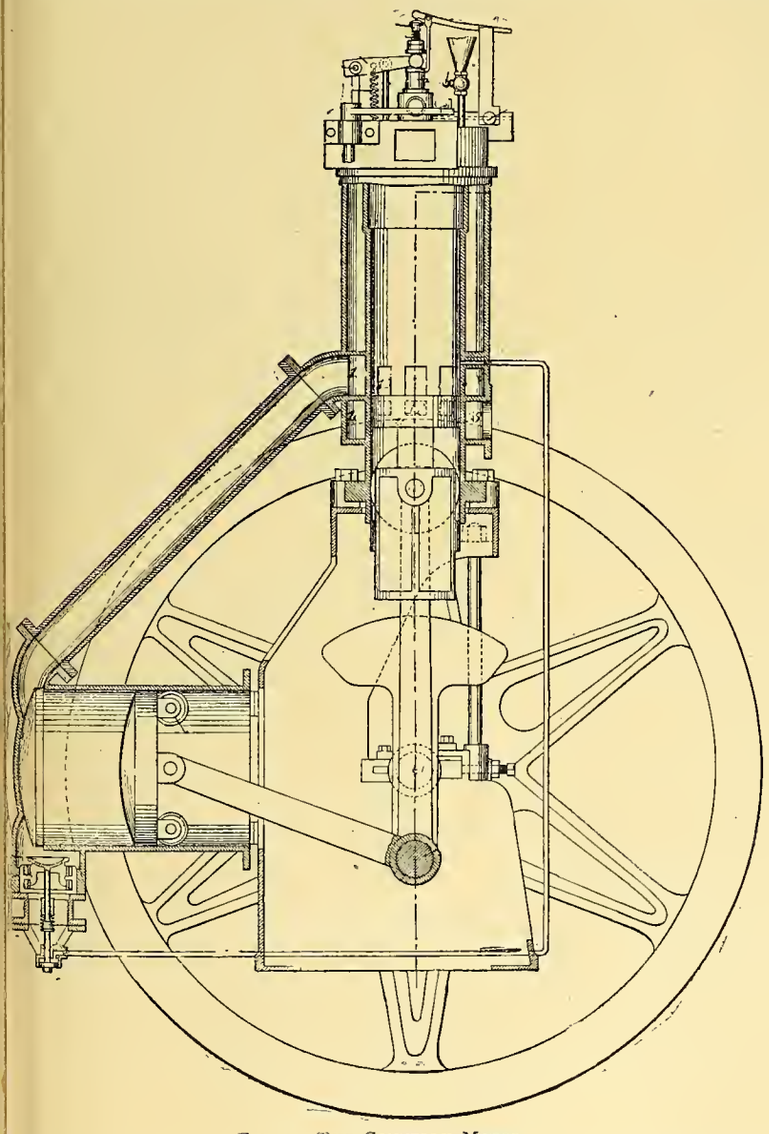


FIG. 3.—THE CONNELLY MOTOR.

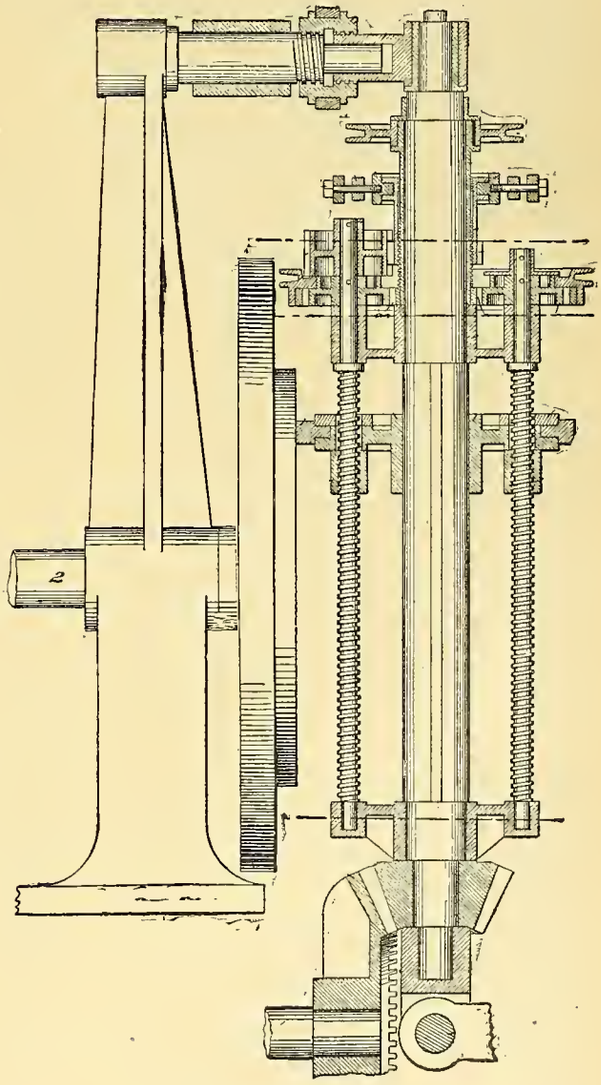


FIG. 4.—THE CONNELLY MOTOR.

ON the New York elevated roads money is counted by weight, ten and three-fourths pounds of nickels being equivalent to fifty dollars. On the bob-tail cars where passengers decline to put in their fares money is also counted by wait.

The
Street Railway
Gazette.

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Articles and papers on subjects relating to intermural transit always appreciated; the GAZETTE'S columns are open for the expression of independent opinions, and the discussion of all matters connected with street railways—on the surface, elevated or underground. A special column is devoted to the publication of trade notes and items from manufacturers and dealers.

CONGRESSIONAL discussions of electric railways have run high since our last issue. Some honorable members said they never heard of such a thing as an electric railway before the late discussion thereon in Congress. Others said, in effect, that they had seen such a thing, but did not suppose they were any good. While others declared they were very dangerous things indeed, and hoped Congress would do everything to suppress them. Extracts from the Congressional discussions are given in a part of our *Directory Supplement* this month. They are amusing, or rather astounding, if not edifying.

CHICAGO is still the scene of agitation by elevated railway projectors, while the underground schemes are lying still. Quite twelve months have elapsed since the West Side Rapid Transit Co. "put their heads together" to "create" public opinion against existing and prospective means of intermural transportation on the west side of the city, and proclaim the advantages (imaginary and otherwise) of "L" roads. The public, however, will not be convinced against its will. And unfortunately (or otherwise) the oracle of the West Side Rapid Transit Co. sticks to the gross mistake of running down the present facilities with the view of setting up his own scheme; and this is continually done in such a way that everybody can see through it.

NEWSPAPER efforts to brew troubles between street railway managers and employees are the rage just now all over the country. The Boston press, for instance, has been making considerable rumpus for some time, indicating that there was a strong feeling of dissatisfaction among the street car drivers and conductors of the Hub. It was probably upon that supposition that a weekly paper, the *Railway and Steamboat Gazette*, started last April holding out the announcement that "complaints * * will be gratefully received!" They did receive complaints, it seems; and, what is more, they investigated those complaints as well as the grumblings published uninvestigated by the daily press, with the result that they have "invariably discovered them to be made out of whole cloth." They unequivocally declare that the great majority of the men are "perfectly satisfied," and that it is only a few ne'er-do-wells who wish they had more money and nothing to do except to receive their wages.

Tramway Horses in Europe.

The *Union Internationale Permanente de Tramways* have gathered information concerning the feeding of horses, and the work performed by the animals. The following are the formal questions issued by the general secretary of the Union (M. Nonnenberg) on the subject, and the answers follow:

A. What does the average allowance to horses consist of? In what state do you feed oats, barley, corn, etc. Is it necessary to soak or crush these articles of food, and to what extent?

B. What implements do you employ for such purpose? What do they cost? What horse-power is required, and what is the output per hour?

C. What is the daily run of your horses in kilometers? At what rate of speed is this accomplished?

(*Tramways d' Aix-la Chapelle et Borcette.*)

A. The average allowance of our horses in 1887 was, 8.35 kilos. oats, 3.59 kilos. hay, 0.50 kilos. cut straw. The oats were given without any preparation.

C. The work we receive from our horses amounts to 20 kilometers daily for those in single harness, and 24 kilometers for those in double harness, the capacity of the cars being the same in both cases. We would remark that our system consists generally of big inclines, which renders the work of the horses very taxing. The average gait of the horses is nine kilometers per hour.

Societé des Tramways du Sud d' Anvers-(South Antwerp).

A. Oats 8.20 kilogrammes, hay 6.50 kilogrammes, straw 3.50 kilogrammes or 5.00 kilogrammes turf. We give oats entire in dry state. We do not find it necessary to soak or crush oats.

C. 21,500 kilometers—10 kilometers per hour.

Tramways de Breslau.

A. The daily allowance of our horses is 9 kilos. oats, 4 kilos. hay and 2 kilos of cut straw, the latter mixed with oats. We give oats without crushing or soaking, as we consider this manner as being the most rational, as only in this way can a horse thoroughly masticate his food and mingle it with his saliva, which process forms such an important part in digestion.

For old horses with bad teeth it may be advisable to crush the oats somewhat. In our enterprise we have no old horses however.

C. The average daily travel is 21 to 22 kilometers, which require a speed of 160 to 200 meters per minute.

Les Tramways Bruxellois (Brussels).

A. The daily allowance is as follows:

(a). For horses bedded on straw: 8½ kilos. oats, 4 kilos hay, ½ kilo. cut straw and 3½ kilos. uncut straw for bedding.

(b). For horses bedded on turf: 9 kilos. oats, 3½ kilos. hay, 1 kilo. cut straw, 4½ kilos. turf.

Large horses which are heavily worked receive in addition to the above, one kilo. oats.

When a veterinary surgeon orders bran or oatmeal given to our horses, we diminish the quantity of oats, so as to bring the cost of this particularly prescribed food to our normal price.

The oats are not subjected to any preparation, the hay being given uncut.

For a period of two years as an experiment and an economical test, we fed 3 kilos. barley instead of 3 kilos. oats. This innovation brought very unsatisfactory results, especially in winter. In consequence thereof the horses lost so much flesh that we were compelled to abandon this manner of feeding. Experiments with soaked and crushed barley have not given any better results. The use of barley whole, crushed or soaked (which we have tried for several years) has given bad results.

B. Straw cut by hand power, is only used at the depots.

C. Single harnessed horses make a daily run of 22,500 meters, with a reserve of between 15 and 20 per cent., according to the business and topography of the lines. Taking into consideration the reserve and supplementary services the horses may be used for, the average work is but 19 kilometers for an average horse.

Horses in double harness make 22½ to 25 kilometers daily according to condition of the road, with a reserve as above, and under the same conditions the daily average run is about 21 kilometers.

It must be borne in mind that the topography of Brussels is very uneven, and that our tramway system presents a large number of very long and frequent inclines, etc. Also that in the computation of the work of the horses it must be remembered that outside of their regular duties they are expected to do all the hauling of fodder salt, sand for the road, as well as the transferring of the cars to and from depots and car shops. The average speed of a trip is 140 meters, stoppages included. Owing to the accommodating manner of the road in affording ample time to passengers for entering and descending and promiscuous stoppages, the cars lose considerable time by these frequent halts.

Tramways de Cassel.

A. The daily allowance of our horses consists in general of 8 kilos. oats, 4 kilos. hay, and 1 kilo. of a mixture of 2 parts of cut rye straw and one of hay.

The oats are neither ground or wet. It is fed the same time as the mixture in four meals daily say 2 kilos. in the morning, 2 kilos. at noon, 1 kilo. in the afternoon, and 3 kilos. in the evening. Hay is given only in the evening, and then a one time.

We have tried grinding oats for all the horses but we soon had to abandon it as we became convinced that the expense of the crushing, even with machinery, would exceed the benefits to be derived by its use in that manner. In our opinion the soaking or crushing of oats is only to be recommended for very old horses, or for horses which do not seem to feed well.

C. The average daily run of our horses is 25 kilometers.

Tramways de Cologne.

Daily allowance as follows: Oats, 8.5 kilos. hay, 5.5 kilos., straw, 1 kilo, add for turf bedding 3 kilos.

With us the food undergoes no preparation (cutting or crushing) with the exception of the straw, which is cut.

For some time we have tried a mixture of oats and barley (in the proportion of 5 to 3), but the result has not achieved enough importance to warrant our drawing conclusions from same. Still the impression produced by this test on the representatives of this enterprise is that an allowance of oats alone, is preferable to a mixture of oats and barley, even if the latter is crushed before mixing. It is well known that barley slightly cracked or soaked digests easily.

During the winter months the proportion of corn is augmented and the quantity of oats decreased.

Only the corn is crushed.

The grains are given to the horses mixed with cut straw, and slightly dampened.

(B). The corn crushing machines are simple in construction, being composed really of two corrugated cylinders, one placed on the other. A apparatus of this kind costs about 220 Marks. A gas machine of two horse power is the motor, and delivers 15 to 17 quintals of corn per hour.

(C). The average daily work we find to be 26.11 kilometres. This is produced at the rate of 150 metres per minute, stoppages included. It can be said, however, that the real speed is 160 to 170 metres.

Tramways de Francfort.

(A). Our average ration to horses can be set down at ⅔ oats and ⅓ corn. Both cereals are slightly pressed.

We have obtained some genuine success by this manipulation, as we have discovered that certain horses which have been troubled with costiveness, &c., by using this treatment now digest perfectly.

We consider that steeping of the food is injurious, as the cereals lose a portion of their nutritious qualities.

(B). The grinding is done by means of cast steel cylinders.

This machine is propelled by a 3 horse power gas machine, the expense of which is 21.3 Pf. per hour. Output 10 cwt. oats or 25 cwt. corn.

(C). During the three years past our horses

ave traversed daily an average of 23 4 kilo- ıetres ; in 1887 the work exacted amounted to 3.5 kilometres. Our cars are propelled by one orse, and the traffic is very considerable.

Tramways de Halle.

(A). Our horses are allowed daily 8½ kilos. ats, ¼ kilos. peas, 4 kilos. hay, 1 kilo. straws he oats and peas are not crushed.

(*C*). Our horses cover on an average 24½ kilo- ıetres daily, at a speed of 150 metres a minute.

Tramways de Hamburg.

A. Following is what we allow our horses daily: kilos. oats, 1 kilo. corn, 1 kilo. peas, r½ kilos. ut hay and 2½ kilo. of cut straw, mixed together lry. The horses receive in addition to above 1½ ilos. of hay placed in the stable racks, and 2 ilos. of straw for bedding.

B. Corn and peas are crushed.

The crushing mills and hay cutters are gener- lly moved by horse power. Each depot prepares s own food for horses stabled there. In one of ur depots we have put up a 2 horse power gas ngine.

C. The schedule daily travel is from 20 to 21 ilometres for single harnessed horses, and 22 to 3 kilos. for double. This record is frequently xceeded. The horses make 166 metres per inute.

Tramways de Heidelberg.

A. Our daily rations can be summed up : 6 ilos. oats, 2 kilos. corn, 6 kilos. hay (of which 3 ilos. cut) ½ kilo. cut straw and 3 kilos. turf for edding.

The corn and oats are crushed, the latter in all ases being simply pressed to thus guard against eing ground into meal.

B. We use a cylinder machine (Schrotmuhle) or this purpose, moved by horse power. Price f same 700 marks.

C. We exact 25 kilometres as a day's work of ur horses, with a locomotion of 12 kilometres er hour.

Tramways de Leipzig.

A. Our horses receive a daily allowance of kilos.oats, 4½ kilos.hay, 4½ kilos.straw and 2½ ilos. cut straw. This is distributed in 5 meals. he oats are neither soaked nor crushed and are ıixed with the hay.

When we give the horses corn we crush it in a ylinder mill and give it in conjunction with oats nd a mixture composed of 5 parts of cut straw nd 4 parts of luzerne (clover hay).

We can only recommend crushed oats for ld horses with bad teeth and deranged diges- ive apparatus.

Should barley be given (which we can not re- ommend) it should be soaked in warm water ntil the grains open, then it is to be mixed with he cut straw and served in a tepid state to the orses.

B. Our experience in regard to implements o crush feed being so limited, we would not isk expressing an opinion.

C. The daily service of our horses is 20.7 ilometers for an average, and 22.3 kilos. for a ood strong horse.

It will be noted that, with the exception of one ne, all the locomotion is done by one horse. When the natural conditions of the road, in a lace like Cologne, are taken into account, the bove figures represent considerable work.

Tramways de Danzig.

A. The allowance of our horses is composed f 6 kilos. oats, 3 kilos. corn, 4½ kilos. hay, 2 ilos. cut rye straw and 2 kilos. of straw for bed- ing. We crush oats and corn in such a manner hat the hulls of the oats are lightly bruised, and he corn simply cracked.

We were induced to flatten out the oats be- ause we observed that the manure voided by orses fed on non-crushed oats, when exposed to he rain at certain times, would become covered ith vegetation. This demonstrated the fact hat the oats had passed through without being igested.

B. We employ for crushing a machine manu- actured by H. P. Eckhart, of Berlin, cost 230 narks, and which has done its work satisfactorily or a period of eight years without requiring any epairs. The output of this machine is in the eighborhood of 600 kilos. oats or corn; it is noved in conjunction with a hay cutter, which latter has a capacity of 600 kilos. per hour. The motive power is an Otto gas engine of 4 horse-power.

The gas plant cost about 3,500 marks. The cost of this enterprise is M 0.70 per hour, the cost of gas being M 0.17 the cubic meter.

C. The average run of our horses is 25 kilo- meters, accomplished at a speed of 160 meters per minute.

Tramways de Lubeck.

A. The daily ration for our horses is as fol- lows : 8¼ kilos. oats, 1 kilo. peas, ¾ kilo. bran, 3 kilos. cut straw, 2½ kilos. hay, 1½ kilo. straw for bedding.

The oats and peas we do not grind. The peas are soaked for 12 hours before being given to the horses.

We would not recommend grinding oats, be- cause the horses will not well masticate this food and hence their digestion will suffer.

C. The average labor of our horses last year was 27.783 kilos. daily, which represents a speed of 150 metres per minute.

(*To be continued.*)

The Thomson-Houston Electric Railways.

ROADS UNDER CONTRACT, SEPTEMBER 1ST, 1888.

Name of Road.	*Location.*	*Miles Single Track.*	*No. of Cars.*	*Motors.*
Scranton Pass. Ry. Co.	Scranton Pa,	2	4	8
Hoosac Valley St. Ry Co	N. Adams, Mass.	5	6	12
Third Ward St. Ry. Co.	Syracuse, N.Y.	4	8	15
Riverside & Suburban St Ry.	Wichita, Kans.	2	3	3
Des Moines Broad Gauge Ry.	Des Moines, Ia.	7½	8	16
Omaha & Council Bluffs Ry. and Bridge Co.	Council Bluffs, Ia.	9	12	24
Danville St. Car Co.	Danville, Va.	2	4	4
Hudson St. Ry. Co.	Hudson, N.Y.	2½	3	6
Eckington & Soldiers' Home Ry. Co.	Washington, D C.	2-1-7	3	6
Seattle Electric Ry. and Power Co.	Seattle, W.T.	5	5	8
Bangor St. Ry. Co.	Bangor, Me.	5	4	8
West End St. Ry. Co.	Boston, Mass.	10	20	40
ORDERS FROM ROADS NOW RUNNING.				
Scranton Suburb. Ry. Co.	Scranton, Pa.		10	20
Nayang Cross Town Ry. Co.	Scranton, Pa.		4	8
ROADS RUNNING WITH T.-H. IMPROVED MOTOR TRUCKS.				
Scranton Suburban Ry. Co.	Scranton, Pa.		1	1
Lynn & Boston St. Ry. Co.	Lynn, Mass.	1⅞	2	4
Revere St. Ry. Co.	Revere, Mass.	1	1	2
Observatory Hill Ry. Co.	Allegheny City, Pa.	4	4	8

Boston, Mass., Aug. 16, 1888.

MR. WINTHROP COFFIN, Railway Department, THOMSON-HOUSTON CO., Boston.

Dear Sir: After an investigation of several electric railroads, including those at Allegheny City, Salem, and Revere Beach, and a study of the overhead work and the motors of both the Sprague and Thomson-Houston companies, I have decided to equip our road with your system. Although your estimates are very much higher than the cost of the Sprague system, I am convinced that the extra strength, simplicity, neatness and wearing qualities of your motors and other parts of your system will much more than overbalance the first extra cost, and give us a system that can be depended upon.

Yours Truly

EDWARD C. KILBOURNE,

Of the Seattle Electric Railway and Motor Co., Seattle, Washington Territory.

Boston, Mass., Aug. 29, 1888.

CAPT. EUGENE GRIFFIN, THOMSON-HOUSTON ELECTRIC CO., Boston:

Dear Sir: The Lynn and Boston Railroad have adopted the Thomson-Houston overhead system for propelling cars by electricity, after careful examination of all methods of propulsion. We have operated for two months one branch of our road by this system, and are now equipping the part of our line which runs upon the most densely populated streets of Lynn. I do not consider the conduit method sufficiently tried to justify its adoption by us. (Signed)

A. P. BREED, president

MR. WM. H. CLARK, secretary and treasurer of the Derby Horse Ry. Co. Ansonia, Conn., was in Chicago recently. He thinks there is nothing like the Thomson-Houston electric railway system.

J. H. WELLS is no longer connected in any way with the Engineers' Publishing Company. He has no authorization to transact any business, or to collect any money on our account, and our friends will please remember this.

The Sprague Electric Railways.

The Sprague Electric Railway and Motor Co. since the last issue of this paper has closed the twenty-sixth contract for equipment of railroads on the Sprague system.

When it is remembered that this is simply the record of the last six months and that on the first of February the Sprague Company had not a single road in operation, it is indeed a wonderful showing, and is a pretty good sign of special merit.

As a correspondent observes, it speaks very directly for the care with which each electrical equipment is prepared and for the success which has attended each installation.

Among the latest contracts for the electrical equipment of street railways closed by the Sprague company, are those in Erie, Pa., Reading, Pa., and Asheville, N. C.

The first named company is the largest in the city of Erie, and operates twelve miles of track and over one hundred horses. The contract specifies for the equipment of 12 cars, and overhead system. The electrical appliances will be of the finest description, and will embody all the latest improvements introduced by the Sprague company upon their railroads. At the central station there will be four dynamos of 50,000 watts capacity each, which will deliver the electricity to the line at a pressure of 500 volts. The overhead wiring will carry the light No. 6 bronze wire for a working conductor which is in use upon all the Sprague railroads.

The East Reading Street Railroad Co. runs out Fairview Avenue, and covers about a mile and a half of street. The same overhead system will be used as on all the Sprague company's roads, and the poles will be of a neat and tasty design.

The president and directors of the Asheville Railroad, before making any contract with the Sprague company made a careful examination of all the electrical systems now in operation in this country. They decided upon the Sprague system, considering that superior to all others. The road is three miles in length.

At St. Joseph, Mo., the successful operation of the Sprague system on the road of the Union Passenger Co. of that city has decided the Wyatt Park Railway Co. to adopt Sprague motors and overhead wiring upon its cars

The Union Railway company has also contracted for an extension of the Sprague system upon its road.

Two other street railways now using the Sprague system over part of their roads, have decided to extend it over the whole. These are the Wilmington City Railway company of Wilmington, Del., and Suburban Ry. Co., Wilkesbarre, Pa.

These have been in operation about three months, and have been giving perfect satisfaction. The first equipments of these, were three and four cars respectively.

The work on the electrical equipment for the Brockton, Mass.,East Side Street Railway is being pushed forward as rapidly as possible. The Sprague overhead system of wiring will be used and all the latest improvements will be adopted. It is expected that this road will be in operation by the middle of the present month.

The committee appointed by the city council of Akron, Ohio, to investigate the subject of electrical railway propulsion, has advised in favor of the Sprague system. They visited every successful railway in the country, and the operation of each was inspected. In the report the committee stated that they were fully satisfied, from their investigations, that the Sprague system was superior to all others, and consequently the contract for equipping the road in that city has been given to the Sprague Co.

The equipment will consist of twelve cars.

The Manchester and Richmond Street Railway company has also contracted with the Sprague company for the equipment of its cars by the Sprague system. This will make *three* roads and *one hundred* cars which the Sprague company has in operation or under contract in that city alone.

The East Cleveland Street Railway, of Ohio, operating 160 cars and owning 650 horses, has, through its president, Dr. A. Everett, contracted with the Sprague company for the electrical equipment of a part of that important railroad.

There is no necessity of changing the truck of the street car or of stopping traffic in order to change from horses to electricity.

"It is a success in all respects" (the Sprague road at Richmond, Va.) "and it is carrying the people of Richmond as they have never been carried before, and with entire satisfaction to everybody. It is operated by a system of overhead wires which is positively unobjectionable; the cars ascend grades of nine per cent. at the rate of six miles an hour, and are under the most perfect control." (Pres. Whitney, of Boston.)

The Street Railway Exhibition.

Mrs. Farnham's Street Car Operator will be there.

Mr. Augustus Day will exhibit his well-known scrapers.

The Kail Manufacturing Company will exhibit their fare boxes, change maker, etc.

The Sprague Electric Railway & Motor Co. will be represented. Their general agent, Mr. H. McL. Harding, says: "We trust to have a machine shortly as near perfection as human invention can reach."

We are promised details of numerous exhibits for our next issue. There is every prospect of a good exhibition, as well as a splendid convention. It is the Association's 7th annual (the perfect number); it is held at Washington, the head center of the U.S.; and Willard's is the hotel, the best in Washington. As declared in our advertising pages, the courteous proprietor (Mr. O. G. Staples) intends to provide such a grand banquet as was never excelled if ever equalled.

Mr. J. C. Higdon, the active patent lawyer, writes Sep. 1: "I have noted your articles on the Exposition or rather Exhibition of railway appliances to be held in this city in October, and you may rest assured that I shall take pleasure in doing all I can to make it a success. I will try and be on hand, and would be glad to meet the street railway people of the country, many of whom I am personally acquainted with; and I hereby extend, through yourself, a hearty invitation to any of your friends to call at my offices while here. The Patent Office is only a short distance from Willard's."

Our Card Basket.

Mr. C. A. Coffin, vice-president and treasurer of the Thomson-Houston Electric Company has commenced a well merited vacation.

Col. Thomas Lowry has examined the Prosser street railway locomotive at Palmyra, Wis., and will tell the street railway men, who will meet at Washington in October, all about it.

Mr. O. G. Staples, proprietor of Willard's Hotel, Washington, D. C., where the forthcoming street railway convention is to be held, is the well known Mr. Staples, late of the Thousand Island House. Several of our street railway presidents know him well, and speak of him in the highest terms of praise.

Major J. J. Palmer passed through Chicago recently, on a tour of inspection of electric railways, on behalf of the Helena Motor Ry. Co., who were going to use steam motors, but Major Palmer has assured them that "Electricity is what they want." The Major visited the now celebrated Richmond electric road, and he says he cannot quite decide whether to have the Thomson-Houston or the Sprague electrical equipment.

Mr. J. C. Robinson, the famous tramway organizer and manager, visited Chicago recently. The American instinct is heavily upon him, and we hope his valuable services will soon be secured by some large company in this country. The old country is not the best place for him, here he is in his element.

Mr. C. T. Yerkes is again the central target for newspaper squibs in Chicago. He was shoved to the background while Mr. Sumner C. Welch was on the stand, but now Mr. Yerkes is well to the front. Justice McAllister, of the Appellate Court, scored a point of law in his favor Sep. 6, and somehow or other Mr. Yerkes always comes out of every contest on top.

NEW PROJECTS, PASSING EVENTS, &c.

Alabama.

Anniston.—Franchises have been granted for steam motor lines, to two companies. The Anniston, Williamsport and Highland Cave RR., with a capital stock of $120,000, will build a road about four and half miles long. The Anniston, Aderhold Park & Lake Side Dummy Line is the project of a company with $75,000 capital.

Arkansas.

Camden.—The Camden Street Railway and Telephone company has been organized for the purpose of constructing a street railway, etc.

Little Rock.—The Little Rock Electric Street Railway company has completed its line, and celebrated the event by giving a big excursion to the citizens and any one else who would accept the company's hospitality. It was attended by the officers of the state, county and city, and by a large number of guests from different points in the state and country. The line is four miles in length, and passes through the best property in the city.

California.

Los Angeles.—G. W. Morgan, Nathan Cole, jr., and others, have petitioned the Los Angeles, Cal., trustees for an electric railroad franchise, to build a road from Franklin and New High streets to Pasadena. The storage battery system will be used.

San Francisco.—The Sutter Street Railroad company has notified the Board of Supervisors of the intention of abandoning the franchise they had to run a railroad over certain streets.

Colorado.

Denver.—The Denver City Street Railway company is considering the building of a viaduct on Sixteenth street. The company will build a horse car line in North Denver as an extension of its projected cable line. It will build a power house for its cable line that will be 125x150 feet, with two stories and basement. In the basement will be two 30x60 Corliss engines with 600 horse power boilers. There will be drums for five cables.

Connecticut.

Ansonia.—The wires of the Ansonia electric railway were struck by lightning recently and all the motors which were in connection at the time were injured, and the armatures burnt out.

Meriden.—The Daft company have completed the equipment of the electric road, the opening of which was recorded in our last issue. There are eleven motor cars, and the line operates admirably according to all accounts.

Florida.

Tampa.—The Tampa Street Railway company is looking into the claims of electric railways, and proposes to adopt electricity.

Illinois.

Chicago.—The Jackson street bridge has been opened, and a splendid structure it is. Efforts have been made to obtain rights to run a street car track over it, but the city fathers are positive that this one bridge must be preserved from the invasion of street cars. Consequently the new cross-town company—the Union Pass. Ry. Co., the organization of which was recorded in the Gazette for December last—has to seek passage over the river lower down.

Inquiry among the property owners along Taylor street proved that the petition for the Union Passenger's franchise had been extensively signed and that the property owners were decidedly in favor of giving the company a fair show. Mr. Clayton Marks, 201 Home Insurance Building, is the secretary of this company. They think of adopting storage batteries, if it can be shown that they are reliable and economic.

The State street elevated road (outstripped, for the time being, by the "alley way "L" road) is to be "pushed" vigorously.

The West Side cable road is to be constructed right away. A friendly opposition, under the leadership of Col. Thompson, has done much to clear the course of all obstructive opponents.

At a recent meeting of the West Side car drivers and conductors, resolutions were adopted denouncing an alleged scheme to bring discredit on the association by introducing brothers-in-law, which they claim is the work of Pinkerton men.

A hundred property owners who are membe of the Northwestern Improvement Club, in meeting held Aug. 30, decided to petition t City Council to lay sewers on West Chicago av nue between Oakley avenue and Rockwell stre The West Chicago street railroad company h promised to extend the car tracks to Hannit street as soon as sewers are put down.

Certain property owners on Twenty-seco street between the Illinois Central Railroad tra and Indiana avenue, procured an injunction fr Judge Jamieson Aug. 29, restraining the Chica City Railway Company from laying a track Twenty-second street. The company got pe mission last year to build a cross-town line fr the lake to the river. There are 2,203,96 feet frontage on Twenty-second street from the la to Indiana avenue, and one-half of this fronta should have been signed to the petition for t ordinance. It is asserted that only 222.2 fe signed, they being Mrs. Harriet A. Jones a Mrs. Ella I. Jones. The ordinance, it is said, otherwise defective. As all events, there see to be a feeling that street car facilities in th district are ample at present, thanks to the fo sight of Mr. C. B. Holmes.

The Chicago & South Side Rapid Tran company, or alley way syndicate, are proceedi vigorously with their condemnation suits. Th mean to get there as soon as possible, it seem all rumors to the contrary notwithstanding.

The Chicago underground railway proje are not dead, but slumbering. The latest pr ject in this connection is for a deep tunn something after the style of the new sub-w now being constructed at great depth in Londo

North Chicago is now being agitated for elevated road. There is a scheme for the co struction of an elevated railroad on Wells stre and into the northern suburbs. The name the organization is the Chicago, Lake View Evanston Rapid Transit company. The capi stock is $8,000,000 and the proposed issue bonds $4,000,000, to bear interest of 5 per ce and run forty years. It is said that certa financiers have agreed to take the bonds. T road will be run on the Sherman system, whi includes an electric motor. It is claimed th right of way has been secured from Lake Vi to Evanston, and appeals are now being made property owners for right of way on Wells stre within the city limits. Little is yet known abo the personnel of the undertaking, but the menti of the "Sherman" system brings to mind o friend the Hon. Thomas B. Bryan, who h pushed hard against the tide on the West Side

Englewood.—An effort on the part of ma residents of Wentworth avenue in Englewood have the City Railway Company continue tracks south on that avenue past Sixty-thi street is meeting with opposition. The matt will come before the Board of Trustees of La in a few days for final settlement. The peop who object to the street cars on Wentwor avenue are in favor of having the cable extend down State street to Vincennes avenue. Th are also agitating the question of building a vi duct over the Lake Shore yards at Sixty-thi street.

Hyde Park.—The Chicago City Railway Co pany are negotiating with the Village of Hy Park, the Town of Lake, and the representativ of the Lake Shore & Michigan Southern and t Pennsylvania Railroads to bring about by equitable arrangement the building of a lar and substantial iron or steel viaduct over t area of tracks at Sixty-third and State streets.

At a meeting of residents and property ow ers of Hyde Park, at the Village Hall recentl E. A. Warfield was elected president and A. Proctor secretary. The question of rapid tran being under discussion, Mr. Fred Howard offer the following resolution, which was unanimous adopted:

"Whereas, It is apparent that every new e terprise resulting in greater local railroad faci ties in our village assures a large increase values of real estate, and adds to the populati and general prosperity of the community; and

"Whereas, To afford convenient and rap transit to that portion of the village lying ne Grand boulevard and farther south in the san direction our Village Trustees have given a fra chise to the so-called State Street Elevated Ra

d Company, and, believing that company has intention, ability and means to carry the ject to completion; therefore

Resolved, That this meeting respectfully es the Chicago authorities to promptly and orably consider the proposed ordinance grant- to said company the privilege of building and erating an elevated railroad from Thirty-ninth eet to the business centre of Chicago."

Jefferson.—Some time ago, as a result of much blic agitation, when the Chicago, Milwaukee St. Paul Railroad suddenly advanced its com- itation rates 63 per cent., two ordinances were pared by the village board granting to Mr. rkes permission to operate lines on North and mitage avenues, but fixing the fare at a uniform ce of five cents. These terms were refused. August 29 a meeting of Jeffersonians was d and a committee was appointed to draft an linance that Mr. Yerkes would accept.

Lake View.—Chicago's northern suburb is tating for "rapid transit" facilities.

Normal Park.—An "interested party" warns neighbors against the approaching extension the Chicago City Railway through Englewood. points out the "danger" of the extension be- continued to Normal Park. What he is in- ested in, however, is only a street or two, and nks a street car line would make his property s "residential."

Ottawa.—The electric street railway company ject to begin work about October 1st, and to ve two miles of the road in operation by De- nber 1st. Thomson–Houston's is the system.

IOWA.

Davenport.—It is stated, and then contra- ted, that the negotiation of Mr. R. S. Den- g, of the Chicago syndicate, for the purchase the street car lines in Davenport, Rock Island l Moline has been successful. The deal has ly been hindered by two obstacles, namely, the jections of the Rock Island City Council to unting the two necessary franchises; the one ng an approach to the Government bridge, l the other the privilege of connecting the two ck Island and Moline lines, so that they shall one. Mr. C. B. Holmes, accompanied by Mr. Calkins, went down from Chicago with certi- l checks to the amount of a quarter of a mil- n dollars to close the deal, but Mr. Holmes eld fast that what he had" until a way should secured to get across the river bridge.

The Sprague electric road here is booming. e following is from the Davenport *Tribune:*

"A great success! A wonderful affair! An mense advance for Davenport was the verdict nounced Sunday evening after the first elec- c car in Iowa had made several trips over the e. Car No. 2 started Sunday at 3 o'clock A. and went over the road to East Davenport at errific speed, without a single hitch, with no ps at switches or corners, which were made h perfect ease. Sunday evening everyone was tching for the car which started at Second and ady at 9.40, went up Brady to 15th street, nce east to the end of the line, thence back to ady and north to Central Park; then down ady to the power station; in all a distance of ¼ miles in 53 minutes. Not a single flaw was ind either in trolley wire or ground wire. The ute taken is made with horses in one hour and enty minutes, and includes the long Brady eet hill—1,300 feet—with 7.30 per cent grade; 5 feet on 13th street of 5 per cent grade, and 5 feet north of Locust of 3 per cent grade; ht switches to be made on the round trip, elve curves and three railroad crossings. The , lighted by five 16-candle power Edison hts, was certainly a remarkable and beautiful ht.

"The cars were built by the Laclede Co., St. uis, and are made very strong, with 3-inch es and heavy wheels, and weigh with the tor attached 3,600 pounds. They are 22 feet g over all, and have the swinging gear so as take the corners easily. They are beautifully ished. The motors are 7½ H. P. each, and hung to each axle, and both are worked at same time from either end of the car by ans of a switch which the car operator regu- es with his left hand while managing the brake h his right. At either end of the car is an ctric fare box which rings a bell as each fare leposited into the box, and registers each as it drops below out of sight. The Central road was the first electric road to use these boxes. The trolley is so placed on the roof of the car as to allow plenty of motion to the trolley wheel, but keeping the latter pressed up against the underside of the overhead or trolley wire. The car receives its power from the trolley wire.

"The current generated from the two car dynamos is from 400 to 460 volts only, and is by no means dangerous. Mr. Sprague writes: 'The pressure need not be more than 450 volts, and my men have frequently gotten shocked, both in practice and by way of a practical joke, at from 400 to 600 volts, which is not comfortable, of course, but from which they have never suffered any inconvenience.' The third dynamo gives a pressure of 220 volts only, which will be used to furnish power for motors for printing presses, elevators and machinery of most any kind."

KANSAS.

Wyandotte.—The West Side Street Railway Co. has a capital stock of half a million dollars, with a strong board of directors—Chas. F. Hutchings, Luther H. Wood, etc.

KENTUCKY.

Louisville.—Louisville's first electric railway is now nearly completed. The construction on Green street is progressing rapidly. The overhead (Sprague's) system of transmission will be employed. Under each car will be a 15 horse power motor. Thus, in case of necessity, each car so supplied will be able to draw after it several ordinary cars. This road will have a length of about four miles. It is expected to extend the system in time in both directions from its present route. The road will be in operation in about two months. The time made will be more than twice as fast as that of the ordinary horse cars.

In addition to the Green street line another electric railway is projected here. It is proposed to run a line of cars between this city and New Albany, which is on the Indiana side of the Ohio. This city is about five miles from Louisville. The projectors are, however, not likely to do anything until the Green street line has been completed and proved a success.

LOUISIANA.

New Orleans.—The New Orleans and Carrollton Railroad Co. are awaiting a permit to use electric motors.

This city was a perfect Venice during the floody storm of last month. During the night that the heaviest rain fell the "all night" street cars ceased running after 2:30 o'clock, owing to the danger of the mules falling into gutters where bridges had been floated away. At 6 o'clock the Magazine street line of cars resumed their trips, but the cars were preceded by men armed with saws and axes, with which they cut away trees which had fallen and obstructed the tracks. All of Coliseum place was a lake, from the dwellings on Camp street to those on Prytania. It was after 9 o'clock before the cars resumed their trips above Louisiana avenue, as the tracks had been badly washed, and planks and bridges floated away.

The Dryades and Rampart, Clio and Erato, Dumaine, Esplanade and other street car lines commenced running at later hours than usual and all of the cars were propelled through flooded streets. The bayou route of the Dumaine street car line was abandoned entirely, the water standing four feet and more on the track from Claiborne street to the bayou. All that section of the Second district embraced between Marais street, the lake, bayou St. John and Esplanade streets was inundated, and although the street cars were running none could alight from the cars dry shod save into boats or upon rafts.

MAINE.

Lewiston.—Electric propulsion is growing into favor and much desired here.

MASSACHUSETTS.

Boston.—The Brookline extension of the West End Street Railway will be in operation, it is expected, before the next number of the STREET RAILWAY GAZETTE becomes due. The Newburyport Car Mnfg. Co. are manufacturing the cars. The Armington & Sims' engines (250 H. P. each) will drive the dynamos, and no effort is spared to make the electric railway first-class in every respect.

Brockton.—The East Side Street Railway Co. have made arrangements with the Brockton Street Railway Co. to use the same tracks on Main street.

Holyoke.—The Holyoke Street Railway Co. is to be reorganized under the leadership of Mr. W. C. Loomis, who has bought up a majority of the stock.

MICHIGAN.

Bay City.—This city is plagued with the "exclusive right" question. The Circuit Court issued an injunction August 1, enjoining the Bay City Street Railway Co. from laying tracks on Third street. The company claim exclusive rights to all the streets of the city, and these legal proceedings will test the validity thereof. A project is matured to bring a continuation of a West Side street railway across the river, which must come along Third street, if at all, and the Bay City company proceeded to head them off by laying a track on that street themselves.

Detroit.—The Grosse Pointe Electric Railway was officially and aldermanically inspected August 18, when fifteen Detroit aldermen took a trip over the line in response to the invitation of Messrs. Frank E. Snow and W. A. Jackson on behalf of the Grosse Pointe Electric Railway Co. The Detroit *Tribune* of next days says: "The so-called 'Snow' electric railway franchise comes before the common council next Tuesday evening, and yesterday's trip was intended to make plain the meritorious features of the Fisher system, a method of electrical application patented by the Detroit Electrical Works, which will be used on the proposed rapid transit routes in the city if the franchise is granted. The Fisher system has been adopted recently in San Jose, Cal., Springfield, Mo , Phillipsburg. Pa., and Sault Ste. Marie, and is in operation on the two Detroit roads to Grosse Pointe and Highland Park. One motor propels the cars, while in some systems, as the Sprague, two are required." The six miles and one-half of track was run over smoothly in in pretty fast time—22½ minutes. Not a hitch occurred, and the aldermen declared themselves highly pleased with the enterprise."

MINNESOTA.

Minneapolis.—Kenwood, says the Minneapolis *Tribune*, is destined to be a delightful place for homes. There are already numerous residences built there. The magnificent lake boulevard system which finds an outlet through it will make it popular. There is a scheme on foot to secure a street car line into the addition, and Douglass avenue on the top of Lowry's bluff is now being graded with the idea of running a street car extension over it another season.

St Paul.—The Enos Electric Railway Co. "now that it has the inch wants the ell," and offered a "pressing" ordinance to the council August 21 to secure authority to build their elevated electric railway from the end of their proposed bridge on Second street, along Cedar to Eighth to Wabasha, to University avenue to the city limits. "The company was promptly sat upon by the council's referring the ordinance to the committee on streets."

MISSOURI.

Kansas City.—The City Council has refused to grant the Metropolitan Street Railway Company a franchise for the building and operating of a loop cable line that would have connected the Ninth, Tenth, Eighteenth and Fifth Street Railway.

Mr. Howard M. Holden, of this city, has returned from a trip to the Northwestern States. During his absence he investigated the merits of the Van Depoele system of operating street cars by electric motors, the patents for which are now owned by the Thomson–Houston Electric company, and, as far as his investigation extended, is well satisfied with that system. In the town of Appleton, Wis., a place of some 12,000 inhabitants, the street cars have been operated by the Van Depoele system for a little over two years. "The people of that town seem to be well pleased with the system," said Mr. Holden. "It has stood the test for more than two years now, and, so far as I was able to discover, the people have never yet complained. The cars run very smoothly and with comparatively little noise. My investigations were made with a view to building a road from the Chicago, Milwaukee &

St. Paul depot at Excelsior Springs to the Elms hotel, a distance of about a mile. The company is seriously contemplating this step, and before long will probably make the connection I am very favorably impressed with what I saw at Appleton, Wis., and it is among the probabilities that the road will be built."

The Metropolitan Street Railway company of this city is closely watching the operation of the electric roads of the country. If they should prove successful during the winter, the company propose to build in Armourdale or on the southwest boulevard to Rosedale, and perhaps both. A. J. McCarty, of the company, and C. J. Hubbard, representing Boston capitalists, visited St. Joseph and investigated the operation of the electric roads there. In his official report to his company, Mr. McCarty said: "I found two miles and three-quarters of road containing seven right angular curves and a four per cent. grade in operation. Six cars were running at a rate of speed equal to that of an ordinary horse car's, although greater speed could be obtained if desired, for at my request a car was run at the rate of fifteen miles an hour, and from what I saw on that day the road seemed to be in successful operation. The Sprague system of overhead power is used, although it may be changed to a conduit system if desired."

Robert Gillham, the well known engineer of this city, who has been the constructing engineer of most of the cable lines in this city, and is now the constructing engineer of the cable line of the Denver Street Railway company, proposes to make a test of the electric railways now in operation. He will be accompanied by Captain G. S. Griffith of the United States Army.

St. Louis.—The Short series system of electric railway, which we described in a recent issue, is to be tried here by the St. Louis Railway Co., or the Broadway line. The Board of Public Improvements approved of the plant August 13, and granted a permit to operate a short line experimentally for nine months, the overhead wires to be less than 18 feet high. Col. Flad, president of the board, is strongly in favor of the wires being placed 80 feet high if a permanent ordinance should be granted. The experimental line, which extends a distance of a mile and a quarter, is being constructed as rapidly as possible, under Mr. Short's personal supervision, and is expected to be ready by about the latter part of November. Mr. Wm. Jens, the civil engineer for the various lines of street railway of which Mr. John Scullin is president, spent one month in different parts of the country investigating the various systems of electric railroads, and induced the company to try Mr. Short's series system, which we have already described, but the following description of the line now in progress brings out some of its features more clearly:

The electric railway to be built at the end of the Broadway line will consist in the street construction of ornamental iron supports for the conductors. The lower portion of the iron post will be four inches in diameter, make of strong gas pipe set in the ground five feet with cement and broken stone. The upper portion of the pole is made of three-inch gas pipe ornamented at its top with an arch and arm, to which the cross cable is attached. This pole or arch will be painted a dark slate color, with two coats of paint, and all the castings will be made of malleable iron, thus preventing the possibility of breakage. The cross cable is insulated from this pole and the wires are in turn insulated from the cross cable with special insulators for the purpose. Should a wire become grounded on this cross cable and in turn the cable be grounded on the post or iron support, no shock could be obtained from the pole, as it will be thoroughly grounded. The iron supports for the wires shall be set erect and be of double strength, sufficient to carry the weight upon them; they will be placed at intervals of from 125 to 150 feet.

The conductors shall consist of two one-fourth inch hard drawn silicon bronze wires four inches apart over each track, and shall not be lower than eighteen feet above the rail. The conductors or any part of the circuit shall not be connected with the earth or the rails of the track, but all shall be perfectly insulated. The lightness of the overhead construction will make it very inconspicous and scarcely noticeable, and at the same time it is made of such materials as shall make it exceedingly strong. Should one of the conductors fall to the earth from any accident, or should the telegraph or telephone wire fall over them, and be in contact with them, they may be picked up without injury.

The cars to be operated on this line will be much like the ordinary grip car on the cable roads, each being provided with two powerful motors, which will overcome any load which may be put on them with any condition of track. These cars may be stopped with great suddenness by applying the brake and reversing the motor. A life-guard will be provided on each motor to prevent people from getting under the wheels in case of accident. Electric head-lights will be put on the motors to light the track during the night.

New Jersey.

Asbury Park.—The Sea Shore Electric Railway (Daft system) commenced running July 23, and has since been operated very successfully, we are informed.

New York.

Brooklyn.—The Atlantic Avenue Railroad Co. has been attacked by some limbs of the legal machinery lately. A preliminary injunction was recently issued restraining President Wm. Richardson from laying a switch at the Hamilton avenue ferry for the new railway. Two or three men were arrested while laying a switch at the point mentioned. It is stated that the company have no permit to lay such switch from the Commissioner of Public Works. President Richardson maintains that no such permit is necessary. Police Justice Massey concurs in this view, for he discharged the men arrested on that ground.

The following curious telegram was wired from Brooklyn to all the papers August 29: "An evening paper to-day says that Atty.-Gen. Tabor has determined to move for an order allowing him to begin an action on behalf of the people of the State of New York against the Atlantic Avenue Railroad company of this city for the purpose of vacating its charter. The proceedings will be begun on September 8th in Kingston. The complaint on which the Attorney General bases his action sets forth that the railroad company never received from the City of Brooklyn consent to construct or operate its railroad."

Buffalo.—The Peoples' Electric Street Railway company are to have a hearing before the city council shortly, for consent to construct, maintain, and operate an electric street railway, commencing at the intersection of Seneca street with Indian church road or street, thence running along Seneca street westerly to the Buffalo river; thence crossing said river and continuing along said Seneca street and West Seneca street to Franklin street; then northerly along Franklin street to West Eagle street, etc.

The Central Labor Union did "quite a bit of important business" Aug. 26, according to the Buffalo *Express*. The organization committee reported that the employees of the Buffalo street railroad company were forced to work more hours than the law allows, and that the company were trying to find excuses for the removal of all who were members of the street car men's Union. The committee has been to see the District Attorney, they stated, and he had informed them that if the Central Labor Union would furnish the evidence, he would prosecute the street railway company.

They decided to institute proceedings at once.

New York.—The John Stephenson Company are building some elegant two-horse cars for the Twenty-Third street Ry. Co. who are going to submit to public opinion, as expressed in the *World*, and do away with the bobtail cars.

The Park Board, having been authorized by the Legislature to have street railways in the transverse roads across Central Park, met Sep. 5 to receive bids for the building and operating of such roads. But two bids were received. They came from the Fourth avenue line and the Second avenue line, and were both for a road across the park from Eighty-fifth street and Fifth avenue to Eighty-sixth street and Eighth avenue. The offer was the same from each: To build and operate a line for fifty years, charging five cents fare and paying to the city 3 per cent of the gross receipts for the first five years, and 5 per cent thereafter, the city to refund the cost of construction to the company in annual ir ment paid out of the percentages received; companies to give transfer tickets on all the isting and prospective lines. The Board the bids under advisement.

After the meeting President Robb, of the Board, said: "I think we can get much b offers than those. Of course the city is to the roads after they are constructed—and the way, what a chance that will be for layi model railroad, and thus showing the street way companies and the public how street ways should be laid—but these offers provid the city's refunding the cost of the roads the percentages received. We can do b than that. Those roads will be immensely able, not so much for the fares actually colle on them as for the connection they will fu between the east and the west sides. I t we can get the roads built without a dolla cost to the city, just for the privilege of op ing them for a term of years, and, with the centage to the city, they will not only be a convenience—in fact, an absolutely neces convenience—but a source of income as That they are a necessity is certain. There four of these depressed transverse roads an should have car lines through each of t That would give one every half mile, as the is about two and one-half miles long. T roads were put there and sunk below the su for that purpose."

There was considerable excitement at First street station of the Second avenue elev railway Aug. 27. A young woman, Mary B mer, of No. 115 Broome street, attempte board a train, but stepped between the car platform and broke her leg. At the time of accident the station was crowded, and woman's shriek threatened to cause a panic when the nature of the accident was lea quiet was restored. The woman was take Bellevue Hospital.

The servants of the "L" roads must per their duties circumspectly or else they will c it. Gateman John Glancey, of the Han Square elevated railroad station, undertoo remove a drunken man from the station rece Joseph Fuchs, a French cook, employed at 11 Broadway, interfered, and Glancey ta him on the nose with his fist. Fuchs retu the blow, and Ticket-seller William J. L appeared and struck Fuchs with a stick. A Tombs next day Justice Power discharged F and held the gateman and the ticket-selle assaulting him. That beats the justice of Ju Hawes, of Chicago, hollow.

North Carolina.

Asheville.—The Asheville Street Railwa being equipped as rapidly as possible.

Winston.—The electric railway here is t equipped a la Sprague.

Ohio.

Cleveland.—The *Public Ledger*, Sept. 7, h special article contrasting Cleveland with City of Brotherly Love. Writing from standpoint of a Philadelphian, the correspon says: In our city the street car companies l the streets in repair, or are supposed to dc It is estimated that this saves the taxpayers a $200,000 a year. Then we get $50 for each used, and a percentage of the profits of company. Here (Cleveland) the city gets n ing but a few dollars per car, barely enoug pay the cost of clerk hire for keeping the count. They are compelled by law to pave tween their tracks, as there are usually tracks on each wide street—going and return —it was supposed this law included all the s from one outside rail to the other opposite but the companies interpret it only between pair of rails, and over which their own ho travel. The struggle ended as it always doe an interpretation for the companies, and citizens call the strip between the two pair rails, the "Devil's Strip," and grunt, but yet when the paving has to be done. And her elsewhere car companies show no dispositio help in public emergencies. Though many dreds are in the city to attend conventions, of the surplus may hang on by toe and fi nails, and the balance remain till they can g chance on the second, third or fourth car, w coolly takes its turn on strictly regulation t

there is the same trouble here, as elsewhere, it the use of the streets. Bay windows, jut-out beyond the buildings, are to be hereafter idden; but those erected in violation of law :o stay. Illegal property thereby becomes able, while the legal property remains out in :old. Hack stands are also exciting. Every- y in the city cries shame that there is no d for hacks and express wagons, yet, as fast)cated, the law is invoked by the frontage ers, and the law tells the hacks to move on. e streets are for general use, and can not be :opriated for hack stands."

Marion.—A street railway ordinance is pend- in the city council. The road is to be elec- and must be underground or accumulator em. The projectors are Geo. E. Turner and V. Robertson, who expect to have a mile and lf in operation within one year. The pro-)rs are desirous of obtaining all the informa- possible relative to underground and mulator systems. Marion is quite a manu- uring town of seven thousand inhabitants. four railroads, and is enjoying a steady and id growth. Waterworks are building, an ex- ive sewerage system is projected, and an tric light and power company is being or- :zed.

PENNSYLVANIA.

Allegheny.—The question of granting a fran- e to a new company of eastern capitalists, cipally, to operate a street railway with :es, steam or electricity, is under considera-

Braddock.—The Braddock Street Railway Co. been organized with a capital of $25,000.

Erie.—The city authorities have granted the : Passenger Street Railway Co. the privilege recting wires and poles for the purpose of)ling electricity to be used as a motive power unning their cars. Work will be begun at an y day, or just as soon as the company can de upon the system it will use. The officials ne company have been absent from the city several days investigating the various railway or systems in use in other cities.

Philadelphia.—A war against bob-tail cars is ng in this city. The *Ledger* piles up the ay against them almost if not quite as good ne *World* does in New York.

A strike is entirely improbable," we are as- d, in the City of Brotherly Love, and the chievous agitators labored in vain in trying ause a strike on traction lines. The way that *Ledger* sums up the matter is worth record-

meeting of employés of the Columbia ave- branch, or "red end," of the Philadelphia ction Company early on Saturday morning, . 1, resulted in rumors of a threatened strike he cable system. It seems that the company introduced a new schedule on the Columbia ue red cars running down Market and Mc- n streets, increasing the number of trips on Market street end from eight to nine per day, on the McKean street end from six to seven day. Heretofore, the eight and six trips re- tively have been made in a little over twelve s, and for the extra time 10 and 25 cents has paid. Under the new order, it appears, the a trip is being paid for at the rate of 25 and ents, and some of the men have complained the increase of 15 cents is not enough for extra time. But some of the men openly ress their satisfaction with their employment objected to being brought into trouble. In some of them said they would not leave the ice of the company under present conditions me and pay even if a few men should suc- l in blocking the cars. The opinion was rated that the rumors of trouble were not l for the men generally and were due in the n to agitators. Some of the men said they not care to work more than twelve hours, but rs said they would rather do so in order to e the extra pay.

here was also the same difference of opinion rding the "swing system," some of the men erring it and others complaining about it. ductors on the Market street white cars pro- d to be satisfied with their pay and treat- t, and intimated that they did not want to be rn into trouble with the company.

wo of the "red end" employees, a gripman named Christy, and a conductor named Logue, are said to have been discharged, presumably for agitating against the company.

One Monday morning, last month, one of the agents of the Women's Branch of the Pennsylvania Society for the Prevention of Cruelty to Animals visited the large stables of the Traction company. It was the result probably of those mischievous agitators trying to raise prejudice against the company by sending a false report to the society. At all events, we are gratified in learning that "the agent expressed himself as quite agreeably disappointed in finding the stables in such very nice order, well cleaned and the aisles swept for the 334 horses, many of them in fine order and condition; some, he thought, too heavy for car service in hot weather. * * * There were some half dozen in the hospital. All appeared to be well cared for; some twelve or fourteen were in the shoeing shop at the time the agent was going around. He noticed a good many bar-shoes, made so as to protect the heels of the animals in traveling over the cobble-stones."

WASHINGTON TERRITORY.

Walla Walla—A company has been incorporated here by F. D. Boyer, C. B. Hopkins, A. I. Jones, G. W. Babcock and others for constructing and operating street railways in Washington Territory, Oregon and Idaho.

ENGLAND.

Bristol.—The ordinary half-yearly meeting of the Bristol Tramways & Carriage Co. was held Aug. 1, when an account of the first eight months' working of the amalgamated [consolidated] company was rendered. Upon the motion of the chairman it was decided "that the report and accounts as submitted be received and adopted, and that a dividend for the six months ending 30th June last, be paid on the fully paid and £8 paid shares at the rate of £5 per cent per annum (free of income tax), such dividend being payable on and after the 4th August instant."

An interesting feature in the report is that the average cost per horse per week for forage and bedding was 9s 10d, which, considering the quality and quantity of feed, is very reasonable. The hay and straw contract for the ensuing six months has been concluded at a figure slightly lower than the preceding one. Of course, with Mr. Challenger's practical knowledge of feeding horses, this department is bound to be first class at Bristol.

London.—The city of London and Southwark Subway Co. have decided to abandon the cable, for which the road was being constructed, and use electricity as a motive power, if the report which has reached us from London be true. This says that the directors of the company have, after careful investigation, arrived at the conclusion that the line can be more thoroughly, efficiently and economically worked by electricity. Several eminent firms have, they say, expressed their readiness to undertake the work, the system which they propose to adopt being that of continuous conductors, and are so sanguine of success that they have offered to work the line on favorable terms for a number of years. One or two of the shareholders evinced opposition to the action of the board in discarding the original idea of a cable, for what, in their opinion, was the more risky electrical system, but eventually the resolution proposed by the chairman was sanctioned. A portion of the road is expected to be in operation by the beginning of next year.

GERMANY.

Berlin.—The Schwartzkopf company, of Berlin, has just constructed a new electric tramway. The current is furnished by a battery of sixty cells, with a capacity of 370 ampére-hours. The motor is a disk dynamo, with double winding on the armature, and two commutators.

THE JOHN STEPHENSON COMPANY have had a very elegant car exhibition at the Cincinnati Centennial Exposition. It is one of a number which Col. Kerper will place on his cable road.

MR. ELIAS E. RIES, who has been in Boston and neighborhood for some time, has returned to Baltimore.

Books, Pamphlets, Periodicals, Etc.

Scribner's Magazine for September contains articles on a wide range of popular subjects profusely illustrated. "Railway Passenger Travel," by Gen. Horace Porter, is the fourth article in the successful series on Railways, begun in the June number. Gen. Porter describes the development of the convenience and luxury of modern travel, especially with reference to sleeping, parlor and dining cars and vestibule trains. There are also brief discussions of couplers, steam-heating, switches, checks, immigrant transportation, ratio of accidents and relative fares in Europe and America. Gen. Porter has used his unusual faculty for narrative to bring out the most interesting and striking features of the subject. The twenty-seven illustrations include drawings by Shirlaw, Blum, Broughton and other skilful artists.

Table Talk for September—another seasonable and entertaining number. Summer is dead—almanacally and climatically—and Mr. Wheaton treats her demise with becoming solemnity in his opening poem; then follows a variety of household information the housewife cannot afford to lose. "A Dictionary of French Terms used in Menus" may be both useful and interesting to those who shall have the honor of partaking of the Street Railway Association banquet at Washington next month.

The National Car Builder Supplement for the present summer contains, *inter alia*, a full list of street railway companies with their officials, lengths of railways, equipments, etc. The various lines of each extensive system are clearly specified, and altogether the present issue of Mr. Reynolds' excellent publication shows the greatest care, as usual, in its preparation. In comparing the items given with those in our own directory, we find but unimportant differences, such as are almost unavoidable; simply for the reason that no two forms are filled up alike at some offices. Thus, for instance, the Classic City St. RR. Co., Athens, Ga., has 24 mules according to the STREET RAILWAY GAZETTE DIRECTORY, whereas the *Car Builder Supplement* says they are 24 horses; but the latter, from a report from the same company "received too late for classification," says they are 24 horses and mules.

Patents.

The following list of recent patents relating to intermural traffic is specially reported for the STREET RAILWAY GAZETTE by Wm. G. Henderson, solicitor of American and foreign patents and trade-marks, Norris building, Fifth and F streets, Washington, D. C. A copy of any of the following will be furnished by him for 25 cents:

Issues of July 31, Aug. 7, 14, 21 and 28, 1888.

386,923. Car-starter and brake—A Jeenel, Breslau, Prussia, Germany.

386,871. Switch for overhanging tracks—E. S. Ellis, Lake, Ill.

386,872. Switch for overhanging tracks—E. S. Ellis, Lake, Ill.

387,610. Electrically driven car—J. Weis, Jersey City, N. J.

387,382 and 387,283. Electric railway system—D. G. Weems, Baltimore, Md.

387,592. Traction cable railway—J. P. Hunt, Philadelphia, Pa.

387,608. Turn table for cable railways—C. Vogel, San Francisco, Cal.

387,956. Railway car heater—J. R. Lanning and J. Young, Oakland, Cal.

387,807. Car starter—J. H. Parmelee, Bridgeport, Conn.

387,914. Car-starter—J. H. Pendleton, Brooklyn, N. Y.

387,906. Cable-grip for railway cars—J. H. Pendleton, Brooklyn, N. Y.

387,920. Grip and brake-gear for cable tramcars—N. H. Richards, Richmond, Victoria.

The following to J. H. Pendleton, Brooklyn, N. Y.:

387,911 and 387,912. Grip for cable railway cars.

387,990. Attachment for cars on cable railways.

387,907, 387,908, 387,909, 387,910, 387,991, 387,994 and 387,995—Cable railway.

387,992, 387,993, 387,996, 387,997, 387,998, 387,913 and 387,989. Gripping device for cable railways.

Patents Described.

The following are brief descriptions of patents relating to street railway interests issued during the past month, especially prepared for the STREET RAILWAY GAZETTE by J. C. Higdon, mechanical expert and solicitor of patents, room 29 St. Cloud building, opposite U. S. Patent office, Washington, D. C. A printed copy of any of the following will be furnished by him for 25 cents (stamps):

ELECTRIC TRAM-CAR—Van Gestel Manufacturing company, New York. The motor is mounted upon a removable platform suspended from the axles.

COUPLER FOR STREET CARS—F. A. Pierce, Chicago. The coupler is hinged so that it may be detached by raising it to a vertical position.

PROPELLING AND HEATING STREET CARS—National Tramway Motor company, New York. A tank containing super-heated water, is carried by the car, as is also an engine and a heat-storage tank, the latter being provided with evaporating and expanding tubes.

STREET RAILWAY TRACK-CLEANER—E. A. Anderson, Sterling, Ill. This patent covers small details in the manner of suspending rail-brushes to the truck.

CABLE-GRIP—O. H. Jadwin, New York. A heavy weight is applied to one side of the grip, for the purpose of counter-balancing the draft-pressure in running around curves.

SIGNALING APPARATUS FOR CABLE RAILROADS—H. W. Smith, St. Louis, Mo. This patent covers devices whereby the gripman may signal the signal trains of an intersecting road. A gong is struck by the passing grip.

CAR-AXLE—A. M. Wright, Chicago. One wheel is loosely fixed upon a sleeve, and said sleeve is loosely mounted on one end of the axle, then the box at this end is loosely mounted on the sleeve.

CABLE-GRIP AND PICK-UP—Holmes & Charles, Washington, D. C. Cams are located in the conduit, so as to be engaged by a pick-up device on the car, and the grip-proper is provided with pivoted jaws, which are closed by pressure of the cable against them, after the picking-up operation has been accomplished.

REMOVABLE CALK FOR HORSESHOES—T. B. Mason, Trenton, N. J. A detachable clamp carrying the calk.

DRUM FOR CABLE RAILWAYS—J. Walker, Cleveland, Ohio. This patent claims a driving-drum, having a series of grooved-rings in contact with each other, adapted to turn on the surface of the drum, and held in place by a removable flange.

ELECTRIC MOTOR—W. M. McDougal, East Orange, N. J. The motor is connected to the driving-axle by a flexible shaft.

CABLE RAILWAY—Rapid Transit Cable company, New York. Several patents for improvements in the general construction of cable roads have been granted this company. They claim a "combined roller-grip and positive grip," a "fetching" apparatus, and apparatus for running cars around curves and over crossings.

CABLE-CAR STARTER—Rapid Transit Cable company, New York. This device is arranged to overcome the inertia of a moving as well as a stopped car, by causing a grip to grasp an endless chain located at the station, and thereby to compress a suitable quantity of air to start the train again.

STRUT FOR CABLE-DRUMS—J. Walker, Cleveland, Ohio. The strut is in two lengths, adjustably connected by means of a screw.

PASSENGER MILEAGE-REGISTER—O. E. Michaud, St. Louis, Mo. The time the seats are occupied is registered by automatic devices.

CHAIR FOR GIRDER RAILS—Johnstown Steel Rail company, of Kentucky. A two-part chair for girder-rails, shaped to fit against and support the webs, and provided with lugs to support the lower flanges of the rails.

CABLE RAILWAY—Phillips Economical Cable Grip Construction company, Chicago, Ill. This patent claims a cast-iron conduit having the slot in one side, and other small details.

ICE-CREEPER FOR HORSES—A removable clamp provided with spurs.

Business Notes.

THE JOHN STEPHENSON COMPANY, Limited, are building some elegant two-horse cars for the Twenty-Third St. Ry. Co., New York, as stated elsewhere, to supersede the bob-tailers. Other Stephenson cars are in progress for Oakland, Cal.; Tacoma, Washington Territory; Salt Lake City; Cincinnati, Ohio, etc. The lot of 30 grip cars on the North Chicago Street Railroad, from the John Stephenson works, attract much notice and often receive the congratulation, "How elegant!" The John Stepenson Company themselves "consider them the perfection of that style of car."

THE THOMSON-HOUSTON ELECTRIC COMPANY has just closed a contract with the West End Co. of Boston, for the equipment of twenty cars with their system of motors and appliances. This order was given after a careful and exhaustive examination of the installation made by the Thomson-Houston Co. at Crescent Beach.

MRS. M. L. FARNHAM, of New Orleans has brought a couple of cars to the Cincinnati Exposition, showing the operation of her wonderful street car operator, described in the August GAZETTE. She intends taking the same to the exhibition of street railway devices at Washington next month.

MR. WILLIAN WHARTON, JR., president of the Electric Car Company of America, writes:

"We have been running our eight wheel storage battery car for three weeks in regular daily service on the track of the Lombard & South St. Passenger Railway Co. in this city. The car has been running every afternoon, making from four to five round trips with one charging of the batteries. It has often carried 100 people or more at one time without any trouble. We have been making a great many improvements, although we have been working quietly. We have seven other cars well under way, which will shortly be completed.

MR. L. A. THOMPSON, 914 Walnut street, Philadelphia, has invented a gravity elevated railway, a full account of which is given in another part of this number. The *Scientific American* endorses this new idea for solving the city rapid transit problem with some enthusiasm, saying: "The reduction of this gravity system of propulsion to the local wants of towns and cities for the purposes of rapid transit reflects the highest credit upon the inventive and engineering abilities of Mr. Thompson, and we trust it will not be long before his plans will come into extensive operation. The system is at once effective, safe, and desirable.

THE SPRAGUE ELECTRIC RAILWAY AND MOTOR COMPANY are very busy just now, and their factory is working to its maximum capacity, we hear. They have at present twenty-seven roads in operation or in process of construction in different parts of the country, and are constantly making additions to this number.

Among the many points of superiority in the Sprague system of railway propulsion much stress is laid on its system of conducting current to the cars with the impossibility of an accident at any point of the line interfering with the operation of the remainder of the road, its system of using one motor on each axle of the car controlled by a single switch, its method of flexibility suspending motors from the axles to secure perfection of running, and its use of lightning arresters.

The Sprague company (it is claimed) was the first one to place lightning arresters upon their cars, having recognized the advisability of such a course early in the history of the Richmond road, and have, consequently, never had a burn out disabling the cars upon any of their railways.

MR. THOS. ASHBURNER has opened an office at Room No. 603 Keith & Perry Building, Kansas City, Mo. where he will do a general commission and brokerage business in rails, fastenings, railway supplies and equipments, iron, steel, nails and machinery.

The Ticket For Every One.

An Excursion Ticket to Milwaukee, good for admission to the Milwaukee Exposition, which opens Sept. 5. Never before in the history of the Society have there been so many and such bright promises of an exhibit of great and varied interests. For the past month the vast building has been a hive of human industry, and space has been in such demand that many tardy bodies owners found themselves compelled to take their away, an unheard of thing heretofore.

Moving and active manufacturing displays will be much more numerous than last year.

The art gallery has been renewed and filled with works of the most famous artists of both continents. The "Grant Ulyssium," consisting of twenty-four panoramic paintings, illustrating the life of Grant from the cradle to the grave is one of the features. It was exhibited at the Chicago Opera House and in New York, for itself for weeks, to crowds at 50 cents admission. This is its third appearance for the public.

Great St. Louis Fair Programme.

The 28th Annual St. Louis Fair opens Monday, October 1st, and closes Saturday, October 6th. $70,000 is offered in premiums, which will be distributed among the exhibitors of horses, cattle, sheep, swine and poultry, machinery and mechanical displays, works of art, textile fabrics, produce, fruits and vegetables and mineral specimens. The railroad companies offer reduced rates, and the Fair Committee announce numerous special attractions. There will be trotting races daily, and the Zoological Garden will be open free of charge to all visitors attending the fair.

On the night of Tuesday, October 2d, a grand annual nocturnal pageant of the Veiled Prophets will be given at great expense. The streets of the city will be illuminated by 500,000 gas jets. Further information may be obtained by addressing Mr. Arthur Uhl, Secretary, Chestnut St., St. Louis, Mo.

INTER-STATE INDUSTRIAL EXPOSITION OF CHICAGO.

For the sixteenth consecutive year Chicago opens up its great Inter-State Industrial Exposition, replete with the best products of Science, Industry, and Art, on Wednesday, September 5th, and closing Saturday, October 20th.

The immense structure is now laden to its fullest capacity with the finest and most magnificent exhibits ever displayed; from almost every quarter of the civilized world, illustrating as it does every avenue of human industry in its most complete form, it is almost a necessity that they who would keep abreast of our most advanced ideas in both industry, science and art, should not fail to visit this great Exposition.

Every railroad and transportation line running into the city have made reduced rates, and there is every indication that a much larger attendance will follow than any year that has preceded.

The Street Railway Gazette.

VOL. III. CHICAGO OCTOBER, 1888. NEW YORK No. 10

The Late John George Brill.

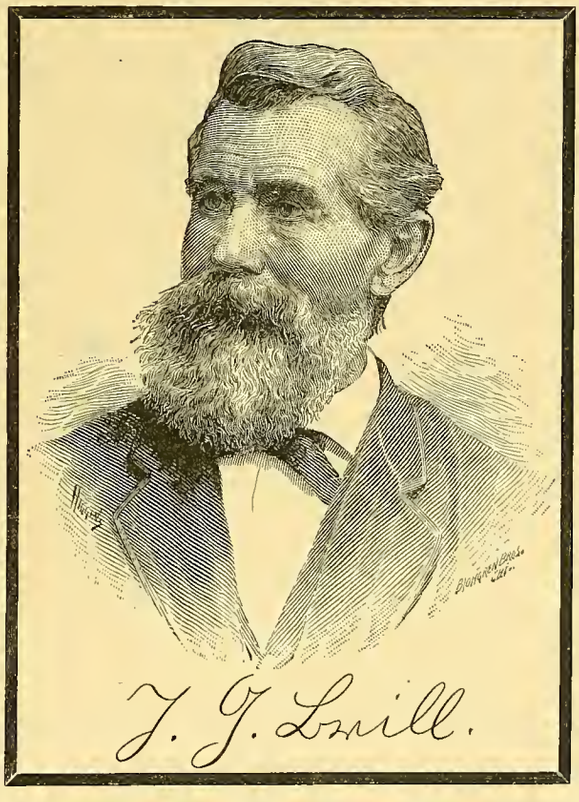
We regret to hear of the death of Mr. John George Brill, the famous president of the J. G. Brill Company, and founder of the Philadelphia Car Works, which took place at his home, 3411 Baring street, Philadelphia, Saturday morning, September 22nd, after an illness of more than six months.

Mr. Brill was born near Cassel, Germany, in 1817. His father, who had entered the army when but 17 years of age, served through the Waterloo campaign as one of the body guard to the Prince of Hesse-Cassel. He sent his son to Bremen, where he learned the trade of cabinet making. After his father's death John George Brill came to this country, in 1847, and settled in Philadelphia. A few years afterwards he obtained employment with the predecessors of the Allison Manufacturing Company, car builders, with whom he was employed for about 25 years. In the latter part of the sixties Mr Brill established himself with his son, G. Martin Brill, in a small way, in the business of car supplies on Chestnut street, and later on, as their means increased, gradually drifted into the building of tram cars, and afterward into the manufacture of all classes of railway cars. In 1872, they obtained the first large order of railway cars that came to this country from Mexico, and since that time, says the Philadelphia *Public Ledger*, they have made the greater portion of all the cars ordered from that country. The demand for their cars came not only from all parts of this country, but also from Europe, Asia, Australia and Central and South America. At present 40 per cent. of orders received are for foreign account.

Mr. Brill introduced many novelties in the manufacture of cars, and was a thorough and conscientious mechanic. He was prouder and more ambitious regarding the good quality of work than of money getting. He considered his greatest triumph the obtaining of the highest award, the gold medal, for the best tram car at the Exposition of Railway Appliances, in Chicago, in 1883.

There are but few street railway men, if any, who did not know the late Mr. Brill personally. And his portrait and autograph given herewith will be mementos valued by very many of our readers. The signature, as may be readily unstood, is in German. Mr. J. G. Brill did not write English.

The advent of J. G. Brill as the head of an establishment for building street cars might be said to mark an era in the industry in the United States and consequently in the world. The old firm of Murphy & Allison which was one of the two earliest builders of street cars having had their extensive works destroyed by fire in 1863, moved to a larger plant and thereafter carried on their works exclusively for the building of freight cars. During the years prior and subsequent to 1863 J. G. Brill and his son G. Martin Brill were among the most valued employees of Murphy & Allison. After Murphy & Allison relinquished passenger car building, the business fell entirely into the hands of two firms in the State of New York, the leading one of which finding a monopoly had dropped into his hands, strengthened it by the purchase of almost any and all patents which had a bearing on street cars, and this aggregation presented so formidable an appearance that the impression was created that no street cars could be built without infringing on some of these patents. The natural consequence of this was high prices. After the establishment of Mr. Brill's works and after the name had begun to be known this obstacle was encountered. Careful examination of the subject made it clear that the majority of these patents were not tenable, and the new works found themselves in the position of being obliged to make good their claim that the patents were not tenable. The result was a long and expensive suit tried in the plaintiff's district and being lost by him there appealed to the Supreme Court where the judgment was also in favor of the defendent. Following also in the wake of the leading suit were at least a dozen suits against different railway companies which were defended and won by the able counsel of J. G. Brill & Co. Besides these patents there was another one owned in New England for a vital part of a street car which had not only run its legal course but had been extended out of regard for the interests of the widow of the patentee (who by the way received nothing or next to nothing from it), which was thorn in the side of the street railway officials in the country during its whole term, and caused the expenditure by them of many thousands of dollars of which they were unjustly mulcted. This unjust attempt at extortion was tried against this firm on the ground of infrigement, although the owner of the patent had from time to time requested them to use the device, and when the patent expired he brought suit. The trial of the suit consumed the whole time of the court for eight days and resulted in the ignominious defeat of the plaintiff. In these two cases cited Mr. Brill's firm did good service to all passenger railway companies, and this service was done at a great expenditure of money and time and almost entirely without any help from the railroad companies. Mr. Brill's knowledge of the business from its inception, and his stern sense of justice convinced him throughout these trials of ultimate success, and of the fairness of his cause. Prosperity is almost sure to follow a man who works early and late, and treats everybody with fairness, and his children can look with pride on their father's record from the time when he first set foot on the shore of the New World.



Fate of the First Cable Railway.

Under this caption a San Francisco correspondent writes us, under date of Sept. 23, giving an account of the invention and construction of the first cable line, and lamenting that that road has now become a mere branch of a more extensive system; most of the interesting incidents which he enumerates were related in Mr. Hallidie's biography published in the ST. RY. GAZETTE some time ago. The original Clay street cable road was running independenly since August 3, 1873, until the 8th ultimo. On the latter date, as our correspondent pathetically relates, "the machinery was stopped, and the cable was transferred from Clay Street engine house to that of the Ferries and Cliff House railroad company; and thus the pioneer cable road, once the pride of San Francisco, and which was always visited by tourists with great interest, has now become a branch," etc.

The Ferries and Cliff House railroad was in full operation for the first time Sept. 19 over all the roads which its original franchises cover. The company owns twelve miles of cable line, eight miles of steam line, one brick engine and car house, in which are the 500 horse power stationary engines that operate all the cable lines, a carhouse at the junction of Leavenworth and Clay streets, in which the now unused Clay street engines stand, and a carhouse and depot at the junction of California street and Central avenue. Further extensions are yet contemplated.

The Street Railway Association of the State of New York.

This association held its sixth annual meeting at the Fifth Avenue hotel, New York, September 18. President John W. McNamara called the meeting to order at 11 A. M. The following delegates were present (the names being given alphabetically):

Edwin Bedell, director Harlem Bridge, Morrisania and Fordham Railway Company, New York City.

Henry A. Cassebeer, Jr., vice-president Steinway and Hunter's Point Railroad Company, Long Island City.

Joshua Crandall, superintendent Broadway Railroad, Brooklyn.

Frank Curtiss, president Sixth Avenue Railroad Co., New York City.

Charles E. Harris, superintendent New Williamsburgh and Flatbush Railroad, Brooklyn.

E. Burton Hart, second vice-president, Central Crosstown Railroad Company, New York.

George S. Hart, president Second Avenue Railroad Co., New York City.

D. B. Hasbrouck, secretary and treasurer Houston, West Street and Pavonia Ferry RR. Co., New York City.

E. T. Landon, auditor Dry Dock, East Broadway and Battery Railroad Co., New York City.

Daniel F. Lewis, president Brooklyn City Railroad Co., Brooklyn.

George W. Lynch, vice-president Christopher and Tenth Street Railroad Co., New York City.

Lewis Lyon, president Third Avenue Railroad Company, New York City.

Milton I. Masson, secretary Central Crosstown Railroad Co., New York City.

Thomas H. McLean, secretary Twenty-third Street Railway Co, New York City.

John W. McNamara, president Albany Railway, Albany.

William N. Morrison, superintendent Bushwick Railroad, Brooklyn.

Wm. J. Richardson, secretary Atlantic Avenue Railroad Co., Brooklyn.

H. M. Thompson, secretary Brooklyn City Railroad Co., Brooklyn.

J. L. Valentine,, treasurer Central Park, North and East River Railroad Co., New York.

Fredk. S. Wicks, president Central City and Genessee & Water Street Railroad Companies, Syracuse.

Chauncey C. Woodworth, secretary Rochester City and Brighton Railroad Company, Rochester.

C. Densmore Wyman, vice-president Central Park, North and East River Railroad Company, New York City.

PRESIDENT'S ADDRESS.

President McNamara said:

Gentlemen:—We are about to begin the sixth annual meeting of the Street Railway Association of the State of New York. As President of the Association, I greet you as representatives of companies who have expended in the construction and equipment of their roads upwards of forty six millions of dollars; and whose tracks and sidings aggregate five hundred and thirty-four miles.

These roads, for the year ending September 30th, 1887, carried nearly three hundred and three millions of passengers; and so carefully were these passengers carried that only six met death by accident, and only ninety eight were injured. People, in number more than five times the population of the United States, were carried last year on our cars, and only one hundred and four of them were injured. It seems to me that the mere statement of these facts is all that is necessary to demonstrate to the public the care and vigilance with which the officers of the several companies discharged their duties.

It gives me pleasure at this time to state that all the companies represented in our Association were able to pay dividends last year, except six.

I desire to remind you that the three subjects brought to our attention by our President at the last annual meeting are still open for consideration. A motor for street car service, possessing all the advantages of horses, with greater speed and cleanliness, has not yet been produced, or, if in existence, has not been adopted by any of our companies.

The "unjust and unequal taxation" with which we have been burdened, and which at times has threatened the existence of some of our number, has received no attention from the legislature; and the Labor Question is still with us.

I desire again to thank you for the honor which you have conferred upon me, and to thank the members of the Executive Committee and the members of the special committees for the prompt and able manner in which they have discharged every duty assigned them. We shall listen with pleasure and profit to the reports of some of the committees, and I trust we will all return to our homes wiser and stronger than when we left them.

REPORT OF THE EXECUTIVE COMMITTEE.

Membership.

Regarding our membership, we have lost one company and gained two. The Niagara Falls and Suspension Bridge Railway Co., under date of January 26, 1888, withdrew from the Association, inasmuch as being a member of the American Street Railway Association, and a small company, it considered that it could not well afford to continue membership with both, and therefore resigned from this. The two new members are the Brooklyn City & Newtown Railroad Co, of Brooklyn, and the Fifth Ward Railroad Co., of Syracuse.

The financial condition of the Association is altogether satisfactory, there being a balance on hand of $354.55.

Street Railway Business.

As is the case in a presidential election year, there has not been the same marked annual increase over the business of the preceding year as is usual in all other years. In some cases, elevated railroads, newly constructed, have materially interfered with the business of a few surface railroads, while the reduction of the fare on elevated lines has seriously affected the business of others. The elevated roads themselves have suffered as much as, if not more than, the surface roads, by this unwise decrease of fare; while the public has likewise suffered by decreased accommodation on elevated railroads as the result of reduced income. In those cities, however, that are so populous as to require the construction and operation of elevated railroads, the possibilities of future business development are so great that holders of street railway properties thus adversely affected need not be more than temporarily discouraged, as the sure increase of population will speedily make good present losses.

Knights of Labor.

The organization known as the "Knights of Labor" have, in a few instances, ordered "strikes" or, as they are preferably called by members of that order, "tie-ups." In each instance, so far as your committee has been able to learn, these strikes ought not to have occurred. Certain it is, when strikes do occur, the public is sadly inconvenienced, while the Knights of Labor are inevitably brought into disfavor thereby. No management of a company will force a strike upon its employees, as that is manifestly a destruction of, or at least a vital interference with its business. The day of strikes should be wholly past, and we believe that a severely-tried public will no longer tolerate interference with its rights, which railroad employees, as well as railroad managers, are bound to respect.

Sister Associations.

It is with pleasure that we report the organization of a sister State Association—the Street Railway Association of the State of New Jersey. This has been modeled precisely after the pattern of this Association, its members having adopted a similar constitution and by-laws. We desire to express our cordial interest in its welfare.

In this connection, we would also mention the fact that the State of Massachusetts has under consideration the establishment of a similar local organization.

Obituary.

We have to record the death of the president of one of our members—Charles Curtiss, for many years president of the Forty-second Street & Grand Street Ferry Railroad Co. No man stood morally higher in the community than he, having been likewise president for many yea of one of the city's strongest banking institution He always took a deep interest in the welfare this Association, as was manifest by his attenc ance at the meetings when his health would pe mit. We thus desire to record our appreciatio of his friendship, and regret for our personal lo in his death.

Respectfully submitted.

John W. McNamara.
Daniel F. Lewis.
Lewis Lyon.
Wm. J. Richardson.
} Committee

"United States Mail Lines."

Secretary W. J. Richardson read the followin communication:—Your committee appointed o the subject of "United States Mail Lines would respectfully submit the following repor

Last October—the month following that i which the annual meeting of this Associatio was held—the American Street Railway Ass ciation met in the City of Philadelphia, and at meeting of the Executive Committee the follo ing resolution was adopted:

"Resolved, that the President, Chairman the Executive Committee and the Secretary authorized to confer with the Postmaster-Gener upon the subject of the designation of stre railway cars as United States Mail Lines; a they are hereby authorized to make such an a rangement with the Department as in their jud ment may be deemed wise." It having come the knowledge of your special committee th the National Association had undertaken t management of this question, it was considere by your committee as being inexpedient for it make separate and special application, when t same subject could doubtless be better secur by the larger association, while it was feared th there might be a possible clashing between t committees, should they proceed independent of each other. We therefore confine our repo simply to a statement of the foregoing fact, ha ing deferred our action to await that of t National Committee.

Respectfully submitted,

C. Cleminshaw, Chairman.

Stable Disinfection.

The secretary (Mr. Wm. J. Richardson) re the following paper:

Members perusing the last annual report the proceedings of our Association will find th the subject of stable disinfection has been near exhausted. Having been appointed the comm tee on Stable Disinfection, however, I beg to su mit the following report:

No chemical can take the place of hard wo plenty of ventilation, fresh air, light—especial sunlight—and cleanliness, by aid of the broo scrubbing brush, plenty of soap and water. dark stable, no matter where situated, is alwa an unhealthful one, and usually a dirty one t Want of light discourages growth and promot everything that is deleterious to health. It is t unqualified experience of all who have opportu ties of judging, that light is second only in i portance to fresh air, and the next worse thi to a close, poorly ventilated stable is a dark o Light purifies the air, especially bright sunligl To disinfect a stable means to cleanse it fr infection, or to purify it from contagious matt not to deprive of odors, especially bad ones, sulting from impurities—this is to deodori Most people when they deodorize think th disinfect, but they are only putting one sten in the place of another. They think they a destroying filthiness. But they only make filth ness less evident, because they make the od which is an indication of its presence, less p ceptible. Remove the cause and all t unpleasant effects must cease. A stable shou be built of brick (glazed brick towards the insi if possible), high and well ventilated, the windo should reach to the ceiling, in order to allow current of fresh air to pass through and there prevent flies and other insects from gathering the ceiling, flies being unable to remain on ce ings where there is a current of air constan passing under them. If the stable cannot built of brick, have the walls of laths and plast paint the walls with paint in which is mixed so sulphur or sulphur salts. The same pertains walls if made of wood. The floor of the sta

should always be of concrete, well drained, and a flooring of yellow pine or other wood to cover and protect it. The wood partitions of the stalls and the flooring should be painted or brushed once every month with a solution of one part of sulphate of zinc, one part of common rock salt and sixteen parts of water; or in other words, one pound each of sulphate of zinc and rock salt and two gallons of water. The manger ought to be of stone or artificial stone, and so made that the horse can eat up every particle of food in it.

The following is a list of deodorizers in general use: Carbolic acid, or phenol, thymoil, naphtol, benzoin, vinegar, turpentine, carbolate of lime—a mixture of one part of pure carbolic acid with fifty parts of slaked lime,—chloride of lime and chlorine gas, which is easily prepared by putting a quarter of a pound of bin-oxide of manganese in half a pint of water and adding a half pint of common muriatic acid. Muriatic acid must be added gradually, and when the odor of chlorine is no longer perceptible, the remainder of the muriatic acid must be added in order to evolve a fresh supply of chlorine gas.

Now, as to disinfectants. The principal disinfectant is copperas. Copperas is a salt of iron in combination with sulphur, and is sulphate of iron. A solution of copperas, one pound to two gallons of water, in which is dissolved one ounce of pure, not crude carbolic acid, is the best disinfectant and deodorizer that we have. Next in the list is chloride of zinc. This can be easily made by a solution, as stated above, of sulphate of zinc, common rock salt and water. Permanganate of potash, which is very cheap, costs about fifty cents a pound. One ounce of this dissolved in two gallons of water will destroy or disinfect all vegetable impurities or any sources of contagion in any liquid. Solution of chlorinated lime, which is a mixture of one pound of chloride of lime one gallon of water, stirred, allowed to settle, and then the clear liquid poured off. To this is added one quart of hot water, in which has been dissolved a pound of ordinary washing soda. By adding one ounce of carbolic acid to this you have what the Frenchmen call *Phenol sodique*, which is used in nearly all the army stables in France. Sulphate of copper in solution, one pound in one gallon of water. All the sulphur salts. Live steam. Sulphurous acid gas, easily prepared by burning sulphur, or growing sulphur on hot charcoal. Corrosive sublimate, but dangerous to use, being poisonous and sweet to the taste. One ounce in five gallons of water. Last, but not least, and the best of all, burn out the whole place. Remove all woodwork, put on a pile and set fire to it.

In several stables which I have visited, I have noticed that they use carbolic acid or carbolate of lime sprinkled around promiscuously. This is very injurious. The horses, constantly inhaling the fumes of carbolic acid, may be attacked with disease of the kidneys, and any human being also.

Should any of you wish to have further information, or if I can be of any service to any one in the matter here spoken of, please call upon me.

Respectfully, HENRY A. CASSEBEER, JR.

The foregoing reports were unanimously adopted; as also was an elaborate paper on the Labor Question by Mr. Frank Curtiss. There was not much discussion—none of special interest. Mr. H. M. Thompson had lacked legitimate time to prepare a paper on Quarterly and Annual Reports.

Treasurer's Report.

Balance Sep. 20, 1887	$	92 37
Receipts		1,030 00
		1,122 37
Expenses		767 82
Balance Sep. 18, 1888	$	354 55

The following officers were elected for the current year:

President.—Chauncey C. Woodworth, Rochester.

1st Vice-pres.—John W. Partridge, Brooklyn.

2nd Vice-pres.—John S. Foster, New York.

Secretary and Treasurer.—Wm. J. Richardson, Brooklyn.

Street Ry. Men Enjoying Themselves.

CINCINNATI, Oct. 5.—Col. Geo. B. Kerper was in all his glory to-day. Never were honors so thickly thrust upon one man as upon the genial faced and bald headed George. He was officer of the day at the Exposition; entertainer-in-chief of about 5,000 street railway people; musical director of ten great bands; wore the blue decoration as master of ceremonies in the music hall reception, was the composer and donator of a waltz, and never refused to "come and take something."

"Kerper," "Kerper," "Kerper," was the refrain all day long at the Centennial Exposition, and with his usual ubiquitousness the Colonel seemed to be right on hand to answer every call.

The long-advertised and anxiously looked-for Street Car Employees' Day fell to-day, at the Exposition, and with the day came about 3,000 visiting street railway men, from the stable boy up to the president and all alike wore the white satin badge of fraternity and good fellowship, and bell punch, whip and reins were laid aside with the pen and ink horn of the president, and all met on an equal footing and exchanged the hand-shake of humanity. President and driver, in more instances than one, met, looked into one another's face, and spoke for the first time to-day, and, forgetting their relative positions, remembered only the one object for which they were gathered—to have a good time.

And they had it.

A thousand Cincinnati street car conductors, drivers, grip-men and stable hands were off for a holiday. All the cars that were running were gaily decorated with flags and bunting, and from the earliest moment when the exposition gates

opened, began moving in that direction, loaded from platform to platform with the pleasure-seekers and their families, or, in lieu of families, with their sweethearts.

About 9 o'clock the first train of excursionists arrived. It was from Louisville, and enroute picked up the Indianapolis train. From the former city there were 165 men, Superintendents H. H. Littell and Funk in charge. The Indianapolis delegation, under Superintendent Jones, numbered 120 men. In each case the men brought their families, so that the total number exceeded 1,000. In the Hoosier capital one of the conductors told the GAZETTE representative that the company to-day had put on bobtail cars so as to permit of a greater number of men being excused to come to Cincinnati. After the arrival of this train others began arriving at frequent intervals, until by noon there were nearly 10,000 people in the city. Cleveland sent 260 men under Superintendent Al. Johnson; Springfield sent 50, and with them came Ex-Congressman and General Asa Bushnell. Findlay, Kerper's latest acquisition, sent over 1,500 people, the largest excursion that ever left the natural gas capital. The "Kid" band, a musical organization of 36 pieces, comprising all boys and one girl, none over 14 years of age, came with the Findlay crowd. Then in rapid succession came train loads from Dayton, from Toledo, from Hamilton, Lexington, and a dozen other cities, together with delegations from Chicago and more distant towns.

At 10 o'clock the various delegations formed into line on the Court street Market Square and marched to the Exposition over a line of streets more than three miles in length. The parade itself was nearly two miles long. John Harris, superintendent of the Cincinnati Street Railway Company, was grand marshal. He was mounted on a white horse, and looked really gorgeous in his brilliant sash and white plug hat with a tri-colored band. Mr. Harris' aids were Superintendent Allee, of the Walnut Hills lines, and the two superintendents of the Covington and Newport companies. They were also mounted. Four platoons of police, twenty-five men in each, led the marching body, and immediately preceding them was a patrol squad of four wagons. After the police came the First Regiment Band of forty pieces, then the grand marshal, Harris, and staff, and following them were a dozen carriages. In them were seated the Exposition officers, some of the city officials, President Kilgour and other local street railway magnates, together with the visitors, including Superintendents Anderson, of Indianapolis, Littell and Funk, of Louisville, Johnson, of Cleveland, Gen. Bushnell, Judge Caldwell, P. G. Monroe, Dan Pugh, (of the John Stephenson Co.), E. V. Cavell, and many others. Then came another band, and next the reception committee, forty strong, all wearing shining beavers and carrying natty canes. After them came the local street car drivers, conductors and grip-men, the Covington and Newport contingents and then the visitors, each city delegation having its own band of music or drum corps and its distinctive flag or banner. Altogether there were about fifteen bands in the procession.

The gates on the Elm street side of the Exposition were thrown wide open at 3 o'clock and the procession filed in. It was met by George Kerper, the officer of the day. He escorted the immense throng into Music Hall, and the 6,000 square feet of Brussels carpet could scarcely afford standing room.

Liberati's famous military band, of New York, played several selections, and then Col. Kerper stepped forward. It was some time before he could be heard, as the smiling owner of miles upon miles of mule, cable and electric street car lines was greeted with tremendous cheers.

When he did make himself heard he spoke as follows:

COL. KERPER'S SPEECH.

"*Ladies and Gentlemen:* On behalf of the Commissioners I extend to you a hearty welcome and return our sincere thanks to all of you for the good work you have done in contributing your full share towards the success of this great exposition. To the street railroad men and their visiting delegations, I extend the right hand of fellowship and count myself as one of you. For the past fourteen years we have worked together for the good of Cincinnati. Our motto has been "Onward," and no matter how bleak or sultry the day, we have been on deck and carried our patrons to and from their homes. The mode of transit has each year been improved, and each of us in our respective positions can say to our employers and patrons that we have contributed our share towards this improvement.

"Men of enterprise and capital have permitted us to change some of our horse lines into cables, and we have carried out the work they laid out for us to do. This good work will go on, and in a very few years we will not only further elevate the standard of our lines, but at the same time we will elevate the standard of the entire service. We have come to an intelligent understanding with each other, and to-day we believe that the prosperity of the company that we represent is our prosperity.

"Our responsibilities are great. To your care and your watchfulness is confided daily the safety and comfort of the entire population of this country, and when we consider the few accidents that occur when compared to the immense number of passengers we carry, the people can congratulate themselves that they have good and faithful men to depend upon in the street railway service.

"I hope you will all enjoy the many novelties you will see in this exhibition, and have a good time during your stay, and when you return to your homes tell the balance of the population you left behind what they will miss if they fail to come to Cincinnati before the close of the present month."

Mr. Kerper was followed by Gen. Bushnell, Judge Caldwell, Superintendent Harris, H. H. Littell, Al Johnson, Mr. Funk, and a number of others, all making short and practical addresses.

There were loud cries for "Kilgour," and he

not responding, someone started a yell for "Monroe," "Monroe," "Speech," "Speech." But both Mr. Kilgour and Mr. Monroe, with admirable diplomacy, but a deplorable lack of courage, had fled from the crowd. Mr. Kilgour's blonde moustache was fairly bristling with alarm, while Col. Monroe's usually ruddy face was pale, even after they felt themselves safe beyond the reach of the speech-clamorous multitude.

The two gentlemen were afterward found by Superintendent Harris, Col. Kerper, Mr. Cavill and your correspondent in the cool and spacious aefreshment hall, and as a look of supreme satisfrction had chased away their fears, doubtless they had already partaken of "something" and had found it agreeable.

Liberati's band closed the speech making session by a brilliant burst of music entitled "Kerper's Racket," which is a musical description, all at once, of a car off the track on a cobble stone pavement, two mules loose in the barn, three cable gongs clanging, and seventeen people trying to attract the attention of a car conductor half a square away. The various effects are produced by the performers hammering vigorously on bass drum and cymbal, striking flat pieces of boards together, pounding the floor with sticks of stove wood, and beating an imitation galop on the wall with a pair of mallets.

It must be heard to be appreciated. The composition is original with Mr. Kerper, who, in his lucid moments, denies the authorship, however.

This brings to mind Mr. Kerper's Souvenir Waltz, a copy of which was presented to every visitor rash enough to accept it. The waltz is entitled "My Favorite" Mr. Kerper says he burned the midnight oil for twelve weary months in the production of the music. His one prayer is that it will not be played before the next Centennial, when he will not be present to hear it.

Right here is a fitting place to remember Mike Casey, the flagman on the Vine Street Cable Line, stationed at Fifth and Vine streets, and George Sweeney, a conductor on the Eden Park Line. These two men won the $50 gold badges, offered by Presidents Kilgour and Kerper to the one of their respective employees selling the greatest number of tickets of admission to the exposition. Casey headed the list with a record of 1,300.

Street Railway Employees' Day at the exposition closed in a novel and interesting manner to the employees and the public at large, saying nothing of that little spread which Mr. Kerper tendered his friends in the privacy of the commissioners' rooms. It can be best described in the words of an afternoon paper, as follows :

"The Cincinnati Street Railway Company has done the handsome thing by the visiting and local employees off for a good time. To night at 7 o'clock all the open cars in the city, nearly one hundred in number, will be drawn up in line in front of the exposition buildings on Elm street. Every car will be gaily decorated with flags and bunting.

"The foremost car will be occupied by a band of music, while the others will be filled with employees, their families and friends, and promptly at a quarter past 7 the entire line will start to the "Fall of Babylon," via Clark street, Freeman avenue and Western avenue, after a spin around Fountain Square by gas and electric light.

"It will be one of the most novel sights ever witnessed. It is expected that fully 10,000 people will be given a free ride.

"Just imagine street cars running without a bell puncher!"

BURKHARDT.

THE rolling stock of the Ferries and Cliff House R.R. Co., San Francisco now consists of fifty cable cars, twelve steam cars and six locomotive engines. From the breaking of ground to the completion of the lines nearly two years have elapsed and nearly $2,000,000 have been expended. The cost a mile laying the road has averaged $40,000, or rather more than one-third of the cost of the Market street lines, "and yet, thanks to the experience gained and the system adopted, the new lines are at least as well built as the older ones. The engine-houses and wheel at the northwest corner of Washington and Mason streets are the finest of their kind."

American Street Railway Association.

THE FORTHCOMING WASHINGTON CONVENTION.

Secretary's Letter.

BROOKLYN, N. Y., September 30, 1888.

Editor, THE STREET RAILWAY GAZETTE :

Dear Sir—The seventh regular (annual) meeting of the American Street Railway Association will be held at Willard's hotel, Washington, D. C., the third Wednesday in October (the 17th), 1888, at 10 o'clock, a. m.

A list of the present membership accompanies this letter, there being in all one hundred and fifty-one companies in the United States and Canada.

This meeting will be one of exceptional interest to street railway men, as reports will be presented on the following important subjects : "Conditions Necessary to the Financial Success of the Cable Power," "Location and Construction of Car House and Stables," "Progress of Electric Motive Power," "Street Railway Mutual Fire Insurance," and "Street Railway Taxation."

Special arrangements have been made by the Association for an extensive Exposition of street railway supplies ; and assurances have already been received that this feature of the meeting will be especially attractive.

The local companies have arranged to entertain the delegates with a trip to Mount Vernon, stopping at Marshall Hall for lunch on the return. They will also provide for the inspection of the public buildings and other points of interest of this beautiful city.

The executive committee has determined that this year the meeting shall be specially a ladies' meeting, and have arranged for their participation in the banquet. It is hoped, therefore, that as far as possible, gentlemen will be accompanied by the lady members of their families.

The executive committee, directly following the last meeting of the Association, adopted the following resolution :

"*Resolved*, that the President be and he is hereby authorized to issue a ticket to any gentleman not a delegate, upon the recommendation of a delegate, who may desire to attend the annual banquet. The number of tickets is to be limited by the judgment of the President, and the price of each ticket is to be ten dollars."

As your firm intends to take part in the Exposition of Street Railway Appliances, will you please inform the secretary immediately upon the receipt of this letter, how many from your firm, giving their names, desire to attend the banquet, and enclose the requisite amount (gentlemen, ten dollars ; ladies five dollars), so that the invitations and cards of admission, now ready, may be at once forwarded to you, and definite arrangements as to the number that will attend the banquet be promptly made.

October, for the City of Washington, is one of the most beautiful months in the year. The proprietor of Willard's hotel, at which the meeting is to be held, has reduced his prices to three and four dollars a day, according to location of rooms, and it is advisable that you write to the proprietor at once, in order that you may obtain the best accommodation. An envelope for that purpose is enclosed. I regret to say there will be no reduction in railroad rates, as our organization is neither "religious, benevolent, educational nor medical," as determined by the Central Traffic Association.

Will you kindly acknowledge the receipt of this notice ; and if it is your expectation to be present, please comply promptly with the foregoing request, providing for attendance at the banquet for self and friends, and oblige,

Sincerely yours,

WM. J. RICHARDSON, *Secretary*

The Hotel Reserve List.

The proprietor of Willard's hotel (Mr. O. G. Staples) informs us that the following names (arranged alphabetically) were on his reserve list September 30, for parlors and rooms during the Street Railway Convention week :

D. E. BAILEY and wife,
J. E. BAILEY and wife,
JOHN A. BRILL, D. COOLEDGE,
J. G. CROXTON and wife,
H. C. EVANS, G. C. FOWLER,
R. D. FRAYSER and daughter,
E. S. GOODRICH and daughter,
C. B. HOLMES and wife,
J. H. JOHNSON, W. L. JOHNSON and wife,
G. B. KERPER and wife,
E. J. LAWLESS, D. F. LEWIS,
LEWIS & FOWLER MANFG. CO. (7 people),
D. F. LONGSTREET, wife and two daughters,
A. C. MOSS, C. ODELL and family,
R. J. PARVIN, T. C. PENNINGTON and wife,
WM. RICHARDSON, wife and two daughters,
WM. J. RICHARDSON, J. E. RUGG,
H. S. SEELEY and wife,
W. P. SEGUINE, W. S. SILVER, C. E. STUMP,
H. M. THOMPSON, H. M. WHITNEY.

Exhibitors.

ARMINGTON & SIMS, Providence, R. I., will be represented by their general manager, MR. GARDINER C. SIMS, who intends to stop at Willard's.

THE BALTIMORE CAR WHEEL COMPANY will exhibit a running gear for a cable or electric motor car, and a gear for a cable or electric combination car. They will be represented by their secretary, MR. J. PAUL BAKER, and MR. JOHN S. PUGH.

MR. T. L. BEAMAN, Knoxville, Tenn., will exhibit various styles of his fare boxes and safety chutes.

THE J. G. BRILL COMPANY, Philadelphia, say: "We intend making an exhibit, but intend making it in a parlor, unless in the meantime we can convince ourselves that it is to our advantage to place the exhibit in the hall. We propose to exhibit an entirely new device for overcoming an objectionable feature in four-wheeled horse cars which we think has never been attempted before, at least not in this direction, that is the direction in which we have been working. To better illustrate or explain our device it is necessary to make the following explanation : In tram cars of four wheels the wheel base is necessarily short so as to admit of curving. This necessarily short wheel base has a tendency to make the car pitch forward and back, and which is aggravated by the weight of passengers on rear platform which can not be distributed throughout the length of the car in practice. So much is this the case that the front wheels of heavily loaded cars are lifted from the track, and the rear end drags low and makes the draught of the car much harder, and in the use of electric cars it reduces the effective power of the motors to a degree that almost renders them useless, and the cars very often leave the track. The mechanism that we propose to exhibit is intended to equalize the weight on the four wheels of a car, and it does not matter if all the weight is on the rear end the front end of the car will always be on a straight line with the rear end, that is, the height from the ground will be the same, and the pitching when traveling at a high rate of speed will be overcome. We will also exhibit a large sized model of our patent independent rigid trucks."

THE BROOKLYN RAILWAY SUPPLY COMPANY will exhibit a "Boss" snow plow, also a "Walk away" snow plow, and probably a sweeper—not their regular snow sweeper "but a combination street and snow sweeper for two horses;" also railroad brooms and few samples of supplies. MR. ALLYN will probably be there.

THE CAMBRIA IRON COMPANY will be represented, and will exhibit sections of the various forms of street rails they manufacture.

J. W. DAVIS & CO., New York, will exhibit their snow plow and scraper for street railway tracks. Their manager, MR. AUSTIN ADAMS, will probably attend the convention.

MR. A. DAY, Detroit, will exhibit his scraper.

DORNER & DUTTON, Cleveland, O., will exhibit their wheels, graded stable gutters, transfer tables, track cleaners, rope traces and fastener brasses, etc., MR. W. A. DUTTON, who is now on an eastern trip, will reach Washington about the 15th instant, and MR. DORNER will join him on the 17th.

MRS. M. L. FARNHAM, as stated in our last issue, will exhibit her street car operator, with full sized car.

FROST & PETERSON, New York, expect to make a good display of car ceiling and panel work, nicely decorated car sides, car seats and backs, and all panel work that is used in the construction of street cars. MR. W. P. SEGUIN, general manager of their railroad department, will be in attendance.

THE JOHNSON STEEL STREET RAIL CO. will

make an exhibit of street railway track supplies, both in the hall and on the street. Inside will be shown their improved steel switch pieces, square crossings, various rail sections, and samples of mitis wrought iron castings. Outside, full lengths of such sections as have been most successful in street railway practice during the last year, improved turnable, transfer table for car-house, and automatic switch. They will be represented at the convention by MR. DANIEL COOLIDGE, who has charge of their Philadelphia office, and by MR. H. C. EVANS, who has charge at New York.

HORACE A. KEEFER & CO., Kansas City, Mo., expect to make an exhibit of the Providence girder rail and Price's fare box. MR. KEEFER hopes to be there.

THE LEIB LUBRICATING COMPANY, Buffalo, N. Y., will be represented by MR. CHAS. E. SUTOR, to have charge of their exhibit which will consist of refined and lubricating oils and their "Dux" lubricants.

RUFUS MARTIN'S exhibit will consist of a line of street railway stationery, tickets, coupon books, etc., in charge of MR. O. W. GRIFFITH.

MR. A. W. NITSCH intends to exhibit German and Dutch peat moss stable bedding.

PRATT & LETCHWORTH, Buffalo, N. Y., anticipate sending to the exhibition a sample case showing several styles of hames especially adapted for street railway purposes; but they do not intend to have anyone in charge of the same.

THE PROVIDENCE GIRDER RAIL COMPANY will exhibit their rail, and will be represented by their president, MR. GARDINER C. SIMS.

PULLMAN'S PALACE CAR COMPANY write September 30: "With reference to the part we will take in the street railway exhibition at Washington next month, would say that we are just completing two cars which we expect to forward in a week or ten days, and which will represent our street car department, to a slight extent. These cars are both our standards, one being a sixteen ft. closed street car, while the other is a combination car, suitable for either cable or electricity. The combination car is 33′ 10″ in length. Both cars are finished in mahogany, with bronze trimmings, decorated ceilings, etc., and are manufactured especially for this exhibit. The 16′ car is equipped with Bemis No. 6 gear, while our standard trucks for combination cars, are used under the combination car." We understand that MR. C. L. PULLMAN and others will be there.

JOHN A. ROEBLING'S SONS CO., Trenton, N. J., say: "We shall exhibit a case showing models of our street railway cables manufactured under the Seale patent. With one exception we have furnished these cables to every cable railway company in the United States, and many of them to foreign corporations. They have given universal satisfaction, and we believe they are of the best possible construction for the purpose."

THE SPRAGUE ELECTRIC RAILWAY & MOTOR CO., of New York, will be represented by the general agent of the company, Mr. H. Mc. L. Harding. They say: "Mr. Harding will be glad to explain to delegates to the convention and others interested, the famous Sprague electric railway system, which is now in successful operation in so many cities and towns in this country. The Sprague Co. will also have on exhibition diagrams and models illustrating their system for street railway propulsion, and, if arrangements can be made for exhibition space, they will exhibit one of their car trucks fully equipped for service, with motors, improved gearing, flexible springs, and all the latest and most recent improvements which the Sprague Co. have adopted upon its street car trucks, and railways. All interested in electric street railway propulsion are cordially invited to the Sprague Co.'s headquarters, during the convention."

THE ST. LOUIS CAR COMPANY, St. Louis, Mo., will exhibit a nice card standing on an easel.

THE THOMSON-HOUSTON ELECTRIC CO., (whose principal office is at 178 Devonshire street, Boston, Mass.) will exhibit no apparatus in the exhibition hall, but will have printed matter, catalogues, cuts, photos, etc., and they fully expect to have a car in operation on the Eckington & Soldier's Home Street Railway. MR. WM. J. CLARK will be in attendance from the Boston office; and MR. THEO. P. BAILEY, general agent of the Thomson-Houston Co. in the West, will be there from Chicago. MR. BAILEY has just closed a contract for constructing and equipping a ten-mile electric road at Alliance, Ohio.

MR. RICHARD VOSE, 13 Barclay street, New York, the well known manufacturer of graduated springs for railway cars, writes: "I do not think it would be of any advantage to me to make an exhibit at the convention of the American Street Railway Association at Washington. My goods will be there on trucks and gears, manufactured by different companies. I will also be represented by my full force, viz., JOHN S. SILVER, W. P. WILLIAMS, WM. S. SILVER, JNO. C. N. GUIBERT, and A. W. SLEE."

A. WHITNEY & SONS, Philadelphia, will display fifteen or twenty different styles of street car wheels for use with mule, horse, cable, electric and steam power. MR. GEO. H. KIRK says the company will be represented by one of their own officials.

Supplemental List.

The following additional exhibitors have been heard of just before our going to press:—

FRANK H. ANDREWS, New York, heaters.

CHARLES H. BROWN, car starter.

DUPLEX SUPPLY CO., small articles.

MR. W. L. EVERIT, New Haven, Conn., will exhibit car sash, mats, etc.

THE HALE & KILBURN MANUFACTURING CO. will exhibit seats, seat springs, coverings, etc., and will be represented by MR. GEO. F. SMALL.

JUDSON PNEUMATIC RY. CO., model.

MORRIS, LITTLE & SON, disinfectants.

NAT'L BRAKE BLOCK CO., brakeshoes.

PECKHAM ST. CAR WHEEL & AXLE CO., wheels and axles.

POMEROY & FISCHER, varnish and colors.

RIES & HENDERSON, Baltimore, electric traction increasing device.

WM. RUOFF, jack-screw.

WM. WHARTON, JR. & CO., Philadelphia, rails, turntables, etc.

Cost of Electric Street Railways.

(From *Der Techniker*, translated by H. A. Stoltenberg).

The Fourth Avenue Street Railway Co., New York, has decided to run their cars from 14th St. to Harlem by means of electricity.

A previous examination by experts as to the cost has given the following results:

	Electr.	Horses.	Cable.
Cost of wagons	1	0.54	0.81
Running power	1	1.45	1.06
Road	1	0.53	2.09
Wear and tear	1	1.47	2.04
Running expenses, including wages	1	3.38	1.71
Sum	5	7.37	7.74
Average	1	1.47	1.55

At present there are 60 electric street railways in operation in the United States. The question now is only which system is best adapted—accumulators or an electric conductor running along the line?

The above named company has given preference to accumulators, which we think is correct, providing they can be made strong enough for this purpose.

Reports from Brussels, Belgium, where this system is in use, however, show that it is very defective so far. According to this the batteries are not durable enough, and for this reason have to be exchanged so often as to increase the running expenses too much. Nevertheless it is almost sure that batteries of sufficient durability will be built before long, for it is—although a difficulty—only a mechanical problem, the solving of which is by no means impossible.

As to the present electric performances of secondary batteries, only this can be said: They come up to expectations. For instance, on Fourth Avenue one-half of the 16 batteries—enclosed in one wagon—give enough power for two round trips.

For the reason that at present the best electricians and engineers are working over this problem, good results may be expected in the near future.

(We give the above, so as to complete the variety of views contained in this number.)

Tramway Horses in Europe.

(CONTINUED.)

Societé Allemande de Chemins de fer d'Intérets Local.

A. The allowance we give is, average, 5 kilos. oats, 3 kilos. corn, 5 kilos. hay and 2 kilos. cut straw. Oats is given in its natural state. Generally speaking we do not soak the food, because we find that in its dry state it is better masticated, and by mixture with the animal's saliva, is more completely prepared for digestion.

In regard to corn we would say, in our Dortmund enterprise we wet our corn. At first, some 4½ years ago, we crushed the corn, and as a result we noticed that cases of colic became very frequent, an experience we never had when we fed pure oats. Then we made the experiment of feeding seven horses for one year on corn soaked from seven to eight hours in water. No case of colic presented itself, and thenceforth we gave soaked corn. This step has given absolute satisfaction. The water used for soaking is emptied into the troughs, the horses drinking it with evident enjoyment.

The vats which have been used for soaking should be cleansed with the greatest care.

In our Chemnitz enterprise the corn is crushed.

At M.—Gladbach it is not crushed but "flattened" slightly, we are careful to so lightly break the grain that the horse's teeth will easily open it; should it be crushed to a further degree it will result in small angular pieces which horses only receive with a natural repugnance.

At Duisborg the corn is crushed, but only so much that the grain still holds together; only the hull is completely broken.

B. At Dortmund a mill for crushing corn is employed moved by steam power of the repair shops. The output is about 400 kilos. per hour with 1½ to 2 horse power.

At Chemnitz a similar machine is in operation but moved by horse power. This machine yields 400 kilos. per hour, and is so adjusted that the corn is only slightly broken, as we attach a great importance to proper mastication and digestion on the part of the animal.

At M.—Gladbach the "flattening out" is done between two cylinders slightly corrugated, moved by horse power and producing 600 kilos., about.

The crushing machine at Duisbourg (furnished by Wendt at Berlin at a price of 210 marks) was originally intended for hand power but we have changed this movement to a one horse power with an outcome of 600 kilos. hourly.

C. At our Dortmund enterprise the average work of our horses is 24.49 kilometres daily. This requires a speed which is governed by the roads traversed, and varies from 110 to 198 metres per minute.

At Chemnitz the horses make 21 kilogrammes daily in winter, 25 kilogrammes in summer, 24 kilometres on an average at a speed of 140 metres per minute.

At M. Gladbach the average space covered daily is 25 kilometres with a speed of 154 metres.

At Duisbourg the horses average 22.45 kilogrammes at 160 metres per minute.

Tramways d' Erfurt.

A. In summer our horses receive an allowance of 9 kilos. oats, 3½ kilos. hay and 2 kilos. cut straw. In winter when travel is less the allowance is 8 kilos. oats, 4½ kilos. hay and 2 kilos. cut straw.

Oats are not crushed and are given at 4 meals.

C. The average work received from our horses amounts to,—in 1887—27.43 kilometres daily—a rate of 143 metres per minute. This locomotion might appear slight on a two track line, but in Erfurt where we are operating a single track, with turnouts every three minutes and no fixed stoppages it would be dangerous to augment speed.

Horse-railways of Berlin.

Messrs. Fischer Dick, chief engineer, and Peiser, engineer of the Grand Berlin Street Railroad company:

A. The daily allowance of our horses consists of 8 kilos. of grain, 2 kilos. hay, 2 kilos. cut straw and 1½ kilo. of straw for bedding. The allowance of grain for a horse which works in single harness is 9 kilos.

The grains which are comprised in above enumeration may be oats or corn, or may be both,

this being governed by the market price of the articles. At present single harnessed horses receive 6½ kilos. oats and 2½ kilos. corn, others respectively 6 and 2 kilos.

B. To crush the corn we use a corrugated cylinder mill. These cylinders are 460 m-m long and 150 m-m in diameter; cost of same, 420 marks. The motive power is ¼ horse power and output 2,000 kilos. per hour.

C. The average distance traveled by our horses is 26.4 kilos. for double team and 21.5 kilos. for single teams. The former time is 160 to 170 metres per minute, while the latter consume a minute in 150 to 160 metres.

Tramways de Magdebourg.

A. Up to May of this year the daily allowance of our horses was composed of 8 kilos. oats, 1½ kilos. peas, 5 kilos. hay, 4 kilos. cut straw.

We soak our peas for 4 hours in a cemented vat and then mix it in that state with oats (which have received no preparation whatever), as we find that it aids mastication a great deal. To this mixture we add cut straw and the whole is given dry to the horses. The hay is placed in the hayracks in the evening.

The price of hay having advanced about 50 per cent. we took 2 kilos. from above, since May 1st, and have substituted therefor ½ kilo. oats and ¼ kilo. peas. From what we have since been convinced, the horses are in as good health and the price of their daily allowance has been cut down 3 pfennigs.

We are also justified in believing that our horses have not suffered from the lessening of the hay allowance, and we allow them also 10 kilos. of straw per horse daily for bedding. This straw we receive gratuitously, delivered at the depots, as an exchange for manure, the expense of removal and shipping of which is borne by the party furnishing us with the straw.

B. We do not grind our oats.

C. Our horses daily pass over 23 kilometers of road, consuming per 160 metres one minute of time, stoppages included.

Tramways de Munich.

A. Our horses daily receive the following allowance: 8 kilos. oats, 4 kilos. hay and 4 kilos. straw.

Ever since the commencement of our enterprise we have adopted the so called American system in the feeding of our horses, which consists in giving them cut hay, thus doing away with hayracks. Hence we give at each of the four daily meals one-quarter of the above-mentioned allowance, that is to say, a mixture of oats and hay and cut straw. Between each horse we have built a trough, always filled with water, so that they can drink whenever they feel so disposed, and hence they can eat their rations wet if they desire it.

We have been led to believe than the quantity of water absorbed by a horse under these conditions is less than if he were watered separately.

As a deduction from an experience of twelve years, our veterinary surgeons can testify that our horses are very rarely, and even then very lightly, attacked by colic, which is not the case when other systems of alimentation are pursued.

We give oats without grinding. To horses defective in mastication we slightly bruise the oats, taking care that the hull of the grain is but lightly pressed, so that it will enter easily into the digestive functions.

B. We use for that purpose a simple grinder with polished cylinders costing marks 335.50. Motor for same is ½ horse steam power, with a product of 250 kilos. per hour.

C. Average daily distance traveled, 20 kilometers, effected by a speed of 120 to 140 metres per minute, which includes the stoppages at the end as well as at intermediate portions of the road.

If the time lost in these delays is deducted, the real speed of our horses on the trot will amount to 200 metres per minute.

This result agrees with those which are mentioned in treatises on that subject, notably that of Bockelberg, which indicates a speed of 3 to 4 metres per second for the gait of the "petit" trot and 4 to 6 metres for the "grand" trot.

La Premiere Combagnie de Tramways de St. Petersbourg.

A. The ration of our horses is composed exclusively of hay and oats, dry and not crushed, in the proportion of 9 kilos. of hay to 9 kilos. of oats.

C. Our horses daily cover 29 verts, *i. e.*, 20.93 kilometers, an average speed of 3 metres per second.

La Société Anonyme des Tramways de Reims.

A. The food of a horse depends upon his constitution and age, the work to be exacted from him, as well as local surroundings. This latter may be the means of changing the price of food in a great measure.

Our whole enterprise consists of horses running singly, and in view of the uneven character of our road, we use very strong horses, to whom we feed oats, hay, straw and bran.

The daily average ration for the 4 months of this year consist of: k. 7.8 oats, k. 4.14 artificial hay (luzerne clover hay), k. 5.245 rye straw, k. 0.47 bran.

Before giving the oats were submitted to mechanical treatment for the purpose of eradicating a disadvantage to horses which by reason of old age could not masticate sufficiently; the oats are lightly bruised so as to still retain their flour consistency, which, when once retained, are so nutritive, as can be seen daily.

This mechanical manipulation can also be applied to cereals which are hard and heavy, notably certain Russian grains which are wholly unsuitable for old horses when given without any mechanical preparation.

Before using this method the daily allowance of oats for our horses amounted to 8 k. 30 a 8 k. 50 and still we used the oats of Champagne at a higher price than those of foreign oats.

Specialists contend that the grinding and crushing of oats has a grave disadvantage in allowing this disengagement of the *venine*, extreme volatile principle of the *feculæ* and which they claim contains the nutritive qualities. The grinding, in fact, produces a separation of the *fecule*, which is almost volatile, it is true, but practical results have shown us that this volatile principle plays no important part whatever when the real economical advantage of above treatment is considered.

To the oats thus bruised we add dry bran about 5 or 6 per cent. this daily ration being given in 4 meals: morning at 6 o'clock, at 10 o'clock, 1 o'clock p. m. and 6 o'clock.

In winter, about February and March, we give our horses for several days, as a tonic, cooked oats and flaxseed. About May or June we give them green clover, and in summer they receive daily a drink composed of bran and water.

B. To effect this bruising we use an English-made machine composed of two cylinders turning in inverse directions. This machine costs 600 francs and can turn out 1,000 kilos. oats per hour and requires 0.7 horse power. The motor is a steam engine, but it could be adapted for horse power.

C. Our system is established for speed between 145 and 150 metres per minute. Difference in this respect depends on the line and rails used. The distance traversed daily per horse is an average of 25.700 kilometres, and upon bearing in mind the reserve of 1.690, we have average labor: For able-bodied horse, 21.5 kilometres; for average horse, 21.2 kilometres.

Tramways de Stuttgart.

A. The daily allowance was in 1887: 10.47 kilos. oats, 5.10 kilos. hay in the hayracks, 2.27 kilos. mixture of cut hay and straw, 1.85 kilos. straw bedding. Oats are given dry, mixed with cut hay and cut straw.

B. We do not employ a grinder.

C. The average distance daily traveled in 1887 was 29 kilos., with average speed 150 metres per minute.

Societé de Tramways de Temeswar.

A. Every horse receives daily in three meals: 7.16 kilos. oats, 8.40 kilos. hay and 5 kilos. straw bedding.

The oats undergo no preparation. The use of corn was abandoned because we found that horses fed on same perspired excessively and hence were liable to catch colds, which oftentimes turn out very seriously in the peculiar climatic conditions of the place where we are located.

C. The daily average work of a horse is 26 kilometres, which necessitates a speed of 12 kilometres per hour.

Tramways de Vienna.

A. Our horses get the best of Hungary oats, mixed with cut straw, and we find it very good.

This is the component part of the allowance: Double teams—7.5 kilos. oats and 0.5 kilos. cut straw, 5 kilos. hay, 1.5 kilos. straw bedding in summer, 2 kilos. straw bedding in winter; single harness—9 kilos. oats and 1 kilo. cut straw, 6 kilos. hay and the same bedding for the other horses.

It is well known that dry oats, not ground, constitutes the best food for trotting horses. Corn, ground, or barley cause horses which travel rapidly to perspire profusely and hence it is evident that horses thus fed differ, in equal work, to their own disadvantage. Hence we have made no change in that connection.

B. For cleaning oats and cutting straw we use a machine to which we attach horses which are in need of rest. Two horses will clean, on an average, in one day 4,000 kilos. oats and cut 2,700 kilos. of straw. Each horse works on an average three hours daily.

C. Up to the end of December, 1887, the average daily run of our horses was 24.6 kilometres. Since January 1st of this year this has been increased to 25.2 kilometres. This is accomplished at the rate of 132.75 metres or 177 steps a minute, irrespective of stops.

Nouvelle Societe del Tramways de Vienna.

A. The allowance we make our horses we divide into two classes one representing those in single harness and the other those in double teams. The former receive 9 kilos. oats and 6 kilos. of hay, whereas the latter are entitled to 7½ kilos. oats and 5 kilos. hay. In addition each horse receives ½ kilo. cut straw and 1½ kilo. straw for bedding.

The oats are neither ground or soaked. Experience has shown the ground oats in large quantities pass over into fermentation, that is to say turns sour and becomes bitter. Hence, it should not be given to horses.

As an exception, however, we give ground oats to invalid horses, as well as those of faulty digestion. In this case the necessary quantity for daily use must be ground every day.

B. The mill we use consists of a pair of cylinders and is controlled by hand power, which yields 50 kilos. oats per hour, and costs 70 florins. As the laborers of those who bring us fodder do the manual labor, our daily grinding costs us nothing.

C. The daily run average was in 1887, 23.3 kilometres per horse. The rate of speed is governed by the character of the road as follows:

On the "Meidleng-Sternwartegasse line," length 7,340 metres the speed in 123 metres per minute,

On the "Ottakring-Mariahilf" line, length 4,220 metres; speed 132 metres.

On the "Dobling Schattenring" line length 3,990 m. speed 139 m. on the "Schattenring" line branch, length 2,200 m. speed 156 m. On the "Opernring Sheinbauergasse" length 3,100 m. speed 140 m.

The work daily performed by our horses does not exactly correspond with the real labor they have rendered because the virtual length of the lines has not been taken into consideration. No note has been taken of the other work which we exact from our horses, such as hauling coke and water, transferring cars from depot to depot, house moving of our employees, etc., etc., nor to mention the trip to the relays which are often 3 kilometres away from the stables.

Societe des Tramways de Zurich.

A. The ration of our horses consist exclusively of 7½ kilos oats carefully cleaned and 5 kilos. of best quality cut hay. Oats receive no treatment.

C. The average trip covers 20.67 kilometres which is effected by a speed of 9 kilometres per hour, in case of no obstructions on the track, deducting, however, 3 stoppage per minute.

Mr. E. J. Lawless, who has been for some time on a tour of inspection of cable and electric railways in all the principal cities, will be at the Washington Convention.

Thomson-Houston and Sprague Electric Railway Systems.

MEMORANDUM.

Mr. Tom L. Johnson, of the Johnson Steel Rail Works, having large street railway interests in the west, and looking forward to the substitution of electricity for horses, as a motive power in the near future, desired to investigate the merits and demerits of the different electric systems. His engineer, Mr. Samuel Harris, was dispatched on this mission and spent a month or more in careful investigations in Richmond, Allegheny City, Boston and elsewhere. Mr. Harris, from his professional standing and scientific qualifications, was able to make a fair and impartial investigation, and form a positive judgment. He states, unequivocally, as also does Mr. Tom Johnson, that the Thomson-Houston system is by far the best.

He marks the following points as to the superiority of the Thomson-Houston system over that of Sprague:

The mechanical work of the Sprague motor and car equipment is light, carelessly executed and not sufficiently well considered in general. We consider that the mechanical details of the Thomson-Houston system are very carefully worked out and executed in a manner far superior to that of Sprague.

The Sprague motors are too light, and in Mr. Harris' opinion, are not durable. From a two weeks' careful examination in Richmond, he states that in his opinion there is not a single motor on the line but what has had one armature burned out, and most of them more. He says that from the nature of the construction, the repair bills must be very great, and he can see the faults which cause this trouble, and which faults do not exist in the Thomson-Houston system. He lays stress upon the fact that the bearings of the armatures of the Sprague motors require oiling every trip; that is, twice every round trip; while the armatures of the Thomson-Houston system, turning in oil bearings, require attention at intervals not more frequent than once a week.

Mr. Harris also considers that it is a mistake to have the coils, which constitute the resistance (whether so called or not) wound around the field magnets rather than in an outside rheostat.

The former is the Sprague system, they claim to have no resistance coil whatever, or rheostat; but, of course, resistance in some shape is necessary, as the current must be turned on gradually.

We think our motors and gearings are constructed better than any in the market; that there are better facilities for oiling, keeping in good order, and that they are more durable.

Mr. Johnson states that he proposes to introduce the Thomson-Houston system upon all his western roads, as rapidly as possible.

Mr. Harris considers our brush as far superior to that of Sprague's. On several occasions he saw Sprague's tangential brush at Richmond turn completely over, and states that it was with difficulty gotten back to the repair station.

Our brushes rest directly against the face of the commutator, and are fed by a spring, so that they require no attention until the brush is worn out, and has to be replaced by a new one. This was regarded by Mr. Harris as a very important advantage.

Mr. Tom L. Johnson sent the following telegram:

"Mr. Harris and I have made a study of all the electric systems. There is no doubt in our mind that the Thomson-Houston system is very much the best." (Signed) TOM L. JOHNSON.

Very Truly Yours,

THOMSON-HOUSTON ELECTRIC CO.

A HARTFORD woman who jumped from a street car while it was in motion and was thrown violently to the ground said, when the conductor assisted her to rise: "It was a foolish thing to do. I have heard that it was dangerous, but have always wanted to try the experiment." Hartford is to be congratulated. If this had been a Boston woman she would have turned round and abused the conductor, says the *Railway and Steamboat Gazette*. We would add that if this had occurred in Chicago a horde of chamertic lawyers, as soon as they heard of the event, would have forced the woman to sue the company for heavy damages.

Cable Railway Practice.

BY EDWARD J. LAWLESS.

ARTICLE VII.

One of the most important appliances in connection with cable lines is the grip.

It is not my intention to describe the numerous devices for gripping cables that have been patented within the last ten years, as most of them are of little value, but simply confine myself to those grips that work satisfactorily under

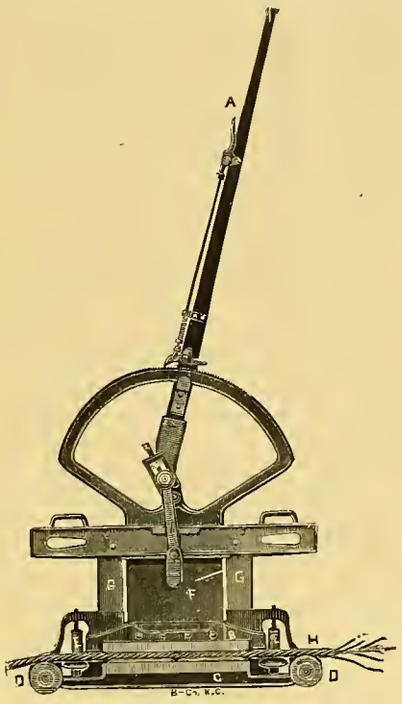


FIG. Q.

the most trying circumstances and carry heavily laden trains up grades as steep as one foot in five feet.

The first grip used was that invented by Mr. A. S. Hallidie and put into service on the Clay St. Hill RR, San Francisco, in 1873. Little of any change has been made in this grip since that time. It is worked with a double screw, one inside the other, the larger to raise or lower the gripping jaws as desired, the smaller to grasp the

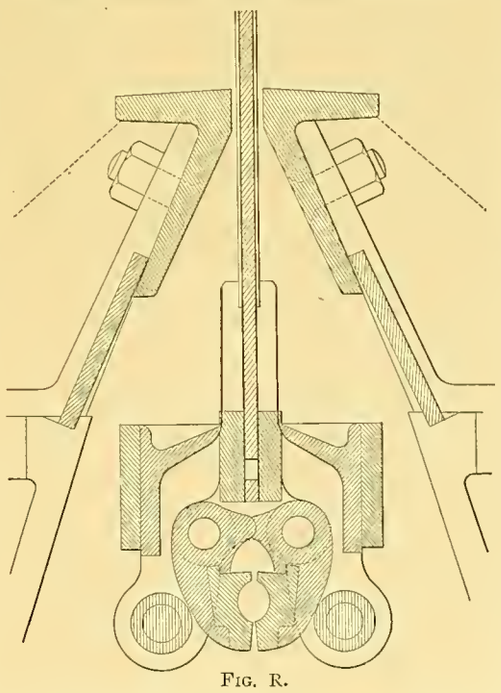


FIG. R.

cable when starting a car. This grip so far as wear on cables is concerned has made an excellent record. It is expensive to make, however; a little slow to handle cars where travel is heavy and change of cables frequent; moreover, should it get out of order, both grip car and grip must be changed.

The next grip used was that invented by Mr. A. E. Hovey, and placed on the Sutter St. line, San Francisco, in 1877. Many alterations have been made in this grip. Rollers instead of metal jaws were first used to grip the cable, with the result that the cable was rolled out or stretched over one hundred feet in twenty-four hours. Moreover the rollers lasted but a short time, as the cable cut them out very rapidly. Subsequently cast iron jaws were used with rollers at each end of the bottom one to support the cable when a car is standing still, which change proved satisfactory. It is surprising how many men have devised roller grips of every description, with a view of saving wear on the cable, seemingly in ignorance of, or overlooking the fact that such an experiment was tried years ago and proved a failure. One improvement after another has been added by different parties to this last grip, with the result that to-day it would be difficult to find a grip more reliable, cheaper to construct or more easily repaired than that shown in figure Q. This grip is somewhat similar to that used in Chicago, with the exception of the adjustment which is the invention of Mr. Henry Root. This arrangement is the simplest and strongest of any in use, seldom breaking even under the severest strains, while a few turns of the screw with a small steel pin will adjust the grip to any sized cable desired or readjust it when the jaws are worn. There is a certain amount of spring or slight yielding to this grip when grasping the cable that is of material benefit to the former, especially when in the hands of a muscular gripman, while a cable under its use will last much longer than with a grip that is perfectly stiff and rigid.

What is the best material with which to make this grip is the next point to determine? The shanks, body plate and lever should be made of soft steel, notwithstanding the fact that they are subject to considerable friction with the slot rail, as, if hard steel be used the first severe frost will make the metal so brittle that the least jar will cause them to break. The quadrant, adjustment bracket, grip beam, and lower jaw can be made of cast-steel, malleable iron or bronze. Some prefer the last, although the first cost is greatest, as if any part gets broken it can be melted and used over again while cast steel and malleable iron scrap are worth very little. The upper jaw, however, should be made of cast steel, with that part which comes in contact with the friction plate of the curves made heavy. This is better than to bolt or rivet a steel plate to the jaw, as such plate is liable to get loose and cause considerable damage and trouble. As malleable iron depends on the outside scale for its toughness and strength, the castings should be made thin and strengthened by ribbing in every possible way; all sharp angles and corners must be avoided. Malleable iron is much cheaper than cast steel, and in some respects will give more satisfaction.

Various metals have been tried for "grip dies" or fillings for the jaws, soft cast iron, chilled iron, hard steel bronze and copper. The last works satisfactorily until the outside wires of the cable begin to break when the sharp steel points cut it out rapidly. A majority of the lines using numerous grips, and doing a heavy business, use bronze; as in such cases it pays to run a furnace and make your own dies, there being no waste of material as those dies that are worn out can be melted and remoulded. Some lines use chilled iron dies exclusively, claiming them to be the best, while very good results have been obtained from soft cast iron dies which is certainly the cheapest metal that can be made for that purpose.

The accompanying cut R shows an end view of a grip invented by Mr. William Eppelsheimer. The quadrant, lever and adjustment are the same as those of the Hovey grip. This is a very desirable grip to use where there are many cables to cross, or many points where it is necessary to release the cable entirely, as any loosening of the lever at these points assures the safe release of the cable, while no "Let go" or "Pick up" sheaves are required with this grip, and consequent angles in the cable avoided. As this grip has no rollers attached to support the cable, and can be only opened slightly when in use for regular travel, it should hang in the conduit as close to the carrying pulleys as is consistent with safety. It occupies less space than the other grip, consequently, when using it, the conduit can be made considerably smaller.

(*To be continued*).

The
Street Railway
Gazette.

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Articles and papers on subjects relating to intermural transit always appreciated; the GAZETTE'S columns are open for the expression of independent opinions, and the discussion of all matters connected with street railways—on the surface, elevated or underground. A special column is devoted to the publication of trade notes and items from manufacturers and dealers.

THE STREET RAILWAY GAZETTE for November will be issued directly after the Washington Convention is over, with a full report of the proceedings of the Seventh Annual Meeting of the American Street Railway Association, as was done last year, thus enabling our exchanges (including several foreign publications) to make extensive quotations, and comment thereon, "while the iron is hot."

THE EXHIBITION of street railway devices at Willard's Hall, during the Street Railway Convention at Washington, opening on the 17th inst., promises to be a great success. We are not a little surprised, however, at the absence of several names that might have naturally been expected on the list of exhibitors. The report given in our present issue embraces only the progress made up to the end of last month. And, inasmuch as the John Stephenson Co., as well as the J. G. Brill Co., have sent cars to the Spanish Exposition at Barcelona, Spain, it will pass strange if they do not send cars to the Street Railway Exhibition at Washington.

STREET RAILWAY ASSOCIATIONS are increasing in number. As shown at the commencement of our DIRECTORY SUPPLEMENT, there are the European "Union" and the British Tramway Institute on the other side of the Atlantic; while the American Street Railway Association (which towers far up above them all) has under its wings not less than four State associations—the Street Railway Association of the State of New York, the Ohio State Tramway Association, the Street Railway Association of the State of New Jersey, and the embryo Massachusetts Street Railway Association—on the American continent. The sisterly feeling existing between the State associations, and the great respect entertained by them toward the National (American) Association—international we should say, until Canada is annexed to the United States—is well evidenced in our report in this number of the meeting of the New York Association.

THE J. G. BRILL CO., as stated in our Exhibition news in another column, have a patent arrangement to prevent the "pitching" of street cars—a much needed reform truly, and one that will be welcomed by all except some that may enjoy swinging sensations while traveling.

Written Receipts for Fares.

An invention of grumblers (last month) against the North Chicago cable railway accidental stoppages was to demand return of fares when there is a stoppage. And to make a good ground for such a demand, the following form of documentary contract was proposed:

In consideration of 5 cents this day paid to me I hereby agree to carry Mr....from....to.... within..hour or return the 5 cents.

Signed.....Conductor.

The North Side St. R. R. Co., would readily agree to that, no doubt, provided they should be adequately compensated for the guarantee and extra trouble. The fare should be double at least, when written receipts should be given; or, to equalize matters more perfectly, passengers should pay according to the distance they travel, say two cents a mile, and then they could well claim similar rights to those for which the steam railroads are responsible.

Under the present system a passenger on a street car can go to the end of the line for 5 cents, or stop on the way wherever he pleases. Accordingly there is no stipulation as to how far a street car passenger should be carried, except that the passenger shall go as far as he chooses, so long as the car keeps running. If the conveyance breaks down, from any cause, the passenger can leave the car, and be thankful for as much ride as he has had, or stop in and wait until the car proceeds. The five-cent fare paid was not for a ride from any particular point to a specified distance (as is the case on steam railroads) and so there cannot be any just or legal ground for demanding a return of fare if the conveyance fails to go as far as the passenger desires to ride therein as quickly as he wants to. And it is all nonsense to say (as some Chicago newspapers declare) that the responsibilities of a street railway company are exactly the same as those of a steam railroad company.

The North Chicago Return-the-Fares Association, if its promoters may be able to fully organize it, are going to test the question whether the return of fares can be legally demanded if the cable cars fail to proceed without delay. They have calculated the thing down fine, and think they have discovered a sweet bone of contention with Mr. Yerkes. Here is the published prospectus of the embryo association, whose membership fee is to be one cent:

"When we've collected enough pennies to make the fight—which won't be long, judging from the favor the idea meets on all sides—we will make a test case or cases. The first time the cable breaks a demand will be made on the conductor for a return of the fare. He has no authority to return it, of course, and won't do it. That part of it is a mere formality. A demand will then be made on the company through Mr. Yerkes, and that will undoubtedly be refused. We will then sue for it before a justice, and, as the law is perfectly clear, it will cost the company $2.05 court costs and fare. That isn't much money, of course, but the idea is to prosecute every such case that is brought to us. It won't take many such cases to convice the company that it is cheaper to transfer or return the fares than to keep paying $2.05 every time it refuses. Suppose all of the passengers—say forty—in one car should sue. That would cost the company $82. It would be cheaper to return the fares, wouldn't it?"

The most curious point of all is that a "respectable" lawyer has indorsed the pretensions of the promoters of the Return-the Fares Association, declaring that the 5 cents fare for carrying the passenger from nowhere in particular to anywhere he likes along the line, imposes the same obligations as the specific contract of a railroad company to carry a passenger from one particular place to a specified destination, according to the amount of fare paid. That a lawyer should say such a thing is all the more extraordinary because the universal practice of the legal profession is to receive fees without ever returning a cent in the event of a case not proceeding. In fact it is the practice of some lawyers to take all the fees they can get, without pretending to take further interest in some of their clients. And even the better class of lawyers, who conscientiously do the best they can for all their clients, never think of returning a fee under any circumstances. For instance, a counsel is instructed to defend a prisoner and gets a fee of $20 with his brief; but he is called away before the case is disposed of, and leaves his client in the lurch, without returning the fee or any portion thereof! And yet—tell it not in Gotham—a lawyer is said to have opinioned that if a passenger pays 5 cents for a ride on a cable car, and something causes that car to stand still for five minutes, after carrying that passenger smoothly and swiftly for, say, a dozen blocks, he can demand the return of his 5 cent fare because he wants to go a block or two beyond where the car has been delayed.

The present strike has put all that in the shade for the time being.

The Parallel System Approved.

Editor, STREET RAILWAY GAZETTE:

In the September issue of a contemporary, an article appears under the heading, "Safety of the Electric Railway," signed by one Sidney Short.

As a street railway man, and an officer of a modest electric light company, I fear that we have made a mistake in adopting any of the present electrical systems, and should have waited until Mr. Short laid down his theoretical examples as detailed by him in the last three paragraphs of his article, and his practical example as demonstrated by him at Denver, now abandoned and being dismantled. He says: "The street railway managers have been earnest listeners to the various stories" (meaning by agents of the various successful electric railway systems), "trying to gather the grains of wheat from the large amount of chaff." Judging from the number of parallel systems and the few series railway installations, the railway managers have evidently managed to select the wheat and leave the chaff.

Again, Mr. Short says: "The street railway company proposing to use electricity for propulsion of its cars cares very little about the theory of electricity or characteristic curve of a generator, or whether two brushes or four are used." He is wrong in this. I, as a railway manager, do care whether there are two brushes or four on a car, and I do not mean track brooms either. We are told that it is dangerous to allow any systems of railway wires on the street, which will under any circumstances shock or kill persons or animals. I agree with my friend, Mr. Short, that it is dangerous, and my connection with the electric light company of our town, enables me heartily to endorse his solicitude for man and beast.

After reading two or three more paragraphs in a similar strain in which we are told of an amount of unheard-of dangers and injuries to be received from contact with telephone and telegraph wires, I would say that I fear the only remedy left for these corporations is to have their wires immediately placed underground, but on second thought I do know that in many towns, there are already in place hundreds of electric light, railway and power circuits, and the telegraph and telephone companies seem thus far to have been able to protect their own and subscribers' interests.

After describing the deadliness of the current used on the parallel systems, Mr. Short goes on to say: "It is said in one city in which such a line is being operated that nothing can be touched without receiving a shock." If we are to believe the dangers and deadliness of the parallel systems, as Mr. Short would have us, how many people must be injured and killed in that town daily. He is right, we must have legislation, and that at once, against such murderous systems. Mention is also made in his article of two cars being simultaneously destroyed by lightning, but we are not told what became of the passengers and fare box. We are then treated to something in the way of realistic novel style of writing, in which we are told how the cars may on a system of this character (that is the parallel) become unmanageable through the carelessness or ignorance of the attendant or through any accident, and there is nothing to prevent two cars dashing into each other at a fearful rate of speed, killing and injuring scores of passengers and demolishing the cars, making as complete a wreck as ever occurred from the use of steam engines. We are not told exactly how such dire disasters can occur. We are not told, that if by any accident the controlling handle in front of the car got out of

order, why the driver could not use the controlling switch in the back end of his car to shut off the current, and that failing also, we are not told why the driver cannot pull down his trolley contact from the wire. Street railway managers please take note and be warned in time and place brakes on your cars (as Mr. Short assumes that you have not already any on), and as you may possibly have a fearful rate of speed to deal with, he has just the kind of brake to meet your requirement.

The balance of the article is made up of what Mr. Short tried to show an associate of mine in a letter by a pen and ink sketch in a series of dashes and circles how his is and was the only true way, that all the other bright lights in the electrical field knew nothing whatever of the requirements of the street railway business. My associate remarked on perusing the letter that it was evidently written by some uncommercial experimenter, and that it was a slur on the intelligence of the directors of over one hundred corporations who had adopted the parallel system.

In the conclusion of Mr. Short's article, we are told that in this system the current is constantly tending to go up to these conductors and on to the lines, when in all other kinds of electricity than that produced by Mr. Short it goes to the earth in about the quickest way it can get there. In connection with this article, I am surprised that a trade journal like the paper that published it professes to be, would print an article of this kind without first submitting it for the perusal of some practical street railway man.

A Railroad Man who Believes in
the Parallel System.

The Sprague Electric Railway Work.

Since the last issue of the Street Railway Gazette the Sprague Electric Railway & Motor Co. have put into operation a number of new electric roads and have closed several new and important contracts for electrical equipments. Among these latter may be mentioned a contract to equip the Minneapolis, Minn. Lyndale Ave. Street Railway Line, of which Mr. Thomas Lowry, is president. The cars will run from Bridge Square to the end of the line, a distance of 14,000 feet. They will all be running by the first of January, 1889, and the Sprague people guarantee their successful operation. The power for this railroad will be furnished by the Edison Electric Light & Power Co., whose building is now in course of construction.

One of the seeming difficulties which besets the adoption of the motor in Minneapolis is the snow. This, however, is regarded as amounting to nothing. The Sprague Co. have what they term their "Working Car," which is equipped with two 15 H. P. motors and carries snow plow, ice-cutter, sand and salt arrangements, etc., for making and keeping the track clear in winter.

Among those new railroads put in operation during the past month by the Sprague Co., may be mentioned, The Hartford & Wethersfield Street Railway, of Hartford Conn., and the Akron Electric Street Railway, of Akron, Ohio.

Among those present at the trial trip of the Electric Car, at Hartford, were president Goodrich, Messrs. Roland Mather, Henry Keney, Judge Henney, Mayor Root, and a number of invited guests. Starting from the depot at 4 o'clock, the run down was made in twenty minutes, six minutes less than schedule time, and this without any special attempt at speed. The return trip was made in eighteen minutes. The trial was perfectly satisfactory to the directors, who expressed themselves well pleased with the easy motion of the car, rounding curves, and in speeding.

The operation of the cars at Akron has also proved very successful, and they carry a great many passengers who are curious to try the new motive power.

Work on the Brookline branch of the West End Railroad of Boston (Sprague system) is being pushed forward as rapidly as possible and will soon be completed. The system used will be the overhead with the small No. 6 trolley wire, which is a feature upon all of the Sprague roads. The poles will all be of iron of a neat and tasteful design. The number of cars to be equipped will be twenty, they will all be lighted by electricity, and will be finer than any cars now running in Boston.

Among the many points of which the Sprague system of electric railway propulsion is superior to all others, may be mentioned its system of conducting current to the cars with the impossibility of an accident at any point of the line interfering with the operation of the remainder of the road, its system of using one motor on each axle of the car controlled by a single switch, and its method of flexibly suspending motors from the axles to secure perfection of running.

The Scranton Electrical Road.

The Sprague Electric Railway and Motor Co. has contracted for the electrical equipment for the People's Street Railway at Scranton, Pa. There will be 20 cars and the system will be overhead with the small No. 6 wire for a working conductor. The People's line is the longest in the city of Scranton and operates over 12 miles of track with more than 100 horses. The power station for operating this road will be one of the finest in the country, with steam and electrical capacity to almost an unlimited amount. An item of great importance is the cheapness of the fuel which will be used for generating the power. This fuel is culm, or anthracite waste, which can be obtained in Scranton at a rate of 10 cents a ton, and which has been proved to have at least 75 per cent. the steam producing capacity of the best anthracite coal. With this cheap fuel, electric power can be produced at a very low expense, and it is the intention of the company to furnish power at a very low price by means of electric motors, as well as to furnish enough for their own cars.

Prejudiced Against Electricity.

A Chicago paper (the *Daily News*) declares that "a thorough inquiry has developed the utter impracticability of electricity in locomotion." Our contemporary goes on to say that "a gentleman connected with one of the elevated railway projects for West Chicago recently spent considerable time in an investigation of electricity as a motive power. His plan was to obtain data from all the American cities where electric cars are being actually worked, with a view of testing their feasibility for his company in Chicago." We should have been glad if the *News* had given the name of this "investigator," or the name of the elevated railway company with which he is connected. Judging from the result of his investigation, as published, it seems clear that he is afflicted with a strong wave of prejudice, and had condemned electricity as a propelling force before making any investigation. About ten months ago a number of gentlemen undertook to "create" public opinion against horse cars and cable railways, and in favor of "L" roads for the West Side of Chicago. Their creative work is not yet *un fait accompli*, and they find it a difficult task to turn the minds of abutting property owners (the consent of a majority of whom must be obtained) to their way of thinking, that is, in favor of an elevated railway after the New York style of "L" roads. The promoters of this scheme have been strongly prejudiced against electric propulsion from the onset. Their rivals on Lake street have nearly obtained the requisite consent, it is said, their motive being electricity. It is probably to set off the Lake street boom that the *News* article was hatched.

Anyway, it is not unprofitable to notice what they say:

"Correspondence was opened with the engineers in charge of electrical roads in various cities, and in several instances personal investigation was made. The result was that, without a single exception, none of the electrical roads were claimed to be meeting the expectations of their promoters, and so far as heavy traffic is concerned are yet utterly impracticable. This includes the electrical roads at Richmond, Va., Scranton, Pa., Minneapolis, Kansas City and a number of other cities. In every case the electrical motor, while feasible for single cars and light traffic at moderate speed, has failed to demonstrate its applicability to large cities. The engineers who have made a special study of the electric motor all agree that it is yet but an experiment. It is hoped that the time will come when electricity can be applied as a motor to elevated or other trains, but that time has not yet arrived. The storage battery, from which so much was expected, has been practically abandoned in the field of experiment, and the most successful method yet employed is the old-fashioned electric wire running parallel with and above the cars.

"These investigations have peculiar significance in view of the multiplied schemes for furnishing rapid transit to the people of west Chicago. One company proposes to run its cars by electricity, and in so doing ignores the failure to make electricity conduce to rapid transit where it has been tried. The New York elevated companies, which introduced elevated roads in America, have spent large sums of money in experimenting with electric motors and have discarded them as not feasible for hauling trains.

"The Chicago company proposes to run single cars on a light structure. This would have the single advantage of escaping the congested surface traffic. It would no more be rapid transit than the north side cable is rapid transit, and would have the additional drawback of being even more unreliable than the cable. For when a cable is properly constructed it should be reliable, barring accidents, but an electric motor has been proved subject to climatic changes, and is affected by atmospheric disturbance.

"It seems clear that no matter what method of structure be employed in the Chicago elevated roads, electricity will not be the motive power for some time to come." So says the *News*.

The Hauss Electric Railway.*

The application of electricity to motive power on the street railways of the larger cities of the country has been the important problem that has engaged the scientific mind ever since city rapid transit has been under serious consideration. There is no subject among all the varied industries of the day, engaging more public attention, or of more importance to the community, than that of the electric street railway, and none has made more rapid progress towards perfection during the last few months. In fact, we may say that the improvements which have succeeded each other in rapid succession have been almost phenomenal. The avidity with which every article appearing in the public prints pertaining to this subject is read, attests the great public interest felt in the development and perfecting of travel by electricity, and shows how welcome it will be when success has been attained. It has long been proven in a manner commercially satisfactory that power can be more economically distributed over an extended territory from a central point by electricity than by any other known method.

There has recently been very great activity manifested among the several electric companies, who have been striving to get the lead in this new field.

Among the latest bidders for public favor in this regard, our attention has been called to the Hauss system, and an illustrated article describing it may be found in this issue of our Directory Supplement.

In setting forth the claims for his invention many interesting questions are raised by Mr. Hauss, and in doing so he has seen fit to indulge in what may be called criticism of the well known systems, most of which are now in practical operation in the smaller cities and on suburban roads, and some of them are working in the city of New York, where the greatest prejudice exists against all new systems. However the claims appear to be honestly made and urged with ability.

The question of perfect insulation; freedom from all danger; economy realized in point of time and money in converting a horse car system into an electric road; the saving in cost of motive power over other electric systems; freedom from noise and jar; the advantages resulting from the light weight of the Hauss motor; absolute control over the speed of the cars, and, finally, the great simplicity of construction of the machinery, is all set forth with considerable force, and should arrest the attention of scientific men, as well as that of the practical railroad managers of this and other countries.

Henry C. Lockwood.

* Described in our Directory Supplement, pages 19 and 20.

Street Railways in Mexico.

Officina del Ferro-Carril de Monterey y Santa Catalina.

Editor STREET RAILWAY GAZETTE.

Believing your readers would be interested in knowing something about street railroads in your sister republic, will give you an idea how business is done in the city of Monterey, the capital of the state of Nueva Leon. Six years ago a concession was applied for in the city of Monterey, Mexico, asking for the privilege of building a street railroad. This kind of business was unknown in this part of the world. After much discussion the privilege was finally granted and liberal to the promoters. In 1883 work commenced and progressed slowly, owing to the fact that but little money was in the possession of the prime mover, Mr. Tiletson, who was the head center and, in fact, all there was to the enterprise outside of a most liberal charter. In 1884 A. C. Schryver, of San Antonio, a far-seeing business man, was induced to take an interest by furnishing a large lot of building material. Realizing that it would soon become a good paying business he determined to buy the entire interest. From a two-mile road he has extended it, occupying the principal business streets and wealthy residence portion of the city, carrying both passengers and freight to most of the business houses and places of resort and amusement. A little more than eighteen months ago his attention was called to the famous Topo Chico Hot Springs, situated four and one-half miles to the north of the city. He applied for an extension of his privilege, which was readily granted, and he at once commenced to build a line to said springs. Not, however, before securing from the lessee of said springs an undivided half interest. While the railroad was being built his partner was devoting his time to the erection of the largest and most beautiful bath house ever erected on the American continent. Under one roof they have a capacity of bathing over three thousand people daily. After the completion of the railroad and the spacious buildings at the springs his partner was induced to take charge of all the lines of railroads and the springs. Within the past twelve months their business has been increased nearly one hundred per cent. and is growing daily. The city authorities have been fair and liberal to the enterprise and offer perhaps fewer obstacles than any city in the two republics. This is strictly an American enterprise, every share and every dollar interested being American. The Company is looking forward to rapid transit and ere long the hay burner will be a thing of the past.

JULES A. RANDLE, Supt.

PULLMAN'S PALACE CAR CO., as appears from their letter among our Exposition Notes, will give all the street railway men that will attend the Convention an opportunity to see a a most handsome couple of street cars.

STABLE DISINFECTION, although thoroughly discussed before, has been ably and edifyingly handled in the interesting paper of Mr. Henry Cassebeer, jr., read by Mr. Secretary Richardson at the sixth annual meeting of the Street Railway Association of the State of New York. It is published in another part of this number, after revision by the author, etc.

For some time it has been known that the president and directors of the West End Street Railway Company, of Boston, Mass., were investigating with great care different methods of street car propulsion, including the cable and various electrical systems. They have made it a point to visit principal cities in this country where these systems are in operation, and have made a rigid examination. They have evidently been governed by the desire to make the best possible move for the improvement of street railway facilities in Boston.

The Electric World came out with a full report of the Electric Light convention, recently held at New York, "the morning after the battle," with a circular letter by the editor and publisher (Mr. W. J. Johnston), calling attention to its promptness, etc.

Electrical Education.

"We feel that the position taken by the STREET RAILWAY GAZETTE, in furthering the electrical railway enterprises, has been a great assistance in educating the public as to what electricity can do," writes Mr. H. McL. Harding, general agent of the Sprague Electric Railway and Motor Co. And what the GAZETTE has done for the street railway world, the Electric Light Association at their recent half yearly meeting in New York, expressed the necessity of doing with electric light, etc.

Thompson's Gravity Railway.

Mr. Thompson has had much experience in building gravity roads. He erected numerous switchback railway coasting tracks in this country prior to 1887, when he went abroad and built a score or more of such roads in England and France, which have proved a great attraction at numerous seaside resorts, watering places, and centers of public resort. Our contemporary, *La Nature*, in describing these railways, recently gave Mr. Thompson due credit as the constructor, but said he was an Englishman. He is, however, a wide-awake, enterprising American.

Among the advantages of this gravity elevated railway are the following: There being no traveling engines or motors of any kind, the construction of roadway need cost scarcely half the amount that would be required if engines were employed. All hissing steam, droppings of dirt, hot water, oil, and coal are avoided. The roadway, being light and airy, does not darken the streets, and the cars running almost noiselessly is a feature of no small moment. The cars can be built very much lighter than any now in use on elevated railways, as there is no jerking or sudden stopping. The destruction of power by the application of air brakes at high speed in this system is entirely avoided, and no power is needed to stop. In other words, the force of momentum is utilized, as the car, encountering an incline on approaching the station, ascends by its own force nearly to the top; all the power required to complete the ascent being furnished by the short section of cable at each station, driven by small stationary engines. Upon releasing the brake, actuated by a lever movement, the car immediately moves forward of itself, as it stands on a moderately descending grade, and again coming in contact with the moving cable, which carries it over the elevation, and the car then speeds on to the next station. A notable feature of this railway is the construction of the roadbed, its cheapness, and yet efficiency, and absolute safety, which our contemporary emphasizes.

Electric Railway .

As the New York *World* says, in our quotation given under Richmond, Va., "there is no longer any question of the feasibility of generating electricity and retransforming it into mechanical power. * * * The problem has been successfully solved all along the line." That statement is true to a certain extent. And news just received from London, in addition to what we published last month, goes a long way to show that electric propulsion is becoming popular even over there.

At the last meeting of the North Metropolitan Tramway Company it was mentioned that probably before the next meeting the shareholders would be able to see electric cars running upon one of their lines. This statement is in a fair way for fulfilment, says the London *Electrical Engineer* of Sept. 28th, and we have lately taken an opportunity of inspecting one of the electric cars, and of ascertaining the arrangements now in progress for the inauguration on the London tramways of a system of electrical traction. The method employed is that of cars carrying their own supply of electricity stored in accumulators, and seems to leave nothing to be desired, either in simplicity or in ease of working, and at the same time will not only save greatly in the first outlay for plant, but can be run at considerably less than the present cost with horses. The system is being carried out, not by the tramway company themselves, but by the Electric Traction Company, Limited, of 23, New Broad-street, who have been occupied with carrying out numerous experiments with electric accumulator cars for some years. In 1887 they made some experiments with an electric car at Southwick, on the West Brighton and Shoreham Tramway, which were extremely successful, and attracted at the time a good deal of notice both of electrical engineers and of tramway directors. Major-General Hutchinson, for the Board of Trade, gave his certificate for the running of this car, and expressed himself fully satisfied and greatly pleased with the working of the system. Various improvements in the details have been since made, and the whole system properly organized for commercial use on existing lines.

The Electric Traction Company after extended experience, consider the motors of Messrs. Immish & Co. to be the best attainable for this purpose, and have entered into a contract with this firm to use these well-known motors in the tramcars on their system. The design of motor may be modified to meet the requirements, also the gearing and the accumulator; but having tried a number, now use the combination of chain gearing, which experience has shown them to be simplest and best. They have satisfied themselves that in their present arrangement they have a system which is practical and economical, and one which can with ease and advantage be introduced upon any tramway now existent without extra outlay, and upon new tramways with an actual saving of first cost.

Paris Street Car Horses.

A correspondent, "Henry Haynie," gives an interesting account of the street car horses of Paris, in the New Orleans *Daily Picayune* "Paris Pencilings." Carters and cabbies treat their horses very badly, according to the account. After stating that the finest and most stylish turnouts belong to the demi-monde class and that there are many such women in Paris and their coachmen are always kind to their horses, the penciler goes on to say: "'Bus drivers and those on street cars are also kind to their horses as a rule. The other afternoon, going through the rue Auber, a street laid with asphalt, and where there are more accidents than elsewhere, I noticed that it was raining and the pavement very slippery, my Jehu did not tighten the lines, and when I said something about the danger of not doing so, he replied: 'Bah! I have driven this mare for four years and she has never fallen once; she trots over the asphalt as if it was a velvet carpet. She has a Parisian foot.' The mare had lean sides, through which her ribs showed plainly, but she went along at a fair pace. Four years of service as a Paris cab horse seemed rather phenomenal, and I said as much to the cocher. He assured me, however, that it was not at all extraordinary. In the stable to which his turnout belongs there are said to be several horses which have been on the streets for eight years and they are none the worse for it. The principal thing, said cabby, is to get them acclimated and accustomed to their work. If this is done carefully and judiciously, a horse will stand hack service as well and as long as any other kind of work that it may be put to Two hours later I happened to be standing on the front platform of a street car when one of the two beasts pulling it refused to go faster than a walk. After one or two cuts the driver laid aside his whip with the words: 'The poor animal is only fit for the boneyard. She has plenty of willingness but no legs.' And tears were in his eyes as he spoke. Noticing that I smiled, and no doubt guessing why, he went on to tell me that he had been on the line since it was started fourteen years ago. That he and his mare had entered the company's service on the same day, and that since then she had made two round trips every day, each of them from 14 to 15 miles. The company had still five or six horses that dated from the opening of the road, while at least half its stock had been in service from eight to ten years, and all of these were yet able to do their work. The omnibus company are not so lucky with their horses and are forced to replenish them more frequently than do the tramway companies. The reason for this is that the former are obliged, by reason of the weight of their vehicles, to use a breed of large, powerful horses, not unlike those of Normandy, and known from the province whence they all come as Limousins.

Our Card Basket.

MR. CHAUNCEY C. WOODWORTH, the estimable secretary of the Rochester City and Brighton R.R. Co., Rochester, N. Y., has been elected president of the Street Railway Association of the state of New York.

MR. F. T. LERNED, agent Peckham Car Wheel and Axle Co., called at our Chicago office on his way to the Washington Convention. He says the Peckham wheels and axles are gaining ground rapidly.

MR. J. F. PFETCH is the superintendent of the Erie City Passenger Railway. At their annual meeting recently held the president and general manager (MR. W. W. REED) and the secretary (MR. J. L. STERNBERG) were re-elected.

SUPERINTENDENT J. C. SHAFFER, of the Citizens' Street Railway Company, Indianapolis, returned September 18 from his vacation in the east, which was largely taken up with confinement to his bed from fever. He will at once resume the vigorous policy of the Chicago syndicate in extending the lines and facilities of the company.

MR. J. C. ROBINSON, the tramway manager of British fame, who is disposed to settle in the United States, has fled from New Orleans to avoid too intimate acquaintance with "Yellow Jack." And by going to Atlanta he experienced a fall of 44 degrees (94 to 50) in the temperature in 24 hours. When last we heard from him he was Rome-ing in Georgia.

WHEN MRS. MARY E. H. G. Dow was made president of the Dover (N. H.) horse railroad company in January, 1888, the stock of the concern was worth only $5 or $7 a share and the road was heavily in debt. The directors have just declared a 20 per cent. dividend and shares are now worth more than $100 apiece. The dividend is paid from the earnings of the road and there is a surplus in the treasury. All this has been accomplished by the energy and executive ability of Mrs. Dow. When she was elected president many people thought that a mistake had been made.—*Picayune.*

* * * ANOTHER dignified, stern and severe looking Chicagoan on the street is C. B. Holmes. When strangers are asked if they can name his occupation, nine out of ten say "Minister." He always wears the black frock, tightly buttoned to the chin, a turned collar, and a stiff derby, gray in summer and black in winter. His attire is scrupulously correct and neat, his beard and hair carefully trimmed and brushed. He is seldom seen walking on the street and hardly ever rides on his cars, preferring his span of handsome bays, which he drives skillfully himself over the crowded thoroughfares. Quite a contrast is Baron Yerkes, who shows more in his general make-up the man of the world. Yerkes always wears a high hat on the street; Holmes seldom, if ever. Yerkes is, one might almost say, esthetic, and always wears the latest fashion outaways.—*Chicago Tribune.*

MR. H. H. WINDSOR, the estimable secretary of the Chicago City Railway Co., who has been president of Plymouth Club, Chicago, over two years, was presented by that popular institution with a very handsome clock on Monday evening, October 8. Mr. Windsor is also editor of the *Plymouth Review*, a monthly periodical showing forth the fruits and attractions of Plymouth Club, which is composed of the young men of Plymouth church and congregation devoted to literary and social culture. The presentation of the clock was a great surprise to Mr. Windsor, but his numerous friends could not hit upon any more appropriate token of their esteem. In response to a letter of inquiry Mr. Augustus D. Curtis (one of the superintendents of the Illinois Central R.R.), who is a member of the Plymouth Club executive committee, says: "As a token of their regard and appreciation of his labors for the Club during the last two years, the members of Plymouth Club, on Monday evening, Oct. 8th, presented their retiring president, Mr. H. H. Windsor, with a beautiful marble eight-day clock. Although taken by surprise he responded to the presentation in his usual happy manner. The members are aware that in his refusal to accept a renomination they lose a most efficient and valued officer, for the success of the Club during the last two years is due mainly to his efforts."

NEW PROJECTS, PASSING EVENTS, &c.

ALABAMA.

Mobile.—The Consolidated Street Ry. Co. has amalgamated the various street railway ventures of this city. The consolidated company has a capital stock of $500,000; Wm. M. Duncan (Nashville) being president, and R. K. Warren secretary and general manager.

Huntsville.—Henry Fuller has organized a company to build a steam motor line here, as intimated in previous issues of the GAZETTE.

ARKANSAS.

Hot Springs.—An exchange says that the construction of the suburban electric railway has been postponed.

CALIFORNIA.

Alameda.—An expiring street railway franchise has been renewed to Theodore Meetz.

Ontario.—The Ontario & San Antonio Heights Ry. Co. has been incorporated, with a capital stock of $150,000; and they have obtained the right to use horse, steam, cable or electric power. Chas. E. Harwood is president.

Petaluma.—The Petaluma St. Ry. Co. has been incorporated, with a capital stock of $60,000.

San Francisco.—Work on the Howard street line is progressing rapidly, though the contracts for the completion of the roads both along that street to Twenth-sixth, and from Market street out Fell to the Park, will not expire until September, 1889. The engine-houses at the junction of Howard and Tenth streets are to be built immediately, and will cost $100,000.

San Jose.—The San Jose & Santa Clara Electric Ry. has been in operation over a month.

COLORADO.

Denver.—The Park Railway Co. has been incorporated by J. R. Schermerhorn, E. W. Merritt, and others, to construct and operate a street railway between the city and the park. They have applied for a twenty-years franchise, with the right to operate the road with "horse, cable or most approved smoke-consuming noiseless steam motor power." The omission of electricity is a striking feature.

The Clear Creek Avenue branch of the City Railway has been completed, and is now in operation. Further extensions are contemplated.

DAKOTA.

Deadwood.—Mr. Miller's new street railway is being constructed rapidly, and is expected to be in operation by the end of next month.

Watertown.—The motor line to Kampeska Lake was in operation during September.

DISTRICT OF COLUMBIA.

Washington.—The *Star* reports a trust deed given by the Capitol, North O Street and South Washington R. R. Co. to Messrs. Bond and Cragin, conveying all the real estate of the company and its franchises to secure $50,000 in 6 per cent. bonds of $1,000 each, payable in ten years.

GEORGIA.

Atlanta.—Mr. J. C. Robinson, who stays at "The Arlington," having escaped from New Orleans for fear of Yellow Jack, says that steam motors have been running very successfully on the principal streets of this city since the beginning of September.

Cedartown.—The construction of the new street railway here is being pushed as rapidly as possible.

Rome.—The North & South Street Ry. Co. is a new organization with $50,000, John C. Printup president. A couple of miles will be in operation next month, it is expected.

ILLINOIS.

Chicago.—License of incorporation was issued by the secretary of the state, Sept. 24, to the Chicago and North Shore Rapid Transit Company, at Chicago; for the purpose of transportation of passengers by steam, electric, or other approved motor upon an elevated railway; capital stock, $5,000,000; incorporators, Norman W. Gifford, Henry P. Kranzy, and Alonzo McLaughlin. The duration of the company is to be ninety-nine years.

License was issued Sept. 27, to the Chicago Steel Rail Company, at Chicago; capital stock, $200,000; incorporators, Samuel W. Adams, John Good, and William A. Hinkins.

Commissioner Swift has issued a permit to Mr. Yerkes for the construction of a "cross-town" road to join the North and West Sides, for which transfer tickets will be issued.

As to elevated railways, the West Side Rapid Transit Co.—the Bryan-Blake combine—have made considerable progress *backwards* recently. The corporation counsel has decided that the Park Commissioners had no right to sign consents for the road alongside of the parks and boulevards; street crossings have also been discounted from the mileage. The result is that this "rapid transit" company has rapidly fallen backwards, and they stand no show.

The Onderdonk-Willits "L" road, along "alley-way" property to be purchased by the company, stands a far better chance. They have been "hanging fire" until their rivals should drop out of consideration. Mr. Onderdonk tells us that his people are ready to proceed with the construction of the road rapidly, if they get a fair ordinance.

The alley-way "L" road (as it is commonly called) on the South Side has a long list of condemnation suits in court, and the concensus of appearances show that they mean to get there, and that as soon as possible.

The State street elevated project is also anxious to proceed; the promoters do not make much head-way as yet, and they have been in the field some years.

There is a "lowerated" scheme in the air also—the Arcade Rapid Transit Co. of Illinois being still afloat, and talking about their projected underground railway along Monroe street.

The Chicago City Railway Company have ordered of F. W. Horne, Western manager of the Excelsior Company, a 25-light machine for lighting the cable station on 57th and Cottage Grove avenue.

The Chicago Passenger Ry. Co. do not seem to be in a flourishing condition. A hundred shares of their stock were sold on the Chicago Stock Exchange, Oct. 3rd, at 65. The *Tribune* observed that "this is the lowest price at which the stock has ever been publicly sold, and as the road is generally supposed to be doing well there is naturally some surprise at the transaction. It will be remembered that the West Chicago Street Railroad Company owns 7,200 shares of the stock, which is a large majority, and it has been given out from time to time that the company intended to buy the remainder, but it is clear that the concern does not care to pay the prices recently ruling. When the negotiations for the control of the West Division Street Railroad were in progress the question of leasing the Passenger Railroad property was also under consideration, but it was found that the net earnings were only $35,000, or 3½ per cent. on the capital stock, and it was therefore concluded that the lease ought not be made. The road's earning make a good showing. The net earnings for the first half of the year were $24,789; for July, $10,519, August, $7,296; September, $8,062, making a total of $50,166. The fixed charges are only $24,000 interest on the bonds, and from the above figures it may reasonably be expected that the net earnings this year will be $60,000. This would leave $36,000 applicable to dividends on the stock—that is, a little over 3½ per cent. But there is another side to the story. The company has expended $125,000 in the construction of the Austin avenue line, and $75,000 will be required for the completion of that line and the purchase of equipment. For the contemplated changes in the Washington street tunnel $150,000 will be needed, and the contract with the city requires $50,000 on the Adams street bridge. This makes a total of $400,000, on which there will be an interest charge of $24,000. This would leave a margin for the payment of dividends, which is so small as to be hardly worth counting. The property promises a substantial growth, but the probability that there will be a long wait for dividends is sufficient to discourage holders of the stock."

THE STRIKING CONDUCTORS AND DRIVERS.

The history of "tie-ups" has reached a critical point in Chicago. The conductors and drivers on the North Side struck Oct. 6, and those on the West Side have followed suit just for spite. Mr. Yerkes seems resolved to maintain his ground and hold the management of the road

in his own hands. Mr. Yerkes was asked how the discord with his men had come about. He replied, "I am glad you asked me that question. From what I have lately discovered I am satisfied that George Schilling is at the bottom of all this trouble. I need not tell the people of Chicago who George Schilling is. He has been mixed up in every labor trouble in this city for a number of years. I think I do not exaggerate when I say he is a 'pernicious influence.' He has been mixed up in all the Stock-Yards strikes, in the West Side strike, in the brewers' strike, and he had to sail close to the wind to keep clear of implication in the Anarchist troubles. He was Spies' proxy in the Van Zandt marriage. He breeds trouble wherever he goes. He has tried to keep under cover in the present disturbances, but I intend that he shall come out in the open. I have had no end of trouble with this man. He controls Christie, the leader of the strikers, because the latter once served with him on shipboard, I believe. I have been pestered by his demands and annoyed by his impudent interference between my employees and myself. Had he not intervened I could have settled all the difficulties with the men. He makes his living by creating trouble. It is his meat and drink. He insisted on attending at all the committee meetings and conferences. He was the first to suggest difficulties and to raise questions on which it was impossible that our company could agree with the men. I attribute the strike to his influence. I attribute the discontent and dissatisfaction of the men to him. But he has had his agents as well as his dupes among them, and I am glad the former have quit the company's employment. The headquarters of this man are in the *Arbeiter-Zeitung* office on Washington street. And I have been given to understand that the demands of the men made on me Sept. 23, were formulated in the *Arbeiter-Zeitung* office. One thing I am sure of. They did not emanate from the committee itself. Do the people of Chicago need stronger evidence of the character of the influences which have led to this strike?"

There are two grounds of grievances put forth, one is wanting higher wages, and the other, which apparently is only a convenient accompaniment for the sake of appearances, is a necessity claimed by the strikers of changing the system of running the cars. Mr. Yerkes readily expressed his willingness to change the time schedule if an improvement could be suggested; in fact he will give a premium to any one who will devise a better plan of operation than the existing arrangement. But the street railways, on the north side, will not yet stand the payment of as high wages as those paid on the south side (Mr. Holmes' system), or even the same as paid on the west side. And the company will procure new hands as speedily as possible. The strikers demand 21 cents an hour for horse car men, 23 for "trailers," and 27 for grip-car men (conductors and drivers). Their earnings hitherto, and the lengths of their day's work on the various lines, according to their own showing, are as follows:

	Hrs.	*Min.*	*Per day.*	*Av. per hour.*
Lincoln avenue	11	50	$2.25	19¼
Fullerton avenue	12	1⅓	2.25	18½
Larrabee street	12	00	2.25	18¾
Clybourn avenue	11	44	2.25	19
Limits grip-car	12	00	2.25	18¾
Halsted street	11	40	2.25	19
Sedgwick street	13	10	2.50	19
Garfield avenue	11	40	2.25	19

Professional agitators have befooled the men to throw up their livelihood, and no doubt their places will soon be filled by others.

The state legislature recently enacted a law providing for the payment for any damage done to property by rioters, and this will naturally have a wholesome effect on maliciously mischievous strikers. And in this connection, the condition of the malcontents and mischief-makers at Philadelphia, as reported in the leading paper of the City of Brotherly Love, which we quote in our news of the district, is interesting to contemplate. And, moreover, Col. Kerper and Superintendent Harris have thoroughly stamped out mischief-makers and strikers from Cincinnati; and we trust that President Yerkes and General Manager Parsons will be fully equal to the occasion in Chicago and give the walking delegate *et al.* such a beating that strikes among street car men will become a thing of the past in Chicago, as it already is in the Queen City.

Fernwood.—A company is being organized to build a street railway here.

Pullman.—It has been reported far and wide that the Pullman Company are going to build a model electric railway in the "model city." This piece of news is hardly correct. A model street railway is to be built there, it is true, and ground for it was broken Sept. 18, but it has not been decided what means of propulsion will be adopted—probably one (or two) of the electric systems may be used. Certain it is, however, that a new kind of gas motor is being perfected specially for this very road, which is to be about four miles long; and if the motor in question will perform half as good as is promised for it, electricity may go—for the present. The cars to be used on the new line are to be 33 feet 10 inches long, and they will be as elegant as it is possible to manufacture. They will form a permanent exhibition of Pullman work, and as such no pains will be spared to fit them up in the handsomest style. Messrs. Loss & Co., of Rochester, N. Y., have the contract for the track-laying, and it is being done under the superintendence of Mr. C. E. Loss.

Indiana.

Anderson.—The Anderson St. Ry. has been in operation over a month. It is to be extended without delay.

Indianapolis.—The McNeal electric railway has passed the council "with an amendment that the company must not use overhead conductors."

The Citizens' Street Railway Co. (of which Mr. C. B. Holmes is president, and Mr. J. C. Shaffer is superintendent), have spent $125,000 in extensions and improvements since May 1st. A new line was opened the end of September, extending from the Union passenger station to the State fair grounds, three miles.

Iowa.

Burlington.—The Burlington Horse Ry. Co. are in communication with the Thomson-Houston people with the view of converting their road to electricity.

Davenport.—The sweeping deal mentioned in our last issue has since been closed. President C. B. Holmes of the new syndicate says that in view of the action of the Rock Island City Council in granting all the franchises asked for, the work of improving the lines already purchased will be commenced at once. He declares it to be the intention of the syndicate to connect Davenport and Rock Island by means of the Government bridge as soon as possible, and says that the line will be operated before January 1. The construction of new lines and the rebuilding of old ones will be pushed vigorously. There is much gratification in Davenport, Rock Island and Moline over having the control of all the connecting lines under one management.

Des Moines.—An ordinance has been passed granting the Belt Line Ry. Co. permission to use noiseless steam motors in the streets of the city (which they want to occupy), but there is a prohibition for them to use electricity.

Kansas.

Kansas City.—The city has granted a franchise to the newly incorporated West Side Electric Ry. Co. The capital stock is $500,000. James D. Husted is president.

Leavenworth.—The Fort Leavenworth Rapid Transit Co. are constructing their line.

Wichita.—The Thomson-Houston Electric Co. say the Riverside Suburban Electric Railway will be in operation in a few weeks.

Kentucky.

New Albany.—The "Chicago syndicate" have set their eyes on the street car lines of New Albany and those of the neighboring city the other side of the river, it is said. The Albany Street Ry. Co. recently executed a mortgage on all its stock, etc., to secure the payment of bonds to the tune of $150,000.

Louisiana.

New Orleans.—At the council meeting, Oct. 2, the committee on streets and landings reported favorably with amendment on the ordinance granting T. Prudhomme and others permission to operate electric motors on street car lines. The franchise is for 50 years. The following is the full text thereof:

"Be it ordained by the common council of the city of New Orleans, That the privilege is hereby granted to T. Prudhomme, Maurice J. Hart, W. J. Behan and Edgar H. Farrar, their transferees, associates and assigns, and any corporation to which they may hereafter transfer this privilege, the right for fifty years to use cars propelled by electricity, on any and all of the street railroads of this city, provided that all such cars so propelled by electricity on said street railroads (shall be used only for the transportation of passengers) and shall in all respects conform to the rules and regulations now prescribed by the respective charters and franchises of said railroads."

The *Picayune* had no report of the passage of the ordinance next day, but the day after (the 4th) it had this curious statement:

"There was no discussion, and as the matter had been considered in secret session by the committee on streets and landings, very little was known about the ordinance. In fact, in some unaccountable way, none of the reporters remarked its passage, so hurriedly was it done. The favorable report upon the ordinance was, however, mentioned in a synopsis of the street and landings committee's report. The committee offered several amendments which were adopted. These have not yet been seen, but they are said to prohibit poles and overhead wires, provides that the motor shall be satisfactory to the council, and that the ordinance shall not be construed as a monopoly. The mayor has not yet signed the ordinance."

The streets and landings committee has not yet taken any action on the petition of the Carrollton road to introduce the Sprague motor.

Maine.

Bangor.—The Bangor Electric Ry. is being constructed as rapidly as possible.

Biddeford.—The B., Saco & Old Orchard Ry. Co. contemplated considerable extensions.

Maryland.

Baltimore.—Times are becoming dull in this famous city. The street car men have actually submitted to a little reduction in wages. The electric road is favored the most, and the horse car companies are seriously considering the desirability of adopting electricity in place of horses.

Cumberland.—A street railway company is being organized here

Massachusetts.

The Massachusetts Street Railway Association was duly organized at Salem, September 20, when the following officers were elected:—*President*, Charles H. Odell, president of the Naumkeag St. Ry. Co., Salem; *Vice-presidents*, Henry M. Whitney (president of the West End St. Ry. Co., Boston), Amos F. Breed (president of the Lynn & Boston R.R. Co.), and F. S. Stearns, of Swansey; *Secretary*, F. H. Monks, of Brookline; *Treasurer*, James H. Eaton, of Lawrence; *Executive Committee*, names given alphabetically, I. A. Abbott (Haverhill), W. W. Cross (Brockton), H. M. Fedderhen (Quincy Point), A. Fell (Lowell), S. C. Hart (New Bedford), D. F. Long street (Boston), J. Olmstead (Springfield), Chas. B. Pratt (Worcester), and J. Tucker (Pittsfield). There was a large attendance, and there is every prospect of numerous membership.

Boston.—The last Council Committee appointed to investigate the working of electric railways, have condemned overhead wires and conductors.

Brockton.—It was stated in the September Gazette, that the East Side Street Railway Co. "have made arrangements with the Brockton Street Railway Co. to use the same tracks on Main street." The agreement did not mature, it seems. At all events, we have received a correction of our statement, to the effect that the latter company have been ordered by the authorities to move their tracks on Main street 24 inches east of the center of the street, the East Side Co. to pay the cost of said removal, and to build their own tracks 24 inches west of the center.

Brookline.—They have commenced to build the Sprague electric power station here, for the West End St. Ry. Co. It looks as if the Sprague Co. may "get there" first, followed closely, however, by the Thomson-Houston Co.

Cambridge.—The electric road from Boston to Cambridge is to be built as soon as possible, says Pres. Whitney, West End St. Ry. Co.

Framingham.—The Union St. Ry. Co. contemplate considerable extensions.

MICHIGAN.

Adrian.—The electric railway here is not to be put in operation until next summer.

Detroit.—The Metropolitan Ry. Co., of this city, have ordered fifteen cars of the Detroit Electrical Works, who will also equip their electric line, which will be nearly five miles long.

MINNESOTA.

Minneapolis.—Col. Lowry has made a big land purchase close by this city, and there has been much speculation as to what he intends to do with it. The following appeared in the Minneapolis *Tribune* of September 27 :

Thomas Lowry and a syndicate have just closed a deal whereby they become the owners of a large tract of land adjoining the 800 acres owned by Mr. Lowry in the town of Fridley, just outside of the northeast city limits. The newly acquired tract embraces a whole section, 640 acres, and was purchased from John Dudley for $200,000. The former tract will be platted as Lowry Heights. It is reported that the first payment is to be $100,000, which will be paid in a few days. There was a rumor that Mr. Lowry intended to plat this large tract of land and open it for a suburb, but when seen last night he said:

"It will be used for nothing at present save farming purposes. A large force of men will be set to work immediately, and the entire tract will be grubbed. I have purchased the land simply as a speculation, and because it lay so conveniently near my own. I have been trying to carry the deal through for nearly a year."

When asked if the Monroe street car line would be extended into the tract Mr. Lowry said that it would not until the property was placed on the market for homes, and it might not be then. The property purchased by the Lowry syndicate was recently under contract to other parties in connection with a large manufacturing plant, which failed to materialize. It is a fine tract, and the sale is regarded as a bargain by real estate men.

MISSOURI.

St. Louis.—The South Sixth street car line people are making strenuous efforts to introduce rapid transit between Carondelet and the city proper. The project has been in hand for two years, says a local paper, and has been delayed only by the inability of that company to secure the desired rights from the Municipal Assembly. Everything was in readiness last fall to sign contracts for the construction of a cable line, when the refusal of a fifty-year charter frustrated the preparations for the time being. President W. L. Johnson says : "It is strange why any opposition is offered to our rapid transit charter. There are 20,000 people in Carondelet, and five times that number in South St. Louis, who would be immensely benefitted by it. We carry as high as 10,000 people some days, and a saving of half an hour to each, as our proposed cable would have done, would mean a saving of 208⅓ days of time to them, which is quite an item." Pres. Johnson, however, has dismissed the cable idea from his mind, and he has almost decided in favor of the Short series system. But there's many a slip, etc., and it may be some other electric system yet.

NEBRASKA

Lincoln.—The Lincoln St. Ry. Co. are contemplating further extensions.

Omaha.—Twenty-two Pullman cars (12 motors and 10 towers) are in course of construction for the electric road (Thomson-Houston system) over the Missouri river—from Council Bluffs to Omaha.

NEW JERSEY.

Belleville.—A street railway company has been organized, and they are seeking right of way.

East Orange.—Electricity is to be adopted here instead of cable.

Elizabeth.—The City RR. Co. are building the tramway hence to Elizabethport, which is expected to be in operation in December.

Jersey City.—The J. C. & Bergen RR. Co. have re-elected C. B. Thurston president. Warren E. Dennis is secretary.

Newark.—The National Electric Ry. Construction Co. has been incorporated here, for the purpose of building electric railways. Mr. Chas. E. Powers, Boston, is one of the incorporators.

Paterson.—The Pat. City Ry. Co. contemplate considerable extensions.

NEW YORK.

Amsterdam.—The Ams. St. Ry. Co. has been stopped by an injunction, on the ground that they had laid tracks without consent of property owners.

The Ams. Electric St. Ry Co. have bought a franchise of the City Clerk, in compliance with the new law in New York State, for which they pay a very small percentage of the gross earnings, but how much, our correspondent does not state.

Brooklyn.—The Atlantic Avenue Railroad Co. is still on deck; and the officials do not seem at all frightened at the grinning of teeth at them by the Attorney General, as well as lesser lights of the law, as mentioned in our last number,

Brunswick.—The Heart's Content St. Ry. Co cannot get a franchise. They threaten to seek compulsory powers, but the authorities only say they can go to law to their heart's content.

Buffalo.—The following preample and resolution was unanimously adopted, without discussion, by the City Council, Sept. 17:

Whereas, The City of Buffalo has heretofore granted to the Buffalo East-side Railway Company the privilege of laying its tracks and operating its road in and along William Street from Michigan Street eastward with the understanding that the said company would, upon the laying of its tracks, place cars thereon, and run the same for the accommodation of the public, and the said company having laid its tracks in said street and is now occupying the same and is neglecting and refusing to operate its road, therefore

Resolved, That the said company be and they are hereby notified and required under the arrangement set forth, to forthwith place upon said tracks and operate the same, a sufficient number of cars to accommodate the public who may desire to avail themselves of the privileges intended, and which were guaranteed to them by the grant aforesaid.

Lockport.—The Lock. St. RR. Co. are extending their tracks, and will put on a number of new cars.

New York —Ten cars (16 feet long) for the Twenty-third street line (to supersede the bobtailers) are to come from Pullman. As mentioned in our September number, the John Stephenson Co. are supplying a number of cars for this road. And beside the number mentioned from the Pullman Co., we understand that the J. G. Brill Co. as well as Lewis and Fowler are to supply ten or a dozen each.

A special despatch from New York, Sept. 26, says: Nothing but the wonderful luck that seems to stick to an elevated road prevented a terrific loss of lives in a collision that occurred between two trains at Ninth avenue and Sixty-fourth street this evening. It was ten minutes of 7 o'clock when a train of cars bound up town emptied its passengers at the Fifty-ninth street station, Ninth avenue, and continued to Sixty-fifth street. There it was the intention of the engineer to switch off to a side-track and put up for the night. He was backing down on the switch, the rear car had left the main track and the third car was just turning when a Harlem train of four cars full of passengers came along at full speed, and before the empty train had time to get out of the way crashed into the third car, throwing it on its side half way off the track. Had it not been for the iron girder suspended between the tracks at this point this car would have fallen into the street. As it was it was lifted off the rear trucks and at the same time pulled the rear car with it, and the forward trucks of the last car and the rear trucks of the third fell with a great crash into the street below. At the same time the concussion threw the forward car of the Harlem train off the track also. The preliminary blowing of the whistle, followed by the shock of the collision, threw the passengers into a panic, and women screamed and men cursed as the cars rocked and threatened to fall off. Those who were in the forward car, which was thrown off the track, were frightened almost out of their wits, and an indescribable scene of confusion ensued as the passengers made a wild break for the doors and tumbled over one another in their efforts to get out. Many crawled out of the windows and got to the tracks that way. But the trainmen soon quieted the panic-stricken people and persuaded them to get into the other three cars.

The New York *World*, 27th, describes the event as "the narrowest escape from a terrible accident in the history of the city's elevated railway."

A case of robbery from the person took place it seems, on the "L" road Saturday evening, September 29th. N. P. Hartman, of 401 Gates avenue, Brooklyn, the author of "Attack on Stony Point," and an amateur drill-master, was returning from Albany late that evening and took an "L" train at the Grand Central Depot for Brooklyn Bridge. He fell asleep, and when he awoke at the bridge discovered that his vest had been cut open and a pocketbook extracted containing $40 and gold medals worth $1,000, presented him for instruction in military drill. That was not the place to sleep in certainly.

Superintendent Alfred Skitt, of the Fourth Avenue Railroad Company, had an informal talk with the Park Commissioners Sept. 26, concerning the application of his company for permission to put a street railway in the transverse road which crosses Central Park at Eighty-fourth street. President J. Hampden Robb told him that he thought the city should get much better terms than had yet been offered, either by his or the Second Avenue Company, before granting a franchise. Mr. Skitt said that the details would all appear in the contract.

Mr. Robb suggested that a franchise for a road at either side of the Park be obtained, so as to make the line of real service as a cross-town line.

Mr. Skitt said that such a step would retard the project a whole year, as the trouble of getting a franchise would not probably be settled until the present Board of Aldermen had retired. A new Board would necessitate going over the same ground again. The Board will soon set a day for a formal hearing of the matter.

GREAT DAMAGES BY THE ELEVATED ROADS.

Judge Andrews, of the Supreme Court, handed down an important decision, Oct. 1, concerning the proceedings commenced by the Metropolitan Elevated Railway Company and the New York Elevated Railway Company for the purpose of acquiring title to the easements in certain real estate along the lines of their roads. Within the past two years a large number of suits have been instituted by owners of property on the streets along which the L roads are constructed, seeking damages sustained by them through the railway's interference with their easements in the streets of air, light and access to their places.

The defendant railways were heavily mulcted in each suit, and last May they instituted proceedings, for the appointment of Commissioners that they might acquire title by virtue of the law of eminent domain to such and as much of these easements as were needed for maintaining the roads.

Judge Andrews is of opinion that the companies are entitled to the appointment of these Commissioners for that purpose. He holds that the term "real estate," as used in the statutes, includes all the incorporeal hereditaments, easements, rights and privileges which are sought in these proceedings; and that the provision for serving notice of the application by publication did not apply, such course being necessary only where the land itself is required by a company for its roadway.

Judge Andrews regards as the most serious of the objections raised to the proceedings the one that proper efforts had not been made by the companies to purchase the easements in these cases. But he concludes that on the whole the company acted in good faith in making the offers they did.

The fact that suits for damages are pending is held to be not a bar to the proceedings. Regarding the objection that portions of some stations are unlawfully used for news stands, Judge Andrews says that the surface railroads have always had news stands at their stations, and that the legality of their existence has never been questioned.

In conclusion, the Judge says that all the objections should be overruled and commissioners should be appointed. "For the sake of convenience and uniformity," says the Judge, "I

have concluded to appoint the same commissioners in all the proceedings."

In order to secure commissioners in whom all will have entire confidence, the Judge has adopted a special plan for their appointment. The petitioners may nominate persons to the court, one of whom will be appointed if found to be disinterested, impartial and free from all objection. The property owners may make like nominations and an appointment will be made.

The two persons so appointed, with a third to be selected by the Judge, will constitute the commission.

THE JULIEN ELECTRIC CAR.

Special despatches were sent from New York Sept. 18, regarding the "substitute for horse cars," of which the following is a specimen: The Julien electric car, of the pattern which the Fourth Avenue Surface Railway Company proposes to substitute for horse cars, made two trips on the road yesterday. A similar car has run up and down the road scores of times within the last year to insure practical test of its workings, but yesterday the car was opened to the general public. It reached the postoffice from the Eighty-sixth street stables about 2 o'clock, and an hour later returned. On the round trip ninety-five passengers were carried. At 4:20 p.m. it left Eighty-sixth street again with the same battery, and arrived at the postoffice at 5 o'clock, making the trip in the time ordinarily occupied by the horse cars, as it is at present intended to do. When the car started back it met the big uptown rush, and fifty-one people had taken passage before the car got out of Center street. The motion was quite as smooth as that of a cable car, and turns were rounded without a jolt. A slight hissing noise accompanies its motion. A practical advantage of the car as shown yesterday was the perfect control exercised by the driver. The car is eighteen feet long and has two trucks, and is handsomely furnished. It is lighted by electricity. As it moved along the street, creeping slowly on the Bowery and spurting again when it reached Madison avenue, with its gong continually sounding like that of a cable car, it attracted considerable attention, though it is by no means a novelty on this road.

In regard to the danger supposed to attach to the sulphuric acid used in generating the motive power, the directors of the Julien Company say that the acid employed is a 90 per cent. dilution, and that one may bathe his face and hands in it with impunity.

The directors of the Julien Company and Superintendent Kitt, of the Fourth Avenue Company, expressed themselves as perfectly satisfied with the result of yesterday's trials. The car will make several trips to-day. Next week another will be put on, and before long the ten ordered of the Brill Company will be in readiness.

It is the intention of the Fourth Avenue Company to fit the old cars gradually with an adaptation of the same system. One of these remodeled cars will be put into service within a few weeks.

Tarrytown.—The People's Rapid Transit Co., with a capital stock of $500,000, has been incorporated here by Geo. Stark, of Nashua, N. H., and others.

North Carolina.

Asheville.—The first Sprague electric road here will be in operation in a few weeks.

Millboro.—Messrs. R. P. Atkinson and R. T. Gray, of Raleigh, are contending against each other for an electric railway franchise here. It is not unlikely but there may be two lines, or, as likely as not, "between two stools" the city may get left.

Ohio.

Alliance.—The Thomson-Houston Electric Co. through their general agent (street railway department) in the West, Mr. Theo. P. Bailey, of Chicago, have closed a contract for an electric street railway here. The contract is for building and equipping the whole road and plant, except the power house; and work is to commence immediately. The road will be ten miles long, two miles being single track, and three cars will be put in operation as soon as possible.

Columbus.—The Main Street stables of the Consolidated St. Ry. Co. were burnt Sept. 23, and nearly three dozen horses were destroyed.

Pennsylvania.

Allegheny.—The Pleasant Valley Ry. Co. contemplate adopting electricity. And the West Bellevue & Allegheny Electric Ry. Co. has been organized, with a capital stock of $125,000, to co-operate therewith,

Norristown.—Extensions are in progress, and six new cars are ordered by the Citizens' Pass. Ry. Co.

Philadelphia.—The Lombard & South Streets Ry. Co. contemplate using Wharton storage battery cars. Since the electric motor car has been running a careful record of the cost of maintaining it and its capacity to handle business has been kept, says an exchange. "Allowing for the original cost of horses, their keep, and making allowance for depreciation in their value, it is ascertained that the cost of motive power for the electric car is a little less than half the cost of horse power."

They are against elevated railways in Philadelphia. The Philadelphia and Reading Terminal Railroad Company had applied for permission to construct an elevated railroad on Ninth street and diagonally across other streets to the proposed station, at Twelfth and Market streets. The application was referred to the Committee on Railroads. The committee had two important objects in view. First, to secure the removal of surface tracks now in said streets, and the abolishment of all grade crossings—over 60 in number—and second, to secure ample provision for the payment to property owners along the line of the proposed elevated road, from Ninth and Green to Twelfth and Market streets, of damages by reason of the proximity of said elevated road to the property along the proposed line, although said property might not be actually taken for the uses of said road, yet greatly damaged by reason of the existence of an elevated road.

During the committee's investigations the Terminal Company asked leave to substitute a new bill. The new bill provided for the construction of an elevated railroad from Twelfth and Market streets diagonally across to Ninth street and Fairmount avenue and there to connect with the present surface tracks of the Philadelphia, Germantown and Norristown Railroad, thus changing all the features of the first bill, and presenting only for the consideration of the committee a line of railroad elevated on private property, and crossing from six to eight of the principal avenues at right angles, commencing at Twelfth and Market and ending at Ninth street and Fairmount avenue, making no change whatever in existing surface lines, removing none of the present dangerous grade crossings, nor providing any means or making any suggestions for their removal in the future, nor any provision for the payment of damages to abutting property.

The committee returned the bill to the council with a negative report.

"Rapid transit postponed" was the caption of a lengthy report in the *Public Ledger*, Sept. 21st, of the refusal of the Select Council to approve of the elevated railway ordinance of the Northeastern Rapid Transit Ry. Co.

STREET CAR MEN GOING TO LAW.

In view of the street car strike in Chicago, the following may be very interesting news. And as it was published before the said strike was undertaken, it is free from prejudice It is quoted from the Philadelphia *Public Ledger* of September 24:—

"At the instance of Messrs. Kenny and Maguire, of the Street Car Employees' Knights of Labor organization, Magistrate Eisenbrown on Saturday issued warrants for the arrest of President Thomas Barr, Superintendent Charles Whiting and Despatcher Samuel McDowell, of the People's Passenger Railway Company, and Julius Fresh, Superintendent, and Hugh Devine, despatcher of the Lombard and South streets branch of the People's Company, upon the charge of working street car drivers and conductors more than twelve hours daily, in violation of the act of Assembly making such violation a misdemeanor. The act was passed at the solicitation of organized street railway employees, in January, 1887. It contains a provision, however, that if the men work overtime they shall be paid extra for it, the necessity for such overtime being left to the discretion of the managers of the railways. The magistrate issued the warrants upon the presentation of affidavits that the law was being violated on certain of the company's cars. This action is the result of the work of the committee, consisting of Lawrence Kenney, who was recently discharged from the People's line; Michael O'Brien, a conductor on the Fifth and Sixth street line, and William H. Barrett, who were appointed several weeks ago by the Philadelphia division of Street Car Employees Assemblies, to consult counsel and collect evidence against the companies. The whole movement is confined to a few hundred men who constitute what is left of the old Local Assembly No. 5356, and its sub-divisions. The Philadelphia division, which represents the remnants of all the sub-divisions, began the legal agitation with the corporation of New York Knights, after a number of discharges had ensued from an attempt to reorganize the assemblies by a ten-hour movement. Many of the old leaders disputed the wisdom of such a course, and serious dissensions, which threaten the existence of the organization, have broken out. The men who were discharged, in most instances, became the champions of the lawsuit and what little funds the division had have been severely taxed for fees and expenses. Charges and countercharges have also been made, some of them relating to the use of funds, and others attacking the integrity of members. One of these charges was made against John W. Shultz, a former leader among the men, who is said to have become disgusted with the present management of affairs. Shultz was an officer having charge of funds, and, in consequence of the charges against him, a committee was appointed to audit his accounts. The accounts were found correct, and the small sum of money found due was turned over to the committee.

"Another accused leader was Edward McDowell, a member of the original arbitration board which secured the agreement from the presidents for $2 a day for twelve hours' work. McDowell was also one of the committee which secured the passage of the twelve hour law. He has gone to Pittsburgh to work for the Traction Company there, and the allegation against him is that he was regarded with especial favor by the railway presidents.

"In addition to these contentions among themselves, the men who still hold to the division organization have had to contend with the overwhelming number of street railway employees who have opposed their movements or refused to join them. Among this body of employees there are many who dread the outcome of the lawsuit for several reasons. In the first place they declare that the presidents are aware of all that is being done, and that innocent men will lose their places on account of the agitation of those who have lost their places already. Secondly, they say many men prefer to work overtime for the extra pay they receive, and thirdly, they contend that a prosecution of the officials, as at present proposed, will result in favor of the companies who will then be at liberty to increase their hours and reduce their wages at discretion.

"The railway presidents say the law is complied with, and overtime is paid for. Superintendent Whiting, of the People's line, one of the defendants in the present suit, says the men on that line who do more than twelve hours' work get extra pay to correspond."

Pittsburgh.—The Citizens' Traction Co. have ordered fifteen Pullman cars.

The electric street railway connecting Rochester, Beaver, Vanport, and Bridgewater is still in its infancy, says an exchange. The contract has not been let yet. John Conway & Co, Rochester, Pa., are interested.

The South Side Passenger Ry. Co. have built a new stable, ordered ten new cars, and Pres. Brickell says further extensions are contemplated.

The Fulton Street Inclined Plane Ry. Co. has been incorporated, with $40,000 capital.

Reading.—The length of the Sprague electric railway here is a mile and a half.

Scranton.—New Pullman electric cars are ordered for this city.

Tennessee.

Athens.—The street railway extension, recently referred to in the GAZETTE, is now completed. Additional cars will be put on at once.

Chattanooga.—There is an awkward legal contention between the City St. RR. Co. and its Rossville neighbor.

Knoxville.—The East Knoxville St. Ry. Co. is being organized by Mr. W. H. Roberts.

TEXAS.

El Paso.—The street railway (for passengers and freight) from this city across the Rio Grande is to be constructed forthwith.

Laredo.—The Laredo Improvement Co. have secured a franchise to build a street railway.

VIRGINIA.

Danville.—The Thomson-Houston Company has shipped a part of the material for the electric railway here, and the construction work will soon be commenced. The road is two miles in length, and four cars will be used.

Richmond.—The New York *World*, Sept. 23, devotes nine columns to show forth the advantages of Richmond and the greatness of the Exposition, now open. Over a column is taken up with a description of the Sprague electric railway there. In introducing the matter the writer says:

"The marked success of the Sprague Electric Railway, which is one of the show features of Richmond, now dubbed the 'Electric City,' not only permits but almost demands a digression from the general subject of Richmond to a consideration of what is to-day the most important scientific problem on which practical men are working.

"There is no longer any question of the feasibility of generating electricity and retransforming it into mechanical power, not only economically but with greater convenience, safety and satisfaction than by any other means, and with a greater range of adaptability. The problem has been successfully solved all along the line."

ENGLAND.

London.—The North Metropolitan Tramway Company have been so far convinced of the practicability of the accumulator car that they have entered into a preliminary contract with the Electric Traction Company to run one entire section of their route—that of the Barking-road, extending from Canning Town to Plaistow—upon this system. Six cars are being built for the Electric Traction Company, fitted at their own expense with electro-motors, gearing, and accumulators, and they have undertaken to run the cars, including all expenses for the tramway company, at a charge of 4½d. per car-mile for a period of six months. At the end of this period the tramway company will have the option of taking over the whole system. This charge is 1½d. per car-mile less than the actual present cost of this route, the average cost of the whole lines being 5d., and of the Barking-road route 6d. per car-mile run. The route chosen is one well fitted to try the capabilities of the new cars, being a single line road, not too smooth, and having both up and down hill gradients and level running. The only objection, perhaps, is its shortness, being only one mile and a quarter long, but, of course, in such a case few cars are sufficient.—*Electrical Engineer (London).*

GENERAL JACK S. CASEMENT, of Pierrepont, is a busy man, says a Cleveland paper, as in addition to constructing the waterworks tunnel, he is largely interested in electric street railways. Some time ago he went down to Erie, Pa., and purchased the controlling interest in the dilapidated horse car line of that city. In a few weeks the cars will be propelled by electricity. Not contented with this he decided to give the citizens of Akron better service. His efforts were successful, and an electric railway is now in the course of construction there. The rails are being laid on East Market street, the Euclid avenue of Akron, and many of the old citizens who have never been disturbed by the "rattle of the car over the stony street," object to the innovation. More than a dozen injunctions have been issued, but the work of laying the track is progressing. East Market street leads to the Sixth ward of Akron, which is the manufacturing center of the prosperous city, and the electric railway will prove of great value to the workingmen and employers. Both the Erie and Akron roads will be completed in a short time.

Patents,

The following list of recent patents relating to intermural traffic is specially reported for the STREET RAILWAY GAZETTE by Wm. G. Henderson, solicitor of American and foreign patents and trade-marks, Norris building, Fifth & F streets., Washington, D. C. A copy of any of the following will be furnished by him for 25 cents.

Issues of September 4 to 25, 1888.

387,782. Cable railway grip and crossing—J. J. Graff, San Francisco, Cal.

387,835. Driving mechanism for endless cable railways—J. Walker, Cleveland, Ohio.

388,108. Railway cable—E. C. Phillips, Garden City, Kans.

388,081. Cable railway — A. A. Shobe and W. Embley, Jerseyville, Ill.

388,240. Construction of railways—E. H. Ashcroft, Lynn, Mass.

388,247. Current collector for electric railways —J. L. Blackwell, New York, N. Y.

Reissue, 10,953. Cable railway — G. W. Douglass, San Francisco, Cal.

388,690. Electric railway station indicator—G. H. Kirwan, Wilkes Barre, Pa.

388,403. Street railway track-cleaner — C. E. Doty, Rock Falls, Ill.

388,686. Cable-grip for traction railways — O. H. Jadwin, New York, N. Y.

388,865. Ventilating railway cars—A. B. Harris, Springfield, Mass.

389,174. Reversible car seat—W. Sutton, St. Louis, Mo.

388,929. Railway crossing—R. H. St. John, Cleveland, Ohio.

388,812. Cable railway system—S. A. Bemis & L. Pfingst, Springfield, Mass., and New York, N. Y.

388,811. Cable car truck, S. A. Bemis, Springfield, Mass.

388,828. Street and station indicator—F. H. Cheyne, Brampton, Ontario, Canada.

389,122. Device for actuating street or station indicators—W. A. Turner, San Francisco, Cal.

389,278 and 389,279. Electric railway—E. M. Bentley, New York, N. Y.

389,281. Contact device for electric railways— J. L. Blackwell, New York, N. Y.

389,189. Current collector for electric railways —J. L. Blackwell, New York, N. Y.

389,299. Electrically propelled vehicle—W. H. Knight, New York, N. Y.

389,728. Passenger car—C. H. White, New York, N. Y.

389,686. Car seat—J. O. Buerk, Red Bank, N. J.

389,787. Cast steel car wheel—R. Bagaley & W. Hainsworth, Pittsburgh, Pa.

389,719. Cable railway—G. W. Shepherd, Philadelphia, Pa.

389,822. Electric railway system—J. D. Nicholson, W. J. McElroy and T. J. McTighe, first two in Pittsburgh, Pa., and last one in New York, N. Y.

389,716. Railway switch—G. N. Reiff, Reading, Pa.

390,154. Street car warmer—G. A. Beach, Chicago, Ill.

390,014. Railway—R. P. Faddis, Socorro, New Mex. Ter.

390,104. Cable railway—R. P. Walsh, St. Louis, Mo.

390,187. Traction railway device—J. H. Pendleton and C. Tiers, Brooklyn, N. Y.

HEATING street cars is a problem that has puzzled street railway companies for several winters passed. Mr. J. Zimmerman, whose heater is fully described in this number of the GAZETTE, claims to have "fully and unquestionably solved the problem." Mr. James Scullin, superintendent of the Union Depot RR. Co., St. Louis, says, "In my opinion it is the most practicable invention for heating cars yet introduced," and President Julius S. Walsh, of Union RR. Co., St. Louis, says the Zimmerman street car heaters "have filled every requisition expected of them."

THE SPRAGUE ELECTRIC RAILWAY AND MOTOR CO.'S western office is at the rotunda of the Rookery, Chicago.

Patents Described.

The following are brief descriptions of patents relating to street railway interests issued during the past month, especially prepared for the STREET RAILWAY GAZETTE by J. C. Higdon, mechanical expert and solicitor of patents, room 29 St Cloud building, opposite U. S. Patent office, Washington, D. C. A printed copy of any of the following will be furnished by him for 25 cents (stamps):

STREET CAR WARMER—E. E. Wise, Chicago. A soapstone-heater is suspended beneath floor of car.

SAFETY BRAKE FOR CABLE CARS—A. Neuburger, Kansas City, Mo. This patent covers an arm hinged to the car at its upper end, and projecting down through the slot and carrying brake-shoes at its lower end for gripping the slot-rails.

ELEVATED SUPPORT FOR ELECTRIC WIRES AND STREET RAILWAYS—L. W. Brown, New Orleans, La. An elevated frame from which may be suspended cars, cables, and wires.

ELECTRICAL CONDUCTOR AND CONDUIT—R. F. Silliman, Troy, N. Y. A single line conductor and insulating conduit composed of sections, each section consisting of a conductor screw-threaded at one end and tapped at the other end, embedded in an insulating material enclosed in a tube shorter than the conductor, the several sections so formed being connected.

CABLE RAILWAY—J. Hartman, Jr., Philadelphia. The upper sides of the conduit are inclined, so as to elude lateral compression from frost. All pulleys are mounted upon tubular spindles, and oil reservoirs are provided for them, so that said spindles will be automatically lubricated, obviating the necessity of frequent access.

TRACTION DEVICE — Rapid Transit Cable Company, New York. An endless belt, composed of two or more thicknesses of sheet-steel, is used instead of a cable.

SUPPLEMENTAL CAR SEAT—J. H. Young, Troy, N. Y. A movable seat adapted to be swung into the aisles and occupied by passengers, augmenting the seating capacity of the car.

ELECTRICAL RAILWAY CONDUCTOR — Leo. Daft, Plainfield, N. J. Parallel stringers are arranged between the rails, glass insulators are suspended from underside of said stringers, and a conducting-rail is supported between the stringers by proper connections to the insulators.

TONGUE-SWITCH FOR STREET-RAILWAYS— A. J. Moxham, Johnstown, Pa. The tongue has its pivoted pin formed integral with its body.

ELECTRIC RAILWAY—E. M. Bently, New York. This patent covers means for permitting the conduit containing the conductor to be swerved around sewer-heads and similar obstructions in the streets which may interfere with the straight course of the conduit,

ELECTRIC RAILWAY TROLLEY—J. L. Blackwell, New York. The bearing-wheels which run upon the overhead conducting wire are made of rubber, thereby doing away with the noise and vibration of the wire.

PORTABLE TURNTABLE FOR STREET RAILWAYS—J. W. Warhurst, San Francisco. A circular base-plate is mounted on wheels or trucks, and so arranged as to be lowered upon the track.

Books, Pamphlets, Periodicals, Etc.

Scribner's Magazine for October is equal to the best of its preceding numbers. The Railway series (which meets with increasing success and the heartiest popular approval) is continued with a discussion of "The Railroad in its Business Relations," by Professor Arthur T. Hadley, of Yale, ex-Commissioner of Labor Statistics in Connecticut, and author of the standard work on "Railroad Transportation: its History and its Laws." He has explained with great clearness and precision the growth of the railway as a corparation; the evolution of rates from the old toll system; the union of roads and rolling stock under one management; and the consolidation of connecting lines and the forming of systems. The important parts played in this business development by Edgar Thomson, Cornelius Vanderbilt, Thomas Scott and John. W Garrett (whose portraits are given), are outlined. Among the other features of the article is a discussion of the relations of the railway corporation to in-

vestors, employees, and shippers and passengers, involving the questions of rates, pooling and government control. Portraits of Judge Cooley, Albert Fink and Charles Francis Adams are given as representative men engaged in the solution of these problems.

Table Talk for October—chatty, cheery reading; food for mind and body. It opens with "A Queer Visit to the Realm of King Saddlerock," in which the writer, Mr. Whitton, gives a Jules Verneian twist to his imagination, dovetailing it with interesting points on the pedigree and habits of the oyster. Then follows Mrs. Rorer's instructions, "How to Prepare the Oyster," with the recipes for the various methods. Then, after her "New Menus for October," she gives the introductory to a coming series of papers on "How to Live on a Thousand a Year"—a hitherto unsolved problem to many; although many others have to live on less than that.

Testimonials form the contents of a neat little pamphlet issued by the Thomson-Houston Electric Co., relating to their street car department. Mr. Tom L. Johnson's memorandum is given elsewhere in this number.

Business Notes.

THE PULLMAN PALACE CAR CO. are obliged to extend their street car works as soon as possible. They are at present unable to meet the demand for their cars. As will be seen under New York City, Pittsburgh and Scranton, Pa., and Omaha, Neb., in our present number, the Pullman cars are supplied for street railways in cities far apart.

THE JOHN STEPHENSON CO. has received an order, among others, from President Rodgers, of the Consolidated St. Ry. Co., of Columbus, O., for 19 sixteen foot cars. The electric cars at Brockton, Mass., were made by the J. Stephenson Co.

THE LEWIS & FOWLER MANUFACTURING CO.'S fare register decision has been maintained on appeal; and thus nearly a hundred suits instituted by the Railway Register Manufacturing Co., against street railway companies using the Lewis & Fowler register, have been put an end to.

THE THOMSON-HOUSTON ELECTRIC CO. report rapid progress in their electric railway work. They expect to show their system at Washington.

For some time the West End Company have been negotiating with the Thomson-Houston Company. Mr. Whitney and his Board have greatly admired this company's road at Crescent Beach, where, during the season hardly a schedule trip was missed. This fact, they think, gives pretty good assurance of the reliability of the system. Negotiations culminated September 14th, when Mr. Whitney signed a contract with the Thomson-Houston Company. They are to begin at once the construction of a line from Harvard Square, Cambridge, to Arlington, to run by the "overhead" system. The cars will be running within sixty days, and very soon afterward a line will probably be running to Bowdoin Square, Boston proper.

The company has at present nineteen roads in successful operation. They are at Scranton, Pa. (3), Revere, Mass. (2), Syracuse, N. Y., Washington, D. C., Ansonia, Ct., Binghamton, N. Y., Detroit, Mich., Jamaica, N. Y., Port Huron, Mich., St. Catharines, Ont., Wheeling, W. Va., Appleton, Wis., Dayton, Ohio., Fort Gratiot, Mich., Lima, Ohio, and Windsor, Ont.

There are also roads in process of construction at No. Adams, Mass., Wichita, Kan., Des Moines, Iowa, Omaha, Neb., Lynn, Mass., Danville, Va., Hudson, N. Y., Seattle, Wash. Ter. and Bangor, Maine.

THE HAUSS ELECTRIC RAILWAY SYSTEM, described on pp. 19 & 20 of our accompanying DIRECTORY SUPPLEMENT, has remarkable characteristics, not the least being the *sixth advantage*, which says: "There is not an inch of room required for passengers' use, and not a sign to denote the use of electricity in the propelling of the car to be seen above the floor."

THE SPRAGUE CO. are very busy just now, and their factory is working to its maximum capacity with orders for electrical equipments. This company has at present 28 roads in operation or in process of construction, in different parts of the country, and new additions are continually being made to this number. No better proof of the satisfaction which railroad presidents and directors feel in their electrical equipments is needed, they observe, than the fact that "nearly all the street railroads which have been equipped by the Sprague Company for some time have ordered additional equipments."

WE are pleased to announce to our readers that we have secured the services of Mr. Frederick Keppy, the well known engineer and publisher at Bridgeport, Conn. as our GENERAL EASTERN SUBSCRIPTION MANAGER. Mr. Keppy is a practical engineer of twenty-six years experience, and is well known throughout the United States and Canada as a publisher of scientific books relating to steam, the steam engine, mechanics, machinery, engineering, etc., having conducted the business successfully for the past fifteen years.

We bespeak for Mr. Keppy the courtesy and patronage of our friends and the craft.

THE CINCINNATI CORRUGATING CO., 152 Eggleston Ave., Cincinnati, O., offer purchasing agents for street railway companies the advantage of a well-assorted stock of over a thousand tons of iron and steel sheets. And when in need of corrugated roofing, siding, ceiling, etc., purchasers would do well to correspond with them.

MESSRS. LEONARD & IZARD introduce themselves in our advertising columns in this issue of the GAZETTE. Their office is at that new elite centre of Chicago's business community "The Rookery." We nope their valuable services will gain the demand they deserve, they are excellent people.

RUFUS MARTIN has moved to Mill's Building, 15 Broad Street, New York.

THE BENTLEY–KNIGHT ELECTRIC RY. CO. have moved to 25 and 27 Tenth Avenue, New York. President and Treasurer R. W. Blackwell states that their electric road in the Empire city will soon be in operation—the Bleecker Street Co. having come to terms.

Copy. Davenport, Iowa, Sept. 22, 1888

To THE SPRAGUE ELECTRIC RY. & MOTOR CO.

C. M. BARCLAY, Agent, Chicago, Ill.

We accept the equipment furnished by you company for the operation of our road. We have found in the peculiar location of our long grade a most trying obstacle. Your motors have been able to overcome this, and in such a successful manner that we now believe our heavy grade is a source of financial benefit, our travel having increased more than fifty per cent.

THE DAVENPORT CENTRAL RY. CO. (By W. L. ALLEN, President; JOHN FIDLAR, Treas; O. S. MCNEIL, Sec.; J. W. HOWARD, Supt.

"W. G.'s" ADDRESS is wanted. We have a great number of letters in answer to his advertisement.

The Street Railway Gazette.

VOL. III. CHICAGO NOVEMBER, 1888. NEW YORK No. 11

Col. Geo. B. Kerper.

PRESIDENT OF THE AMERICAN STREET RAILWAY ASSOCIATION.

The STREET RAILWAY GAZETTE is never sued with a report of the Convention of the merican Street Railway Association without a ortrait, autograph and biographical sketch of ie newly-elected president. We are in a dilem- ia in the present instance. The Col. Kerper ho is now president of the Am. St. Ry. Associ- tion is the identical Geo. B. Kerper whose hotograph and "pedigree" appeared in the AZETTE of October, 1886. It is the same face; iere is no difference in his hand-writing. While undecided as to what should be done, ve wired the new president, asking if he ould please let us have new items for a re- ised edition of his biography. President Kerper coolly replied that there is nothing ew: his birth-place remains the same; the ate of his advent into this world is unalter- d; and he advises us to reserve his death otice for a later edition.

Therefore we can only say that the date f our good friend's birth is just the same ow as it was two years ago, viz., August o, 1839; the place being Reading, Pa. There is one serious difference, however, nd we hope Mr. Kerper will excuse us for ientioning it; and that is, he is now forty- ine years old, whereas he was only forty- even when our first edition of his biography vas published. He carries his age well, owever, and is in excellent health and plendid spirits.

Since we published his biography, wherein comprehensive sketch of his busy career ay be found, Mr. Kerper has established he U. S. Mail Line on his street railways— he first of the kind ever established on a ermanent basis, we believe; and he stands rominently before the country as pioneer n the work of putting a speedy termination o a formidable strike, that wonderful task aving been performed by having injunc- ions served on striking employees. The njunctions, together with the U. S. Mail Line, worked like a charm, and proved the most effective means of ending strikes. No one else has yet been able to work the oracle, however.

We hope to meet Col. Kerper, and his excel- ent wife, at Minneapolis next October, if not efore.

MR. C. B. HOLMES was hardly a day in Chica- go, after returning from the Washington conven- ion, before he went to Los Angeles, Cal., to buy p all the street railways in that progressive city f the Pacific slope. As our readers may remem- er, Mr. Holmes bought the street railways at Indianapolis several months since. Later he urchased those of Davenport, Moline and Rock sland. Now he has gone to Los Angeles, and oon the eight street railway companies there, we expect, will be swallowed up by Mr. Holmes.

THE AMERICAN

Street Railway Association.

Seventh Annual Meeting.

The "Washington Convention" has come and gone. It was held at Willard's Hotel, Washington, D. C., Wednesday and Thursday, October 17 and 18, 1888.

The Convention was called to order by President C. B. Holmes, soon after half-past ten

Wednesday morning, October 17. The first business was to call the roll of members :—

DELEGATES OF MEMBERS.

(Arranged Alphabetically According to Cities.)

Atlanta, Ga.—Edward C. Peters, Supt., Atlanta Street Railroad.

Baltimore, Md.—Nelson Perin, Pres., Baltimore Union Passenger Railway Company; George C. Jenkins, Director, Baltimore Union Passenger Railway Company; J. S. Hagerty, Pres., Citizens' Railway Company; C. C. Speed, Supt., Citizens' Railway Company.

Boston, Mass.—D. F. Longstreet, Gen. Mgr., West End Street Railway Company; M. F. Dickinson, Counsel, West End Street Railway Company; Mr. Cobb, Asst. to Pres., West End Street Railway Company.

Bridgeport, Conn.—Albert Eames, Pres., Bridgeport Horse Railroad Company; B. F. Lashar, Supt., Bridgeport Horse Railroad Company; George M. Eames, Bridgeport Horse Railroad Company.

Brockton, Mass.—Horace B. Rogers, Supt., Brockton Street Railway Company.

Brooklyn, N. Y.—William Richardson, Pres., Atlantic Avenue Railroad Company; William J. Richardson, Sec., Atlantic Avenue Railroad Company; Daniel F. Lewis Pres, Brooklyn City Railroad Company; H. M. Thompson, Sec., Brooklyn City Railroad Company; Wm. N. Morrison, Bushwick Railroad Company; Geo. W. VanAllen, Pres., New Williamsburgh and Flatbush Railroad Company; Charles E. Harris, Supt., New Williamsburgh and Flatbush Railroad Company.

Canton, Ohio.—George E. Cook, Pres., Canton Street Railway Company; O. L. Stanton, Supt., Canton Street Railway Company.

Chicago, Ill.—Charles B. Holmes, Pres., Chicago City Railway Company; Henry H. Windsor, Sec. Chicago City Railway Company; T. C. Penington, Treas., Chicago City Railway Company.

Cincinnati, Ohio.—H. H. Littell, Director, Cincinnati Inclined Plane Railway Company; John Harris, Supt., Cincinnati Street Railway Company; Henry Martin, Pres., Mt. Auburn Cable Railway Company; George B. Kerper, Pres., Mt. Adams and Eden Park Inclined Railroad Company.

Cleveland, Ohio.—Edwin Doty, Supt., East Cleveland Railroad Company; Charles W. Wason, Stockholder, East Cleveland Railroad Company; Charles Hathaway, Pres, St. Clair Street Railroad Company; Charles Hathaway, jr., Treas. and Gen. Mgr., St. Clair Street Railroad Company; M. S. Robison, Jr., Treas. and Supt., Superior Street Railway Company; Joseph Stanley, Director Superior Street Railway Company; George G. Mulhern, Supt., Woodland Avenue and West Side Street Railroad Company.

Dayton, Ohio.—Charles B. Clegg, Director, Dayton Street Railroad Company.

Denver, Colorado.—D. F. Longstreet, Director, Denver City Railway Company.

Detroit, Mich.—S. Hendrie, Treas., Detroit City Railway Company; Sidney T. Miller, Director, Detroit City Railway Company.

Easton, Pa.—Henry Sage, Pres. Easton South Easton and West End Street Railway Company.

Fall River, Mass.—John W. Bowker, Supt., Globe Street Railway Company.

Galveston, Texas—William H. Sinclair, Pres., Galveston City Railroad Company.

Harrisburg, Pa.—Henry A. Kelker, Pres., Harrisburg City Passenger Railway Company; William K. Alricks, Vice Pres., Harrisburg City Passenger Railway Company.

Hartford, Conn.—E. S. Goodrich, Pres., Hartford and Wethersfield Horse Railroad Company.

Hoboken, N. J.—Franklin J. Mallory, Sec., North Hudson County Railway Comp'y; W. C. Doubleday, Asst. to Pres., North Hudson County Railway Company.

Indianapolis, Ind.—Charles B. Holmes, Pres., Citizens' Street Railway Company.

Jersey City, N. J.—J. H. Small, Mgr., Pavonia Horse Railroad Company.

Kansas City, Mo.—Edward J. Lawless, Supt., Metropolitan Street Railway Company.

Louisville, Ky.—T. J. Minary, Vice Pres, Central Passenger Railroad Company; H. H. Littell, Supt., Louisville City Railway Company.

Memphis, Tenn.—R. Dudley Frayzer, Pres., Memphis City Railroad Company.

Milwaukee, Wis.—Winfield Smith, Pres., Cream City Railroad Company.

Minneapolis, Minn.—Thomas Lowry, Pres., Minneapolis Street Railway Company; Julius E. Rugg, Supt., Minneapolis Street Railway Company.

Newburyport Mass.—Charles Odell, Pres., Newburyport and Amesbury Horse Railroad Company.

New York City, N. Y.—D. B. Hasbrouck, Director, Broadway and 7th Avenue Railroad Company; George S. Hart, Pres., Central Crosstown Railroad Company; Milton I. Masson, Sec., Central Crosstown Railroad

Company; Mr. Hutchinson, Director, Central Crosstown Railroad Company; C. Densmore Wyman, Vice Pres., Central Park, North and East River Railroad Company; J. L. Valentine, Sec. and Treas., Central Park, North and East River Railroad Company; Geo. W. Linch, Vice Pres., Christopher and Tenth Street Railroad Company; William Richardson, Director, Dry Dock, East Broadway and Battery Railroad Company; Edwin Bedell, Director, Harlem Bridge, Morrisania and Fordham Railway Company; D. B. Hasbrouck, Sec. and Treas, Houston, West Street and Pavonia Ferry Railroad Company; Aaron Raymond, Pres., North and East River Railway Company; W H. Delany, Supt., North and East River Railway Company; George S. Hart, Pres, Second Avenue Railroad Company; Thomas H McLean, Sec., Twenty-third Street Railway Company.

Niagara Falls N. Y.—Arthur Schoellkopf, Treas. and Mgr., Niagara Falls and Suspension Bridge Railway Company; A. H. Gluck, Director, Niagara Falls and Suspension Bridge Railway Company.

North Adams, Mass.—C. Q. Richmond, Pres., Hoosac Valley Street Railway Company; Eugene Griffin, Vice-Pres., Hoosac Valley Street Railway Company; George W. Mansfield, Electrician, Hoosac Valley Street Railway Company.

Norwalk, Conn.—James W. Hyatt, Pres., Norwalk Horse Railroad Company.

Ottawa, Canada.—Thomas C. Keefer, Pres., Ottawa City Passenger Railway Company.

Pawtucket, R. I.—D. F. Longstreet, Vice-Pres., Pawtucket Street Railway Company.

Peoria, Ill.—H. R. Woodward, Pres , Central City Horse Railroad Company; John H. Hall, Pres., Fort Clark Horse Railroad Company; J. E. Hall, Director, Fort Clark Horse Railroad Company.

Philadelphia, Pa.—John Q. Adams, Sec. and Treas., Citizens' Passenger Railway Company; Thomas C. Barr, Pres., Lombard and South Street Passenger Railroad Company; Thomas C. Barr, Pres., People's Passenger Railway Company; William Wharton, Jr., Engineer, Peop'e's Passenger Railway; E. B. Edwards, Pres., Ridge Avenue Passenger Railway Company; T. F. Edwards, Asst. Sec , Ridge Avenue Passenger Railway Company; Thomas W. Ackley, Pres., Thirteenth and Fifteenth Street Passenger Railway Company; William R. Warner, Director, Thirteenth and Fifteenth Street Passenger Railway Company.

Pittsburgh, Pa —John G. Holmes, Pres , Citizens' Traction Company; William McCreery, Pres., Federal Street and Pleasant Valley Passenger Railway Company; Charles Atwell, Pres., Pittsburgh, Allegheny and Manchester Passenger Railway Company; Charles Seibert, Sec. and Treas., Pittsburgh, Allegheny and Manchester Passenger Railway Company; James C. Cotton, Supt., Pittsburgh, Allegheny and Manchester Passenger Railway Company; John G. Holmes, Treas., Pittsburgh and Birmingham Passenger Railroad Company.

Providence, R. I.—Jesse Metcalf, Pres., Union Railroad Company; John R. Bartlett, Gen. Man., Union Railroad Company.

Quincy, Ill.—Lorenzo Bull, Pres , Quincy Horse Railroad and Carrying Company.

Reading, Pa.—B. F. Owen, Pres., Reading City Passenger Railroad Company; James L. Douglas, Vice-Pres., Reading City Passenger Railroad Company.

Rochester, N. Y.—C. C. Woodworth, Sec., Rochester City and Brighton Railroad Company.

Salem, Mass.—Charles Odell, Pres., Naumkeag Street Railway Company; Willard B. Ferguson, Supt., Naumkeag Street Railway Company.

Salt Lake City, Utah.—Orson P. Arnold, Supt., Salt Lake City Railway Company.

Savannah, Ga.—James H. Johnston, Pres., City and Suburban Railroad Company.

Springfield, Mass —A. E. Smith, Treas., Springfield Street Railroad Company; F. E. King, Supt., Springfield Street Railroad Company.

Springfield, Ohio.—Ross Mitchell, Pres., Citizens' Street Railroad Company; W. H. Hanford, Supt., Citizens Street Railroad Company.

St. Louis, Mo.—Robert McCulloch, Vice-Pres., Bellefontaine Railway Company; John H. Maxon, Director, Lindell Railway Company; Julius S Walsh, Pres., Cass Avenue and Fair Ground Railway Company; Julius S. Walsh, Pres.. Citizens' Railway Company; Augustine W. Wright, Chief Engineer, Citizens' Railway Company; W. Bartlett, Engineer, Missouri Railroad Company; Charles Green, Pres., People's Railway Company; W. L. Johnson, Pres., Southern Railway Company; Christian Peper, Pres., St. Louis Railroad Company; Adolphus S. Peper, St. Louis Railroad Company; John Scullin, Pres., Union Depot Railroad Company.

St. Paul, Minn.—Thomas Lowry, Pres., St. Paul City Railway Company.

Toledo, Ohio.—J. E. Bailey, Pres., Toledo Consolidated Street Railway Company; A. E. Land, Sec., Toledo Consolidated Street Railway Company; D. E. Bailey, Director, Toledo Consolidated Street Railway Company.

Trenton, N. J.—William H. Exton, Pres., City Railway Company; Charles Y. Bamford, Treas., City Railway Company; Frederick Walter, Director, City Railway Company.

Troy, N. Y.—Charles Cleminshaw, Pres., Troy and Lansingburgh Railroad Company; Charles H. Smith, Supt., Troy and Lansingburgh Railroad Company.

Washington, D. C.—Charles White, Pres., Capitol, North O Street and South Washington Railroad Company; W. E. Boughton, Sec., Capitol, North O Street and South Washington Railroad Company; Andrew Glass, Supt., Capitol, North O Street and South Washington Railroad Company; W. J. Cowing, Director, Capitol, North O Street and South Washington Railroad Company; A. M. Clapp, Director, Capitol, North O Street and South Washington Railroad Company; Henry A. Willard, Pres , Columbia Railway Company; William H. Claggett, Sec. and Treas., Columbia Railway Company; A. Claggett, Supt., Columbia Railway Company; George Truesdell, Pres , Eckington and Soldiers' Home Railway Company; Charles C. Duncanson, Vice-Pres., Eckington and Soldiers' Home Railway Company; E. Kurtz Johnson, Treas., Eckington and Soldiers' Home Railway Company; Joseph Paul, Sec., Eckington and Soldiers' Home Railway Company; George W. Pearson, Pres., Metropolitan Railroad Company; A. A. Wilson, Vice-Pres., Metropolitan Railroad Company; W. J. Wilson, Sec. and Treas., Metropolitan Railroad Company; Robert Beall, Director, Metropolitan Railroad Company; Henry Hurt, Pres., Washington and Georgetown Railroad Company; C. C. Sailer, Supt., Washington and Georgetown Railroad Company.

West Haven, Conn.—W. W. Ward, Supt., New Haven and West Haven Horse Railroad Company.

Wilmington, Del—William Canby, Pres., Wilmington City Railway Company; Edwin W. Heald, Gen. Man., Wilmington City Railway Company.

Worcester, Mass.—Charles B. Pratt, Pres., Worcester Consolidated Street Railway Company; H. S. Seeley, Treas., Worcester Consolidated Street Railway Company.

York, Pa.—William H. Lanius, Pres., York Street Railroad Company.

DELEGATES OF NON-MEMBERS.

(Arranged Alphabetically According to Cities.)

The following gentlemen represented companies which are not members of the Association :

Asbury Park, N. J.— F. W. Child, Pres. Sea Shore Electric Railway Company ; R. M. Clark, Director Sea Shore Electric Railway Company.

Birmingham, Conn.—W. J. Clark, Sec. Derby Horse Railway Company ; B. M. Porter, Supt. Derby Horse Railway Company.

Houston, Texas.—William H. Sinclair, Pres. Houston City Railway Company.

Orange, N. J.— Francis M. Eppley, Pres. Orange Crosstown and Bloomfield Railway Company.

Ottawa, Ill. — W. J. Clark, Vice-Pres. Ottawa Electric Street Railway Company ; Thomas P. Bailey, Sec. and Treas. Ottawa Electric Street Railway Company.

San Francisco, Cal. — W. H. Martin, Vice Pres. Ferries and Cliff House Railway Company.

Texarkana, Kansas. —B. M. Foreman, Supt. Texarkana Street Railway.

The foregoing gentlemen then applied for and secured membership in the Association on behalf of their respective companies.

Mr. C. B. Holmes next addressed the convention :—

PRESIDENT'S ADDRESS.

Gentlemen of the Association. It is the time-honored custom of this body to give its president the privilege of saying a few words upon calling the Convention to order. I gratefully improve this opportunity and return to you all my sincere thanks for the honor bestowed upon me at your meeting one year ago in Philadelphia, in electing me to the presidency of the Association. Matters beyond my control prevented me from being present at that meeting, and when I learned your choice my surprise was only equaled by my wonder ; for your lists are crowded with the names of men whose large experience and whose ripe wisdom render them far more worthy of filling this honorable position than myself. But whatever might have been the reason, or lack of reason, for your action, I am profoundly grateful to you. I am also grateful to our Secretary for his untiring devotion to the varied interests of the Association. As the wheels of our cars cease not to revolve from the beginning of the year to the end, so he has not rested, but has been ever vigilant and progressive. My acknowledgements are also due to our Executive Committee for their wise oversight and their intelligent action in the affairs of the Association.

And now, gentlemen, permit me to welcome you all, one and all, from all parts of our great land, coming hither that we may discuss questions of grave interest to our business relations. I welcome you to the reason of things ; I welcome you to the flow of soul ; I welcome you to the riches of experience, which have ever characterized these gatherings and which we hope to find in full measure at this Convention ; and in it all, and through it all, let us renew the friendships and strengthen the bonds of good will and helpfulness which have been so happily and deeply planted in former days.

Perhaps all of us have at some time in our lives climbed to the lofty top of some grand mountain and looked in grateful wonder on the outspread scene below—the busy, bustling city, the quiet hamlet, the hills covered with verdure, the valleys all budding, the majestic river, the silvery creeks, all bathed in the sunlight of the eternal. If on an October day we have viewed that scene, with such a multiplicity of colors, such a majestic combination of beauty, as no poet's pen could describe and no artist's brush could imitate, and we have come down from our lofty outlook filled with an overwhelming sense of the beauty and vastness of earth [great applause], I say, if we have viewed that scene, what such a standard and such an outlook is in the realm of nature, this national capital, to which we have come from all parts of our great continent, should be to you, gentlemen, who think and plan and give your lives and your best endeavors for all the people. Looking from such a standpoint, we are impressed with the greatness of the interests entrusted to our charge. And this feeling deepens and broadens when we consider the relations which this industry sustains to the millions and millions of capital involved ; when we consider the varied, the useful, the indispensable relations which it sustains to every man, woman and child in every city and in every town of any importance throughout the length and breadth of our land. We should have a proper sense of its importance when we consider what a mighty factor this business has become in determining the value of all kinds of property in every city of our land ; and especially does this feeling become most overwhelming when we consider to what grand proportions this industry has grown within the lifetime of the youngest man in this room. When we behold the present hour throbbing with newly-found energies and forces ; when we behold the present hour full of exertion and progress, who of us dares look in the future and draw the limit lines beyond which this business of ours shall not go ; who of us dares say what there will be in the future of comfort for the weary and heavy-laden ; how quickly and cheaply we shall transport the vast populations of the coming years. Who of us dares say how much there shall be of national and mutual prosperity and individual well-being growing out of this business in which we are engaged, which is so young and yet so large. [Applause.]

Let us, then, gentlemen, address ourselves with earnestness to the themes which are to be presented for discussion, and let every member vent the richest of his experience and from the results of his ripest thought contribute to the common fund of information and inspiration. But while we discuss practical things, while we seek to find that economy which shall reduce the cost of every revolution of every wheel, while we seek to find, by prodding every opening, the ways and means to secure the largest return on the property entrusted to our care, while we seek to obtain the most comfort and the greatest safety for our patrons, let us never forget, but let us ever seek and strive to promote the comfort, the hope, the liberty and the manhood of that large, that vast army of workmen whose happiness and the happiness of whose families is so largely in our keeping, involving responsibilities the height and depth and length and breadth of which can be measured only by omniscience.

I thank you, gentlemen, for your kind attention, and will no longer detain you, especially as our Executive Committee have to present a report to you which touches upon all the themes which enter into this great business in which we are engaged, and relating to the interests pertaining to this Association. We will now listen to the Report of the Executive Committee. [Applause.]

EXECUTIVE COMMITTEE'S REPORT.

Washington, D C., Oct. 17, 1888.

To the American Street Railway Association, *Gentlemen:*—Your executive committee respectfully reports as follows :

Street Railway Business.

As has usually been the case in the years of a presidential election, the street railway business, indicative, as it always is, of the general state of trade, is more or less depressed and unsettled by reason of the coming election, and has not shown the increase in receipts which has marked other years The expenses of operation have been no less; and as regards labor, in many cases, increased. So far as supplies generally are concerned, their cost has been a trifle more than heretofore, and hence the cost of operation has been somewhat increased Notwithstanding these conditions, street railway properties, in most cases, have continued to maintain the high consideration which they have in recent years enjoyed as an investment. We also take occasion to note the manifest increase during the year in the construction and equipment of new street railway

roperties, as well as in the extension and development of eretofore existing roads over any preceding year.

Membership.

At the commencement of the meeting in Philadelphia, e membership of the association numbered 152 compans. At that meeting and during the year it has been ineased by the addition of the following companies:

Sandusky Street Railway Company, Sandusky, Ohio.
St. Clair Street Railroad Company, Cleveland, Ohio.
Capitol, North O Street and South Washington Railad Company, Washington, D. C.
Pavonia Horse Railroad, Jersey City, N. J.
York Street Railroad Company, York, Pennsylvania.
Citizens' Railway Company, Baltimore.
Mt. Auburn Cable Railway Company, Cincinnati, O.
Christopher and Tenth Street Railroad Company, New ork City, N. Y.
North and East River Railroad Company, New York ty, N. Y.
Hoosac Valley Street Railway Company, North lams, Mass.
Harrisburg City Passenger Railway Company, Harburg, Pa.
Columbia Railway Company, Washington, D. C.
Eckington and Soldiers' Home Railway Company, ashington, D. C.

The following changes in membership have taken ace by withdrawal, consolidation and change of name. ie companies that have withdrawn are:

Binghamton, N. Y.—The City Railway Company.
Concord, N. H.—The Concord Horse Railroad.
Dayton, Ky.—Newport & Dayton Street Railroad Co.
Muskegon, Mich.—The Muskegon Railway Company.

By consolidation, The Cambridge, Metropolitan, South ston and Boston Consolidated Street Railway Compan, all of Boston, were merged into The West End Street ilway Company of Boston, which became a member in ce of the others.

The Montreal City Passenger Railway Company, of nada, has changed its name to The Montreal Street ilway Company, and retains its membership under the v name.

The Citizens' Passenger Railway Company, of Pittsgh, has been changed to The Citizens' Traction Comy, and retains its membership under the new name.

The Pittsburgh, Oakland and East Liberty Passenger lroad was purchased by The Pittsburgh Traction Comy, which latter company became a member in place of former.

By consolidation of the Worcester Street Railway npany, formerly a member, and the Citizens' Street lway Company, not a member, the Worcester Consoli-ed Street Railway Company, of Worcester, Mass., was ned and became a member in place of the first-named ipany.

Resulting from the foregoing changes, the present nbership is 157 companies.

Reports of Committees.

nmediately following the last meeting of the associ-n the executive committee decided that reports should provided, in addition to that which had already been nged for by a special committee, namely, "Street Rail-Mutual Fire Insurance," upon the following subjects, "Conditions Necessary to the Financial Success of Cable Power;" "Location and Construction of Car ise and Stables;" "Progress of Electric Motive er," and "Street Railway Taxation." The committee eves that reports have been prepared upon all but one ese subjects, namely, "Progress of Electric Motive er."

y reason of the comparative novelty of the subject e difficulty was experienced at the outset in assigning work of the preparation of that report to any gentleman ected with this association. Our highly esteemed d, Mr. Calvin A. Richards, a former president of this ciation and at the time general manager of the West Street Railway Company of Boston, finally consented repare the report, he having given, as was well known ost of us, much thought and attention to the subject. retirement of Mr. Richards from the management of West End Street Railway Company, as well as from street railway business, resulted in his desire to be re-d from the preparation of the report.

he officers of the association knew of no one who was willing to prepare the report, and as it was not ied expedient to have it presented by any one who d not be a delegate to this meeting, this subject will e treated otherwise than by discussion. There will, rust, be considerable discussion upon this very import-ubject, which is at the present time receiving so largely ttention of street railway men all over the country, as inventors and operators. It has come to our ledge that a number of gentlemen prominently con-d with several electrical systems intend to be present is meeting, and the information which may thus be ned need only be limited by the length of time which ssociation may be able to give to the consideration of ibject.

Judicial Opinions and Decisions.

e following judicial opinions and decisions have been d during the year:

1887.

mber—H. B. McCurdy against Pittsburgh, Allegheny and Manchester Passenger Railway Company.
mber—Pittsburgh and Birmingham Passenger Railway Company against Monongahela Bridge Company.

1888.

ry—Nathan Lorie against North Chicago City Railway Company.
ary—The City of Montreal against The Montreal treet Railway Company.
h—The People of the State of New York ex rel. the Vest Side Street Railway Company against Joseph E. Barnard, Comptroller, Buffalo.
April—Isabella Cuming against Brooklyn City Railroad Company.
May—Ellen Kelly against New York and Sea Beach Railway Company.
June—The Newark and South Orange Horse Car Railroad Company against Ezra M. Hunt et al.
July—James Black against Brooklyn City Railroad Company.
August—Charles Dibb against Dry Dock, East Broadway and Battery Railroad Company.
September—James M. Bradshaw against Citizens' Street Railway Company of Indianapolis.
October—City Railway Company, of Trenton, against William H. Lee.

American Street Railway Decisions.

At the last annual meeting there was considerable discussion upon the question of the collation and publication of all obtainable legal opinions concerning street railways. The question was finally referred to this committee.

Your committee determined to go the expense of ascertaining whether the association was justified in undertaking the publication of such a work. A letter, of which the following is a copy, was, therefore, sent to every officer of every street railway company in the United States, Canada and Great Britain, accompanied with a sample copy of the work, covering sixteen pages, and a blank subscription order form:

Dear Sir:—I take pleasure in sending you herewith a few pages from the proposed compilation of American Street Railway Decisions of the Courts of the United States and Canada. This is in pursuance of a resolution referring the subject to the Executive Committee, after a lengthy discussion, at the annual meeting of the American Street Railway Association in October, 1887, at Philadelphia, Pa.

It is proposed in this work to make a collection of all reported cases (and of as many unreported cases as practicable), with the opinions in full.

As will be readily understood, the larger the number of subscribers, the less will be the cost to each. The volumes will average 500 pages each, and be bound in law sheep. The index will be complete and table of cases cited accurate.

If an edition of five hundred copies can be safely published, each volume can be sold for $5.00. The amount of street railway litigation already reported is large, and it is impossible to state at present how many volumes will be required to bring the subject matter to date. It is, however, probable, that five or six volumes will contain everything. In the discussion referred to, some of the gentlemen thought a digest was all that was needed, while others desired the opinions and cases reported in full. If a digest only were issued, it would be necessary for every owner of a digest to own also copies of all the reports, or, at least, have access to them in some large library, while if the cases are reported in full and a digest of them prepared, the whole subject will then be contained in, and covered by, the volumes intended to be issued.

It is in the power of railroad officers and lawyers to make this collection of decisions unique by forwarding to the Secretary important unreported cases. These will be incorporated in the work, and add largely to its value.

As the edition in any case will be limited, and will hence become more valuable year by year, it is hoped that those who appreciate its utility (and what street railroad manager or lawyer will not) will be prompt in acknowledging the receipt of this letter, and forward at once the enclosed subscription blank, duly filled out for one or more copies, that the work may be proceeded with immediately. It is possible to have the first volume issued in two months after a sufficient number of subscriptions shall have been received to warrant the publication.

Awaiting your reply, I remain, sincerely yours,

WM. J. RICHARDSON, Secretary.

The following extracts from letters from the Executive Committee to the Secretary, based upon the receipt of an advanced copy of the accompanying sample decisions, will show the judgment of the Committee upon the proposed work:

[From President Charles B. Holmes, President Chicago City Railway Company, Chicago, Ill.]

"I do not know of anything that has been undertaken by the Association which promises larger benefit to its members than the plan suggested in your letter, and I most heartily approve of it, and of the method you propose for procuring subscriptions to the publication. A single one of the decisions might save a large number of the members of the Association thousands of dollars in the litigation we are all so often forced to defend. I hope you will see your way clear to push the matter vigorously, not only with the members of the Association, but with all the street railway companies in America."

[From Vice-President Julius E. Rugg, General Manager, Minneapolis Street Railway Co., Minneapolis, Minn.]

"I am of the opinion that it will be of much value to street railway managers everywhere, and should endorse the plan you propose to send all street railway managers blanks and sample copies with a view to obtain their subscriptions."

[From Vice-President R. Dudley Frayzer, Secretary, Citizens' Street Railroad Company, Memphis, Tenn.]

"I think it would be best to get up such a compilation as you propose, and then, if we choose to, we can have a Digest to go along with the volumes of Reports.

"I think a subscription should be obtained, which, no doubt, can be done from all the members of the Association and from street railroads that are not members of the Association; and I think this will make the subscription sufficient for the publication of the first volume without any loss to the Association. I will approve of this. When this is compiled and the reports are finished, they will be very valuable to street railroad men."

[From Vice-President Charles B. Clegg, Director, Dayton Street Railroad Company, Dayton, O.]

"I am quite agreeable to the proposition you make of sending a similar specimen to every street railway company. I know of no better way of ascertaining the feeling of members of the Association in regard to the project. I hope you will be successful in obtaining sufficient subscriptions."

[From Ex-President Thomas W. Ackley, President, Thirteenth & Fifteenth Streets Passenger Railway Company, Philadelphia, Pa.]

"My judgment is that such a compilation of cases would be greatly appreciated by the entire railway interest of the United States. Every street railway would become a subscriber and their counsel another.

"It should embrace a thorough report of each case."

[From Mr. Daniel F. Lewis, President, Brooklyn City Railroad Company, Brooklyn, N. Y.]

"I concur in your judgment as to sending sample copies to all street railways."

[From Mr. E. G. Mosher, Superintendent, Augusta and Summerville Railroad Company, Augusta, Ga.]

"I approve of sending copies of specimen pages, such as you sent me, to all members of the Association, and to all street railways, with subscription blanks, to ascertain whether sufficient subscriptions can be obtained to warrant the publication of at least the first volume.

"Such a work will be of great value to street railways."

As stated in the letter, in order to make it possible to publish the work without loss to the Association, it was necessary that an edition of five hundred copies should be issued. As the result of the printed matter distributed, just 125 subscriptions were received, or one-quarter of the number required to warrant proceeding with the undertaking. If each company that has already subscribed, would be responsible for three copies, two of which could be readily disposed of to lawyers in their respective cities, with the number that would be taken by law libraries, the publication could be undertaken at once.

United States Mail Lines.

The question of obtaining the designation of street-railway lines as United States Mail Lines was duly considered by your Committee; and the President, Chairman of the Executive Committee and Secretary were authorized to confer with the Post Office Department upon the subject.

Street cars, especially when drawn by horses, are very greatly obstructed by trucks, carts, wagons and other vehicles; and especially by those used in trucking. The wheels of most vehicles being set at the same gange as those of street cars, and the rails on which the car wheels run being smoother than the pavement adjoining, the track is preferred to the stone pavement, especially by truck-drivers, greatly to the hindrance of the free passage of the cars.

Several street car lines, which run between towns, and hence, between different post offices, have obtained from the Government the designation of their lines as "United States Mail Lines," and are carrying the mails between these postal stations. The result of this designation has been to secure an almost entire freedom from obstruction by other vehicles which either keep off the track altogether or their drivers are careful to leave the track before the cars reach them. The Committee had several interviews with the Department Officers, and it was ascertained that this designation could be obtained only for those street car lines which run between post offices. It being desired to obtain the designation for all companies alike as United States Mail Lines, the question was considered as to whether the cars might not be equipped with letter-boxes; and thus facilitate the collection of the mails. A box suitable for this purpose has been designed, and the Special Committee desire the question to be continued in its hands, if agreeable to the Association.

Kindred Associations.

The Tramways Institute of Great Britain and Ireland was organized to obtain the same objects that are accomplished by this Association. The fundamental principle of membership in our Association is that the street-railway companies only are eligible, and not individuals. The Tramways Institute was organized on the basis of individual membership, and not of companies. It was made up of street-railway officers, manufacturers, inventors and others and was short lived. An effort is about to be made to resuscitate the old organization on the basis of membership of companies instead of individuals.

It is with pleasure that we record the formation of two local Associations during the year, namely, the Street-Railway Association of the State of New Jersey, and the Massachusetts Street-Railway Association.

We desire to express our regard for the welfare of all these Associations, holding ourselves in readiness to manifest this regard at any time that opportunity may offer.

Associate Members.

At the last Annual Meeting the following resolution was referred to the Executive Committee:—"Be it Resolved, That the Constitution and By-Laws be amended so as to permit manufacturers and dealers in street-railway supplies to become associate members of the Association, on the payment of the membership fee of twenty-five dollars and the annual dues assessed active members; it being understood that such associate members shall have no voice in the deliberations of the Association except by general consent; and under no conditions shall they be permitted to vote upon any matter before the Association."

After an extended consideration of the foregoing, by the Committee, the following resolution was adopted as a substitute therefor: "Resolved, That the President be and he is hereby authorized to issue a ticket to any gentleman not a delegate, upon the recommendation of a delegate, who may desire to attend the Annual Banquet. The number of tickets is to be limited by the judgment of the President, and the price of each ticket is to be ten dollars."

Invitations to former Presidents.

Your Committee considers it desirable, and therefore recommends that the Secretary be authorized by the Association to extend a cordial invitation to all gentlemen who have held the office of President of the Association to attend the meetings and participate therein.

Strikes.

During the past year there have been a number of "strikes" with attendant rioting. So far as your committee have been informed of the facts upon which these strikes were declared, they have been wholly unwarranted on the part of the strikers, and the committee believes that a long-suffering public will ere long give expression to its righteous indignation by holding to strict accountability those persons responsible for such outrageous interference with the rights of the traveling public. Certain it is that whenever and whatever differences may arise between the management and employees of a street railroad company, such questions should be settled by arbitration or in some other peaceable way. The public may well demand that their rights, which have heretofore been wholly ignored in the forcible interference with the running of the cars, shall receive the consideration to which they are entitled, and that they shall not be subject to any willful or needless delay by the stoppage of street cars provided for their transit from one point to another.

Street Railway Exhibition.

It was considered advisable that special arrangements should be made this year by the Association, providing for as complete an exhibition of street railway appliances as manufacturers, inventors and dealers in supplies might desire to make. The display, therefore, on this occasion is unusual, and reflects great credit upon those who have participated therein.

A large amount of work has been entailed upon the gentlemen on the local committee having this exhibition in charge, and your committee desires to specially thank Mr. Hurt for his untiring exertions to make this feature of the meeting a thorough success.

Entertainment of Delegates.

The Washington Companies have arranged for special entertainment of the delegates and their ladies; and, in addition to providing carriages for the inspection of the public buildings and other points of interest in this beautiful city, have arranged for a trip to Mount Vernon, stopping at Marshall Hall on the return for lunch. This excursion will take place on Friday, and it is earnestly desired by the local committee that all the delegates, with their ladies, will remain to enjoy the hospitality of the street railway companies of Washington on this occasion.

The Banquet.

The arrangements for the banquet have devolved upon the executive committee this year. It has been ably assisted however by the local committee, and desires to acknowledge its indebtedness to the gentlemen who compose it. We anticipate a very enjoyable reunion on Thursday evening.

Ladies at Banquet.

By reason of the fact that the annual meeting this year is held in the City of Washington, it was considered advisable to have it especially a ladies' meeting, and arrangements have been made for their participation in the banquet. We are pleased to announce the fact that a considerable number of ladies will grace this occasion.

Notices of Meeting.

Notices of this meeting have, as heretofore, been sent to all street railway companies in the United States and Canada; and, as usual, word has been received from quite a number of new companies that they intend to be represented at this meeting. We heartily welcome them all to membership with us.

It is with pleasure that we record that no officer of any of our member companies has died during the year. This fact, in so large a number, must be considered a cause for profound gratitude to God. Respectfully submitted,

C. B Holmes, Thos. W. Ackley,
R. Dudley Fravzer, Daniel F. Lewis,
Charles B Clegg, Chas. Green. } *Committee.*

Upon motion by Mr. Wm. Richardson, the Executive Committee's report was received and adopted.

The Treasurer's Report was next read, and in summary, was as follows :

Receipts.

Balance Oct. 19, 1887	$1,454 66
137 annual dues @ $25	3,425 00
Sale of banquet tickets	470 00
10 admission fees	250 00
6 annual dues, 1886–7, @ $15	90 00
6 mos. int. on call loan of $2,500	62 50
Sales of annual reports	36 00
3 annual dues balances @ $10	30 00
Sales of the salt pamphlets	11 00
	$5,829 16

Expenses.

Treasurer's salary	$1,500 00
Expenses of annual reports	871 30
Am. St. Ry. decision, printing and postage	273 88
Annual meeting at Washington, engraving, printing, etc	150 60
Legal opinions	135 50
Postage, stationery, etc	114 55
Miscellaneous printing	101 25
U. S. Mail lines expenses	48 47
Am. St. Ry. Mutual Insurance, printing and postage	46 25
	$3,241 80
Balance in Bank	$1,087 36
Balance of call loan	1,500 00
	$5 829 16

The report was received and approved. It had been duly audited,

The following is the report of the committee on the Progress of the Cable Motive Power :

THE CONDITIONS NECESSARY TO THE FINANCIAL SUCCESS OF THE CABLE POWER.

Gentlemen :— We beg leave to submit the following report upon the subject of " The conditions necessary to the financial success of the cable power:"

Experience in the construction and operation of cable roads for passenger traffic since 1873, when the first practical application was made of the system in San Francisco, has suggested that the conditions necessary to the financial success of the cable are :—

1st.—Volume of business.

2nd.—Engineering and mechanical construction.

There is a very wide difference in opinions as well as statistics concerning the first. Thus Mr. J. L. Wilcutt writes from San Francisco that " the number of cars run and passengers carried before the cable could be adopted with profit, is affected by so many conditions, such as cost of plant, expense of operating, etc , that the question cannot be answered intelligently."

The Grand Avenue Cable Line of Kansas City, reports that 4,000 passengers per mile per day are necessary before cabling a horse line.

Minneapolis Street Railway Company places the travel at 3,000 to 4,000 passengers per day per mile of double track.

Mr. H. H. Windsor, of the Chicago City Railway, says: " As a rule and under ordinary circumstances, it is not advisable from a pecuniary stand point to build and operate a cable line where it is intended to operate the cars less often than once in ten minutes ; but beyond that figure the economical advantages of the system improve in greater ratio than the increase in service."

Of the six cable lines first constructed in San Francisco, two being converted from horse car lines, the Mayor of that city states :— " That these roads pay dividends from 8 to 24 per cent per annum. The Market Street Cable Railway Company issued bonds for $300,000.00 bearing interest at the rate of 6 per cent per annum. They are now selling at 12 per cent premium ; after paying interest on these bonds there is left a handsome dividend."

We might extend the record of like opinions and statements indefinitely, and with few exceptional cases they all run in the same general direction — that the cable is a financial success when constructed and operated under favorable conditions. These conditions obtain, 1st, in the conversion of horse lines into cable lines, where the former carried any considerable number of passengers per day, say 10,000 over 2½ miles of double track ; 2nd, in case of cable lines originally chartered, as such where the location was through well populated districts, or which from natural advantages would become desirable as residence districts and were of rapid growth ; and 3d, in those cases where on account of steep grades other motors were at a great disadvantage or impracticable.

It is generally conceded that under these conditions not only is the cable a success but the traffic increases very considerably ; the ratio of operating expenses to gross receipts is largely reduced as compared with horse lines ; and as a rule the service rendered the public is better and more favorably received than that given by other motors.

The reports received are unanimous as to the increase in value of property contiguous to newly constructed cable lines, and the rapid filling up and improvement of unsettled portions of cities. This increase in the value of real estate, after the construction of cable roads in San Francisco is stated "to be from 8 to 40 per cent.; in Chicago from 25 to 100 per cent.; in Cincinnati at 100 per cent."

The increase in business is unquestionably due in a great measure to the uniform and generally high rate of speed adopted, varying from seven to twelve miles an hour. Cars moving along the streets at this speed with little noise and with no apparent motive power seem to possess a fascination for the public which is not noticeable in other motors, hence the inducement for the many who ride solely for pleasure.

The best physical and mechanical conditions for the application of the cable are undoubtedly :—

Straight, level lines ;

Well designed machinery with reserve power for contingencies ;

Location of machinery at termini of cables ;

Terminal facilities for handling cars rapidly and safely ;

Cables not exceeding 25,000 feet in length ;

Grip devices which give the minimum wear on the rope;

Rolling stock relatively light.

These conditions will probably give a minimum of operating expenses. Next to the level straight lines follow straight lines with grades ; then roads having heavy grades and curves.

In the absence of reliable data concerning the operating expense of different roads it may be assumed that their expenses are directly proportional to the characteristics of the roads. This, however, will serve only as a general guide in the construction of new roads ; as we have, in one or two notable cases, found that the engineering and mechanical contrivances which should contribute to the successful operation of the system, when unsuitably designed, have caused unnecessary expenditures of money.

As to the several details of the cable system, it goes without saying, that the more perfect and suitable the design, the less will be the expense of operation.

Concerning the engines, Mr. Hanscom, of San Francisco, says : " There is no difficulty in providing engines that will run at a uniform speed under all the changes, or variations of work that may come upon it. The variations in power exerted by an engine under cable work are enormous and rapid. As shown by the indicator, changes range from 50 to 350 horse power in the space of a very few seconds, hence the necessity of having the best engines. There is another very important point in the selection of engines which is by no means so easily attained : this is the economical size of engine.

"An engine too large for the work required means a continual waste in operating expense; an engine too small means expensive renewals and inefficiency.

"In any proposed cable line, the alignment, curvature, grades, etc., should be thoroughly studied with reference to this point, and the plant designed to suit the location. We do not deem it good engineering to design an engine to suit the general average of all the lines in the country."

Thus, from Mr. Hanscom's paper, if an engine were designed to suit the average conditions of all the cable roads in San Francisco, its power would be distributed as follows :

" For moving cables, 57 per cent. of total power.
" " cars, 39 " " "
" " passengers, 4 " " "

But, if we take the road which has the least per cent. of power expended in moving the cable, the "Geary Street" we shall have :

For moving cables, 51 per cent. of total power.
" " cars, 46 " " "
" " passengers, 3 " " "

In this individual case the conditions are better, 49 per cent. being utilized for cars and passengers, as against 42 per cent. in the former case.

On the Olive street cable St. Louis, Mo., these conditions are still better. Of the total power expended we have :

For running engines, winding machinery and cables, 48.2
" cars 35.9
" passengers 15.8

Assuming that the winding machinery has been properly designed as to strength, speed, etc., the points for particular attention are the size of drums, the grooves in same, the journal-bearing surfaces, the gearing or method by which power is transmitted from engines to drum shaft. The tendency of practice is toward large drums. The ten and twelve foot drums formerly used are being discarded. The grooves wear very considerably, much to the detriment of the cables. With solid cast grooves, ten foot drums should be turned down to uniform diameters not less than once in 8 to 10 months, with any considerable amount of work done, For driving drums, would recommend that they be made 15 to 20 feet in diameter. The journal bearings on the driving drum shaft should be ample ; preferably, twice the surface required in ordinary practice. It is essential that these bearings have the least possible wear.

The methods of transmitting power to the driving drum shaft now in use are : spur gearing, belts and cotton rope. There is a wide difference of opinion among engineers as to which of these is the best. In spur gears it is safer to avoid the V-shaped teeth. The gear in general use is the straight, cast tooth. It is cheap, and answers the purpose well. There is this objection, however, that in case of a considerable injury to the teeth, the entire wheel must be replaced by a new one. It is also very noisy. The straight wooden gear has the advantage of being easily repaired in case of broken teeth, and is noiseless. It has thus far proved very efficient in cable service.

As to cotton rope transmission, there seems to be a lack of information in this country concerning its efficiency which has worked against its adoption. It has been in use in England for many years, doing service in some of the largest plants in that country, transmitting as high as 2,000 horse power. Mr. A. G. Brown, in the *American Machinist*, says : " that cotton ropes are largely employed for main drivers, for running traveling cranes. and for intermediate driving of all descriptions, and seem to be growing in favor.

' There is loss of power, variously estimated at from 5 to 10 per cent., but the ropes run so noiselessly, take so little room, and can be so easily led where needed, that their good qualities largely redeem this disadvantage." The small loss in power is due to the bending of the rope around the puleys, but the greater portion of the loss is occasioned by the wedging of the ropes in the grooves, and the strain required to loosen them. The angle between the sides of the grooves universally employed on rope pulleys in England is 45 degrees, this form having been shown by experience to be preferable to one which would allow slipping, as that not only destroys the rope but occasions still greater loss of power."

This method has the advantage of being cheap, easily applied and renewed, noiseless and safer, in case of strained cables bunching in the conduit, causing abnormal strain on machinery and cables.

The apparatus for applying tension to the cable should be so adjusted, in combination with the number of wraps of cable on the drums, that there shall be no slipping of the cable under the maximum working load, and so as to allow the cables to slip on the drums in case of strands fouling in the conduit. The cables should be allowed to slip on the drums before rupture takes place.

The device, usually called the "tension. carriage" should have a travel of one per cent. of the length of the cable to allow for stretch of cable, should be accessibly located, with plenty of room around it, should be designed for easy and rapid handling. It is frequently necessary to "slack off" the cable. from various causes, and this should be done in the least possible time.

The carrying pulleys, main deflection sheaves, and all wheels which support, or in any manner affect the cable in and about the power house, should be as large in diameter as convenient handling and renewals will permit ; should be accurately set, and always well lubricated. The cable should be deflected from a straight course as little as possible. This equally applies to all the carrying pulleys, crown sheaves, curve pulleys and depression sheaves on the entire line of the cable.

These wheels should run without noise; noise in this part of a cable plant means waste of power. On account of the large number of these carrying pulleys, and the loss of power consequent upon any defect in their running, or improper setting, or design, and the necessarily inaccessible location of the same, it should be made a special point with every cable company to have these diligently and carefully inspected. Too much care in this respect cannot be given. To impress this more strongly, I would call your attention to the following table of the engine performance of the Olive street cable line, in St. Louis :

lissouri R. R. Co., St. Louis, Mo.—Olive Street Cable-Engine Performance.

DATE.	No. of tr'ins.	No. of c'rs.	INDICATED HORSE POWER. Machinery and Cables. Total.	Per 1,000 ft.	Cars and Loads. Total.	1 car and load	Per cent. of Horse Power. Machinery and Cables.	Cars and loads.
', 27, '88	24	48	99.6	2.86	56.5	1.18	63.8	36.2
', 2, '88	24	48	99.6	2.86	71.8	1.49	58.0	42 0
', 5, '88	24	48	99.6	2.86	76 2	1.58	56.6	43.4
', 9, '88	24	48	78.9	2.52	77.2	1.60	50.5	49.5
', 6, '88	24	48	78.9	2.52	66.4	1.38	54.3	45.7
', 21, '88	24	48	51.5	1.07	75.5	1.57	40 5	59.5
', 2, '88	25	75	51.5	1.07	186.6	1.82	27.4	72.6
Average			76.66	2.15	80.23	1.52	48.87	51.18

Remarks.—Indicator cards taken every 15 minutes all day on ch date. In most cases 47 and 40 diagrams were taken on each rd.

Summary.

verage H.P. for moving Machinery and Cable, 76.66 or 48.23 per cent.
" " Car, 55.33 or 35.90 "
" " Passengers, 24.90 or 15.87 "
156.89 or 100 00 "

You will notice that on May 5th, 1888, it required 63.8 er cent. of the total power of the engines to move the achinery and cables, leaving only 36.2 per cent. to be ilized in hauling cars and passengers. There was slight nprovement up to June 5th, due to the wearing down and olishing of the journals and bearings of the carrying pul-ys and general limbering up of machinery.

It was noticed about this time that some of the carrying lleys would either stop revolving entirely, or that they ould turn with difficulty. Upon investigation it was und that all the carrying pulley bearings had been orig-ally made slightly smaller in diameter than the shafts hich they supported. These bearings are all made of Lig-um Vitæ. They were removed and burnt to the proper ze. On September 21st, about all of these bearings had en replaced, the boxes cleaned and re-oiled, and we find at instead of 63.8 per cent. it required only 27.4 per nt to move the machinery and cables—a saving in power 57.06 per cent. There are 2,096 of these wooden bear-gs on this line. The sheaves are of cast iron, with oove filled with babbitt metal for rope to run on. There e 1,048 of these pulleys. Each one is numbered and a reful record kept of renewals.

Incidentally, it may be interesting to know that these lleys can be more easily inspected by night than by day. wo men inspect each pulley once, at least, and often two three times in one night. They do this by carrying a ot torch, or very narrow tin torch, suspended by a long re handle; this can be lowered into the conduit through e slot opening at any point, and carried along either at e side of the rope or just above it, illuminating the con-uit perfectly, so that not only the pulleys, but the entire nduit can be examined almost as rapidly as a man can alk.

On account of their number, and necessarily small diam-er, the carrying pulleys should be made of a material that ll give the least wear on the cable, providing, always, at it can be done economically. Just what amount of ury is done the cable by the carrying pulleys is a matter conjecture. Mr. Root, of the Market Street line, San ancisco, is credited with the statement that a cable will it only three years running empty, i. e. without grips or rs, simply running over the drums and chilled cast iron lleys. As the average life of a cable is about 8 to 12 nths, we may infer that the life of the rope is reduced out 25 to 33 per cent. by the drums and pulleys, i. e., in those cable plants where the rope is continually running er chilled cast iron.

There are probably not over half a dozen cable roads w running but use the chilled cast iron carrying pulley. ie Brooklyn Bridge cable has departed from the usual actice, and is using pulleys with leather and rubber cking. These last about ten weeks. Mr. Leverich ites concerning the renewal of these packings, "that ap leather and sheet rubber and odd lots of belting, all good quality, can be purchased at reduced prices. Two n cut, prepare and insert all our packings, so the cost labor is small."

Mr. Leverich also writes, "that in design and manage-nt of this railway, special effort was made to save the lole from wear; as far as I can observe, the packed naves and pulleys wear it very little" Whether these leys will give satisfaction when introduced into the or-nary cable conduit remains to be tried.

Carrying Pulleys.

Heretofore carrying pulleys filled with wood, hemp and lia rubber in one mass, filling the groove and vulcanized place, have "been tried, but were unsatisfactory." bbitted pulleys are too expensive. On the Olive Street e in St. Louis there are a few experimental rubber pul-s which have been in constant service 89 days, and ap-ently are good for as many more days Should this ex-iment prove successful as to the durability of the rub-, these pulleys will have several advantages: they are it, weighing only 20 pounds, noiseless, easily renewed, nparatively cheap and will not injure the cable. We ieve that the general practice of using babbitt metal for bearings of these pulleys is the best.

n roads having many curves the curve pulleys are items considerable expense and trouble The function of se pulleys is to hold the cable in the proper curve. As t introduced, these pulleys not only held the rope out o the curve, but had flanges cast on them for the pur-e of holding the rope up to the proper height. The t practice is to leave the flange off and place carrying leys between them to hold the rope up. The flange un-btedly wears the cable very severely. These curve pulleys should be as light and large in diameter as possible, consistent with strength and the sharpness of curvature; they should be well balanced and perfectly true, easy of access for oiling and readily renewed. They are generally made with a chilled face where the rope strikes. There have been a few experimental ones made with hard wood packing which are proving quite satisfactory.

At the termini of the road the cable should be carried around a sheave of as large a diameter as consistent with distances between tracks, and never less than 100 times the diameter of the cable. Where the loop is used auxiliary cables will be found more economical.

The distinguished features of the cable system are the *cable* and the *grip*.

All the other mechanical and engineering devices are accessory. Not only are these two members expensive as to first cost, but conspicuously as to renewals. Other members of the system may be indifferent as to quality and workmanship, but these two must be as perfect and suitable as money and skill can make them.

At present there are three distinct methods of making cables:

1*st*. The usual and oldest is to twist or lay the wires of the strands to the left hand, and the strands forming the rope to the right hand, or in opposite directions.

2*d*. That known as the "lang lay," formed by the wires forming the strands, and the strands constituting the rope "being" laid in the same, instead of opposite directions.

3*d*. That known as the "lock coil rope," composed of specially shaped wires so formed that when closed together they interlock, presenting a uniform wearing surface, and in which each wire is firmly locked in its proper position.

The ropes now used for street railway service are made exclusively by the first, or old method, and necessarily so on account of splicing. With our present system of splicing, ropes made by the second method can not be safely used, and ropes by the last method can not be used at all.

While the adoption of the later improvements in ropes may not be among the conditions necessary to the financial success of the cable system, it might save a "mint of money," many vexatious delays, serious accidents and the Recording Angel trouble. It is stated on the authority of those who have had experience with the later ropes that they give a much better service than the old style.

It is hoped that in the near future electric welding may be applied successfully to the splicing of cables and that these improvements can be utilized to reduce the heavy expense due to the rapid failure of cables.

As to the two classes of grips in use there is probably little difference in the wear of the cable. The bottom and side grips can be made equally efficient. On roads having many crossings the bottom grip requires the least expenditure of money.

The grips should be so designed that the wearing parts can be renewed with the least possible waste of material and labor. The material should be of good quality and as perfectly fitted up as possible. It is an expensive mistake to construct grips of high priced materials and have them thrown together in an unskillful manner. Rather use low priced material of sufficient strength and put the money into the workmanship.

The cable and grips should be inspected thoroughly once in twenty-four hours, for upon the proper working of these depends the freedom from blockades and accidents, the consequent annoyance to the public and the final success of the road.

The practice of using long solid dies is preferable to that of using roller dies. Any device in a grip which makes contraflexure in the rope is to be avoided.

The practice of many gripmen of applying more power to the grip after the load has been completely started, is not only injurious but also a great source of expense in grip repairs.

The permanent way and conduit should be so constructed as not to interfere with the free and perfect operation of the mechanical appliances. To this end it is necessary to have the conduit large enough to admit of a reasonable amount of street refuse being retained without cleaning, as frequent cleaning of the conduit is expensive.

Conduits that require cleaning but once or twice a year are preferable This, however, depends somewhat upon the character of the street and amount of traffic. The expensive points in this respect will be found at cross streets, at cable and horse car crossings, at valleys and in the various wheel pits. The drainage should be ample enough to carry off the water of the heaviest rain-fall.

The slot opening should be as wide as city ordinances and public safety will permit,—as usually made ¾ of an inch or more. The slot rails should be made adjustable on the yokes to the extent of at least once and a half the width of the opening. These rails, of whatever pattern, should be strong, straight and properly lined.

Of the many devices for preventing the slot closing in extremely cold and changeable weather there are none perfect and none but what have allowed the slot rails to move more or less at times. The space between the slot rails and the track rails should be well paved, rammed and fitted, so that accumulation of water will be prevented. Freezing of water in the interstices of the paving in this space is the frequent cause of slot closure.

Other conditions and elements entering into the cable system and affecting it financially, such as equipment, car houses, machine shops, accident signal service, methods for handling old and new cables, and running trains by time cards, methods of preventing blockades on account of fires, snow, etc., cover so large a field and are of so much interest and importance that any treatment of them in this report would be necessarily so brief that it would be value less and tiresome.

Finally, your committee begs the indulgence of the Association and trusts that a sufficient number of points have been touched to draw out a discussion that will develop some definite and valuable knowledge concerning the conditions necessary to the financial success of the cable power. Respectfully,

Wm. D. Henry, *Chairman.*

Discussion:

Mr. Richardson, of Brooklyn: I would move you, sir, that the President of this Association, who, from his long experience upon this question, must be able to instruct any and all of us, be requested to speak first on this report.

Secretary put the motion, which was carried.

Vice-President Frayzer took the chair.

Mr. Charles B. Holmes, of Chicago: Mr. President, please shut me off when the time comes, for this subject is so large and it involves so much, it touches so nearly the powers which must come to help us out in this work, that when I get started there is no saying how far I will go. The report submitted this morning is a full and exhaustive one; one that is full of exceedingly interesting matter, especially to those who have had any experience in the building and operation of cable lines. One of the most important suggestions made in that paper is on the matter of engines. You take an ordinary engine, one of the old-fashioned valve engines, and it is of very little worth on a cable line. The fluctuations of power and strain come so quickly, that we need an engine for that purpose which will operate as quickly as the flash of the eye, and something that will be true in its operation and control the power, so that when a strain comes quickly one way, and there is a corresponding relaxation the other, the engine will respond at once to the work which it has to do. In connection with the question of the engine, comes the matter of the boiler. It requires a much larger amount of boiler capacity than of engine power for the successful operation of a cable line. Mention was made of the cable or haulage rope. So far as I know, all cable lines in this country are now operated with a six-strand rope, made of sixteen wires to the strand,—sometimes with nineteen wires to the strand. From our experience in Chicago, having operated a cable line since 1882, we have settled down on a sixteen wire strand, the outer wires of the strand being larger than the inner, so as to take the abrasion of the grips, without wearing away too rapidly. The inner portion of the rope has a hemp center, so that the strands fit down into the hemp center, and thus do not grind on each other. As we all know, there is a great deal of elasticity in a new wire rope. I have heard it stated by a gentleman who is a wire rope manufacturer, that a wire rope four thousand feet long will stretch two hundred feet. I know that there is a great deal of elasticity to a wire rope when it is first put in and commences its operation. It will stretch within two weeks to a distance of a hundred feet, and for the next two or three weeks it will stretch perhaps thirty, fifty or sixty feet more. This is all provided for by the winding of the slack on the drum and tension-carriage, which is a device operating back and forth to keep the tension correct.

In 1881, the Chicago City Railway Company operated two hundred and sixty-three cars and carried nineteen millions of people. This present year, 1888, we are operating one thousand cars and carrying fifty-seven millions of people. I know of nothing in the history of the world which has shown such a development of street railway interest equal to that; from two hundred and sixty-three cars to one thousand cars, in the short space of seven years; and we do not put on the cars just for fun, and run them empty, either.

The transmission of power from the engine to the drums, which move the cables, has been alluded to in the report, and reference has been made to cotton ropes. There may be more than one, but I know of only one place where these cotton ropes are used for this purpose, and this is on the Geary Street line, in San Francisco. It is a beautiful thing, as noiseless as the moving of the works of a watch, but I fear that for the heavy work which we have to do in Chicago the cotton ropes would fail us in the transmission of power. The strains on the cables come so quickly, and with such power, that these cotton ropes, not being equal in their tension, would sag more than usual between the drums, and would not be equal to carrying the load, and consequently the ropes would be stretched more in some cases than in others, and there would be more slipping than there ought to be, so that my own faith in cotton ropes for a large plant is weak. We have operated during this summer as high as two hundred and sixty-three trains at a time, some three cars, and others four cars; and the amount of power is enormous which is necessary to move this vast number of trains loaded with people, for the extensions which we have made to our lines enable us to carry the people from all portions of the division of the city in which our lines are operated out to the park; and on Saturday and Sunday afternoons it would do your hearts good to see the thousands and thousands of the workmen of our city, who have been housed up in their small workshops during the week, come out in their best dress, with their families with them, to go to the park. We have carried from fifty to seventy-five thousand people in a single afternoon on this pleasure trip.

Allusion has been made in the report to "the percentage of power." In my mind there is nothing more deceptive than this percentage business. I want to get at this matter in a little different way, and, I think, one that will perhaps convey to you a trifle more tangibly an idea as to what this power is. I hold in my hand a statement taken from cards of our engines, showing the account of power that is required to move the engines and the shaft, viz., twenty-three horse power. That is on that section of our road where twenty miles of cable are operated from one set of engines. It required twenty-three horse power to move the engines and the shaft.

Mr. Richardson: Will you please explain what you mean by that.

Mr. Holmes: I mean that in our engine room we have two engines at one end and two engines at the other end of the shaft; five hundred horse power each, two thousand horse power in all. Until recently we had been operating only one thousand, two engines at one end of the shaft, leaving the other engines as reserve. But recently the travel has been so great that we have considered it advisable to operate the four engines at once, making the wear and tear and exertion much less. Now, then, not only do we have these engines, but we have a long shaft connected

with each that gears on the main pinion and works into gears which are on the drum and shaft, and convey the power from the engines to the drums, which give the motion to the cable. There are four of these drums, and the cable comes in and passes around these drums, and by their motion, movement is communicated to the cable to haul the cars. To move the cables which are in the central part of the city, it required one hundred and eighty-eight horse power; that was for the cables, which, with the power necessary to move the engines and the machinery, exclusive of the cables, putting it all together amounts to two hundred and eleven horse power. This is what you might call the "dead force." We have got to move our engines and drums and cables before we begin to get any returns from the expenditure of force — two hundred and eleven horse power used up in doing that work. What we have out of the two thousand horse power after that, is all available for the propulsion of the cars. We have found that it costs us just about one-half horse power per car, so that you can easily reckon the amount of capacity which the plant has. We have not anywhere near reached the capacity that we can with that set of machinery. I calculate we can put on three times the number of cars we are now running. Another point in connection with this matter of percentage is this: We were operating in the beginning two hundred and sixty-three cars, and it required two hundred and eleven horse power to do the "dead work" of the business; but when we come to operate a large number of cars, say a thousand cars, the "percentage" drops down very low.

The paper had special reference to the conditions which are essential to the financial success of the cable. We may be wild and reckless in Chicago, in more than one direction, but we did this two years ago the present summer; we extended our cable line six miles, taking the place of a horse line on which we had been operating at fifteen minutes' intervals. Some people would say that that was a very unwise thing to do, to put in an expensive plant, costing eighty thousand dollars per mile of single track, in order to operate it for a distance of six miles, where horse cars had no more than they could do at fifteen minutes, intervals. You would be astonished to see how the population has built up on both sides of that line and on the cross streets on either side, and the volume of travel which we have. It is only two years ago since the cable was put in on that line. Last year, a year ago the present summer, we built ten miles more of cable road, and four miles of that was in territory where there were only four houses. We had a cemetery at the end of the line, that was the objective point; but the amount of travel to the cemetery is very little except on Sundays. That was the only feature there was about the road outside of the ordinary travel, but the population which has filled in during this one year, and the advance in the value of property along that four miles of cable road, is most surprising. Over and over again have men representing property at that point endeavored to sell it at ten dollars a foot; it was hawked about the streets and could not be sold at ten dollars a foot, and to-day it is selling for fifty dollars a foot. This shows the benefit of the cable system in the advance of property wherever it is put and wherever it is operated successfully.

Allusion has been made to the splicing of ropes. That is one of the most important features connected with this cable system. When cables are spliced, the point of splice is larger than the cable is on both sides, and when that larger part at the point of splicing comes to the grip, the jaws of the grip are very apt to tear the cable and draw out a strand, and then, of course, there is serious trouble; but this is avoided in a new splice which has been put in operation on our line. This is successful in putting the rope together in such a way that at that point the portion of the rope where the splice comes is smaller than the rope on either side, so that when this portion meets the grip, there is no abrasion of the rope by the grip. The metal that we use in the formation of the cable is known as "crucible cast steel." The first cables we had on our road were made of a composition of iron — a beautiful, soft sort of stuff; but when it came to really hard work, it was of no use; it would not last over sixty days. We are running to-day in the heart of the city of Chicago at the rate of ten and a half miles an hour for two miles, for two miles further south we operate at the rate of eleven and a half miles per hour, and from that point clear down, four or five miles further south, we are operating at the rate of fourteen miles an hour. That is not what we do one day, but it is every day the year round, and have been doing it for some considerable time. You take rope made of iron, and put it through such an experience as that, with the grip grabbing the cable with long trains of three and five cars, stopping at almost every block, and grappling the cable with power enough to start these trains in motion and keep them in motion, and the iron rope would not last through thirty days; but with the crucible cast steel we succeed in always getting sixty thousand miles of service, about ten months of wear, and sometimes fourteen months. We have had as high as fourteen months' service from a single rope, and that without any breaking of the strands or anything of that sort. We have got as high as one hundred and five thousand miles of service from a single rope running daily at the rate of fourteen miles an hour.

The metal composing the grip is also an important feature. They are lined with a species of brass and some other metal combined. We find that the linings give thirty days' service, and after the linings are worn out we melt them over and fill in the jaws of the grip with fresh metal. But in our section of the country, where the grand old northern storms come with the fury of the demons, you want the cable system to clear the track. We have snow at times four feet deep, and we who have been through the work of clearing the tracks with horse power, know what it is, pulling our horses nearly to death in the day-time, and working them at night on the curves and snow piles, until it is perfectly heart-rending to see the effect on the stock. But with the cable, all you have to do is to throw in a little more coal, and the machinery pulls the rope along, and with it the plows and sweepers, and the snow is scattered. We have an additional plow that comes along afterward, and throws the snow to the curbstone, so that no objectionable ridge is left near the track. In a region where snow storms are frequent and severe, the matter of handling snow is one of the most important in the street railroad economy. In the city of Boston it is a very important matter. It costs us in Chicago, in the handling of snow and removing it from the street, and various incidental expenses, frequently sixty to seventy-five thousand dollars in a single winter, and anything that will help us to work at this matter of handling snow in the cheapest possible way, is a great item with us.

Regarding the conditions which are essential to the financial success of the cable, let me tell you what our experience has been for the last seven years; it has not varied a single year. We are operating one hundred miles of horse-car track, in the division where the tracks of which I have charge are located, and we are operating thirty-five miles of cable; and thus we have a good chance of comparing the expenses of the two, and what are the merits of each. The average cost to us on our one hundred miles of horse-car track is twenty-four and two-thirds cents per mile per day for each car; it makes no difference whether full or empty. It costs us for our cable work to do the same work precisely, with one exception (and that I will touch on in a moment), ten and one-half cents per mile per day for each car.

Mr. Richardson: About ten and one-half cents.

Mr. Holmes: Yes, sir; only there is this difference, that when we started our cable system we made up our minds that we would do two things, after taking care of a fair return to the stockholders for money which they had put in. We would give the benefit of whatever difference there was in favor of the cable system, first, to the public; and second, to our employees. The result has been that we have increased the number of cars from two hundred and sixty-three to one thousand, while we have increased our number of patrons from nineteen million to fifty-seven million in a single year. You can see from this that we are giving our patrons a larger number of seats than would be possible for us to do under the horse system

Mr. Richardson: Did you reduce the fare?

Mr. Holmes: Not exactly; I will touch upon that in a moment. We have the same fare that we had, but we are carrying the people now at double the rate of speed that we did with horses. We were formerly carrying them at the rate of six or seven miles an hour. Now we do it at an average of eleven miles an hour. This is a great advantage to our patrons, and it is appreciated. On the point of reducing the fare, I will say that we give transfers from our horse to our cable lines, and vice versa. With our vast network of tracks, we are enabled to transport them from any single point to any other in our whole district for five cents. There was one exception that I wished to touch upon in the matter of expense. While it costs ten and one-half cents per mile for each car by cable, we are paying our drivers and conductors on cable cars more than is received by those on our horse cars. The man who takes the grip-lever and starts the train, receives what is equivalent to thirty cents an hour. We let him, to a certain extent, have the benefit of the reduction in expense. The conductor who operates the cable car and the car behind him, two cars, one large and one small, is paid thirty cents an hour, while the conductor of the car that is attached to the second car and follows behind, and of all of the following cars, gets twenty-six cents an hour. On our horse cars we pay the conductors and drivers alike, twenty-one cents an hour; so that to get at the expense of twenty-four and two-thirds cents under the horse system, we calculate on the basis of twenty-one cents to the operators, while to get the average of ten and one-half cents by the cable system we are putting them down at the rate of twenty-six and thirty cents an hour for who do the operating. If the cable cars were operated at the same rate of wages as the horse cars (and this, I believe, is done in San Francisco), then the cost per mile for operating by cable would be a little less than one third of what it is to operate by horses; where it would cost us twenty-four cents by horses, it would cost us eight cents by cable. I do not know whether I have covered all the points but it seems to me I have said enough. If there is any question any gentleman would like to ask me, I shall endeavor to answer it.

Mr. Harris, of Cincinnati: I noticed in the reading of the report that the gentleman claims if you take a second hold on the cable with the grip, it is liable to be injurious to the cable. I will refer you to a case in Cincinnati. We took hold of the cable on the level road; and when we climb a grade of ten or twelve feet, we are obliged to take a tighter hold in order to make the grade. Is that injurious? I do not mean to let go entirely of the cable, and take a fresh hold, but simply to tighten up the hold.

Mr. Holmes: My judgment on that matter is, that after the car is once in motion, you can tighten up the hold without any injurious effect on the cable. All along the length of the track we have carrying-pulleys every thirty-two feet, upon which the cable runs, and between these pulleys the cable is apt to sag from two to two and a half feet. When the grip takes a hold on the cable, it has the effect of drawing in this slack, which will result, if the hold is tight, in giving the car quite an impetus, and when the cable settles back into its normal condition of two and a half feet sag, it will give the car quite a rush; and if the driver is careless, and does not loosen his hold on the cable, it will bring a check on the car; but if he loosens his hold sufficient to allow the grip to slip through the cable, it will be all right. But after he has got over that sudden check, and the car is passing along with the cable, he ought to take a good, strong hold, and allow no more slipping through the grip, which is wearing both to the cable and the grip, and in my judgment it is better to avoid any slipping, and consequent wearing, when it can be done without any effect to car or passengers.

Mr Richardson: If Mr. Holmes will please explain what I have been puzzling my head about, I shall be glad. He spoke of the sudden change of power required on the engine, when he was speaking of the character of the construction of the engine. If he will, please tell us all abo that.

Mr. Holmes: That comes in this way: Suppose y are operating two hundred and sixty trains, and it shou so happen two hundred should come to a stop at the sar time and start at the same time (that, perhaps, is rather exaggerated case, but we have no means of knowing t exact number, but we do know that a very large number trains will sometimes be started at the same instant). No where you have that large number, say two hundred trair four cars each, eight hundred cars, take hold of the cal at once, and go from a dead stand still into a speed of t or eleven miles an hour, it is a putting out of force to great degree instantaneously and suddenly; and that what produces the reaction.

Mr. Richardson: If that can be assumed to take pla all at once, it answers the question.

Mr. Holmes: That is an extreme case, but, of cours there is a great deal of that thing done, putting forth tremendous energy all of a sudden, and from which acti the old-fashioned valve-engine can not recover its quickly enough. The automatic valve-engine, which is very sensitive engine, recovers itself very quickly. found it necessary to put in larger fly-wheels when introduced our larger engine, than we were using befo We had a wheel that was only twelve feet in diameter, a it would not carry the engine over these dead places wi out a shock to the engine; but now we have put about c hundred and twenty thousand pounds into the fly-whe There is now enough weight in it to keep its steady mot and carry the force over that dead pulling.

Mr. Scullin, of St. Louis: Do you take into conside tion the difference in expense?

Mr. Holmes: I am not taking into account the cost construction in either case; either the money invested the horse line or in the cable line; but we consider or the difference in the saving, the saving in expense of o ration is so enormous that it provides for the interest volved in the cable construction, and leaves a very har some margin after that.

Mr. Scullin: But you do take into consideration difference in drivers and conductors?

Mr. Holmes: Everything connected with the opera i including the wages of the drivers and conductors, all m ters except interest, dividends and taxes are counted in general aggregate of expense.

Mr. Harris, of Cincinnati: I would like to get an swer from Mr. Holmes in reference to the relative str on the cable in Chicago on a level pulling five or six seven cars in a train and of one car in Cincinnati going Vine street hill, which has a grade of seven per cent. a over in some places.

Mr. Holmes: I am sorry not to be able to answer y question. I have had no personal experience in operat on grades.

Mr. Harris: I understand that the strain of one car Vine street hill on the cable is equal to seven or eight c in Chicago on the level.

Mr. Holmes: Do you pull your cars up that gr with big loads; how many cars in a train make the asc at a time?

Mr. Harris: We have pulled up two cars and had passengers on the cars at the time.

Mr. Lawless, of Kansas City: Drawing a car on a per cent. grade, I understand, would be equivalent to f cars on a level.

Mr. Holmes then took the chair, and said: Are the any other gentlemen who wish to give us their experie in operating cable roads?

Mr. Lawless: Mr. President and gentlemen: I reg to say that we have not got the travel and have not the population that Mr. Holmes is favored with in Chica We have got a good many miles of cable line in our to fifty miles of cable for a population of one hundred seventy-five thousand people, and consequently we have be economic in the operation of our lines; but notwi standing the proportion of miles of cable which we h got to the number of population, all the roads pay. far as winter is concerned, there is no question that cable line is the most desirable for handling snow handling cars on a heavy track. I will give you an ide what the cable can do We had an experience in a severe storm of going up a grade of fifteen and one feet in the storm with a heavy snow sweeper, and never turned a wheel; we just slid all the way up track, and the snow flew.

As regards construction of new lines, one of the most important elements to consider in the construction is slot; as the closing of the slot, of course, means a serious impediment. From my observation, I have found that the slots laid with a rod fastened to the yoke has given so much trouble as other designs. For those gen men who wish to have any idea of the cost of construction of the line, per mile of track, I think it will be necessary to provide for an outlay of about fifty-five or sixty th and dollars a mile of single track, not including equipment and power house; I think that would be pretty near figures required. In constructing a power house for a cable line, it is necessary to provide for future contingencies, not simply calculate upon the travel that you expect present; because I do not think there has been a cable laid down anywhere that the travel has not increased least fifty per cent. in the first year. I think it is very desirable, in order to give steady motion to the engines have a heavy fly wheel, and in order to overcome any difficulty that may be experienced with the cable, by having this heavy fly wheel, it would be desirable to have a clutch by which the drums around which the cables wind could be disconnected, so that the cable might be stopped in much shorter time than by shutting down the engines.

The splicing of the cable is very important. We have tried several devices. Having a good many grades to contend with, we had to be very particular, because the strain in starting our trains, especially on grades, was very severe. The principal trouble of the cable is with the splicing; that is the usual experience, unless some unus

:cident should happen. When the cable passes through ıe grip where the wires are tucked, the force of the grip ı pulling on the strand is liable to pull the strand loose. his liability is much greater where there are severe rades. We have to make a slight change in the splicing f the cable, and have adopted a splice somewhat similar ı the Nash and Collins' splice. We make the cable smaller here it is to be spliced, and thus when the splice is per-:cted, it is the same size as the rest of the cable. This its us very well, and the loosening of a strand on our ne is a very unusual thing.

As regards the operation of the road, of course, Mr. Tolmes has very much more travel, and, of course, as the avel increases, the operating expenses are very much less ı proportion. But you can safely rely upon this, no mat-:r what your travel may be, for an equipment of twenty-ve cars, with eight miles of cable, you might safely calculate pon an expense of five hundred dollars a day; but this ıtlay will provide for the carrying of twenty-five thou-ınd people a day, just as easily as it will for fifteen thou-ınd.

Mr. Augustine W. Wright, of Chicago: Mr. President, ıe subject has been so fully discussed that I do not know ıat I can add anything to it. I would be very glad to ıswer any questions. The report is quite exhaustive, and ith your own remarks and those of Mr. Lawless, I do not ıow that I can add any thing. Regarding the cost of ɔeration, I know a road of thirteen miles which is now ınning at five hundred dollars a day, including all the op-'ating expenses.

Mr. Sage, of Easton: How many cars?

Mr. Wright: They are running thirty three trains; one ır in a train. These are the operating expenses only, ot interest.

As to the question of slot, I attribute the motion of the ot to the action of the frost; and I think on the roads ıat they have experienced trouble in this respect it has ɛen largely confined to the first winter. Your experience, ır. President, in Chicago will verify that sta'ement. It due, in my opinion, to breaking up the pavement and re-ıilding the road; the joints having been opened up, fill ith water, which freezes and expands with immense ɔrce. After the first winter these openings are closed up, ı that there is comparatively little trouble.

Mr. Sage: Will you inform us which road you speak of, ırteen miles and thirty-three cars? Are there heavy ·ades upon that road?

Mr. Wright: No, sir; the heaviest grade is about six ır cent. Regarding the question that was asked, Mr. resident, as to the extra resistance of grade, any gentle-an here can readily calculate that for himself. The chnical man speaks of a grade as a per cent You speak ' a grade, as Mr. Harris said, of ten per cent.; then the sistance of the ten per cent. grade would be ten per ·nt. of the weight of the train; or in speaking of it in ns of two thousand pounds, the extra resistance of the ı per cent. grade over and above the resistance of the raight and level track would be two hundred pounds.

The report of the Committee was, on motion, adopted.

Wednesday Evening Session. Secretary ·ad a request from the North Hudson County ailroad Company, of Hoboken, New Jersey, to now the relative advantage of operating an evated cable road as compared with a surface able road, and vice versa.

Mr. A. W. Wright, Chicago: I should say, mong the advantages of an elevated cable road ould be the freedom from street obstruction, hich would permit a high rate of speed. Mr resident, I should say they would be released om the expense of cleaning the conduit, and ıe pulleys would be accessible. They could se a larger carrying sheave, which would re-uire less power. On the surface road, the ten-ency, in first place, in our President's experi-ıce, was to use a large carrying sheave. Theo-·tically, the larger the carrying sheave, with the ıme axles, the less power it takes to propel the ıble; but, practically, as Mr. Holmes found, ıat leverage worked in two ways; the snow and ·e freezing on the pulleys prevented their turn-ıg, so that Mr. Holmes changed his larger carry-ıg sheave to a twelve-inch sheave; and that is enerally accepted now in cable practice as the est size sheave, considering all the points. On ı elevated road, providing there is sufficient ead-room, they could use a larger sheave and ould require less power.

Mr. Edward J. Lawless, of Kansas City: There another important point, which relates to ele-ated cable lines, and that is the freedom from ud, dirt and grit, which in a conduit is a very ·ious matter. The amount of mud, dirt, water nd grit that gets into a conduit, although the pening is only three-quarters of an inch, is con-derable; and there is quite a degree of suction ı the cable, whereby a great deal of dust is rawn into it, which gathers upon the carrying ulleys; and I can see upon the elevated line ıat that objection would be very trifling.

The report of the Committee on the Location nd Construction of Car House and Stables was ıen read by Mr. C. Densmore Wyman, the hairman of the Committee, as follows:—

LOCATION AND CONSTRUCTION OF CAR HOUSE AND STABLES.

Mr. President and Gentlemen:—

At the annual meeting of this Association, held in Chicago, in October, 1883, an able and exhaustive article upon the subject of Street Railroad Buildings, prepared by a committee of which Mr. Augustine W. Wright, C. E., was chairman was read, and, as the records of the Convention very correctly express it, was received with marked applause.

Made our permanent possession by incorporation in the published minutes of the proceedings of the Convention, and in a revised and enlarged form made a part of Mr. Wright's excellent manual, "American Street Railroads," the report has been a familiar handbook to all of us upon the subject of which it treats since the date of its issue. It urged with emphasis, supported by liberal and convincing quotations from eminent authorities, the primal necessity in all Street Car stables of abundant light, perfect ventilation, and thorough drainage, reasoning rightly that the securing of these qualities in construction was dictated not only by humanity but demanded by economics.

The securing of the right of way and the getting of the tracks down in the streets, is too often made the "*piece de resistance*" of street railroad construction. Once this is done, a stable and depot without much reference to location, is constructed, possibly from some old warehouse or unoccupied shed, and horses provided a domicile with stalls sometimes underground, with poor light, incomplete drainage, and imperfect ventilation. The manager confesses that his buildings are not what he would like, but are the best the company could afford. Surely such a policy is shortsighted, for, in the respects above cited, nothing but the best should be good enough, viewed simply as a matter of investment for interest. We shall consider mainly the stables in what follows, since the construction of car houses and shops follow such well known and general rules that the discussion of this branch of our topic is comparatively unimportant. Assuming an unhesitating assent to the statement that in the building of new, or the remodeling of old street car stables, the three qualities before mentioned are fundamental in their importance, it may however, be well to consider what amount of light may be called abundant, and what shall be provided in construction, that the stables may be perfectly ventilated and drained. Technically considered, the answer to this question would lie within the province of the architect and sanitary engineer, but some general suggestions for our own guidance in regard thereto will not come amiss. As the weakest link is the point of test in the strougest chain, so the darkest day is the one to be provided against in the matter of stable light, and thus large windows and abundant sky lights with reflectors if necessary, are counseled. Sunlight is remedial; it favors nutrition and nervous function; it sustains chemically or physically the healthy state of the blood. The blue-glass craze that swept over the country a few years since demonstrated this. Undoubtedly many persons were benefited by the treatment, but that benefit accrued by reason of the necessary subjection of themselves to the sunlight, not from any virtue in the glass or the color. In the case of epidemic and contagious diseases, affections which are greatly nurtured by uncleanliness, sunlight may almost be regarded as a specific, and therefore, in large cities, where the horses of the Street Railroad companies have no open lot or corral in which they can run, and both winter and summer are housed, for 20 out of every 24 hours, the admission of an abundance of sunlight is an indispensable requisite of good stable construction. The ranging of horses in stall rows along a wall and admitting light to these stalls by small windows opening upon the head or above the head of the horse, is in our opinion, unfortunate both as to light and ventilation; the light, if admitted freely, is focussed in the face of the animal, or thrown beyond him without ample diffusion. A better plan and one adopted in the principal Street Car companies, is to arrange that windows of ample size pierce the walls opposite the head of each row of horses, and doors with sashes and fanlights open opposite the end of the aisles, between the horse rows. This arrangement in connection with roof lights, where the stable floor is wider than fifty feet, will ordinarily provide the light needed.

A safe rule to follow in this matter will be to provide in our horse homes for the admission of as much light as we arrange for in the living rooms of our own homes. Now, as to ventilation, what we want principally in our stables is an upward moving current of air without draughts. The best authorities tell us that the amount of air necessary for the healthy respiration of a horse is from five to six thousand cubic feet per hour. Assuming that ordinary construction advises stalls 9′ x 4½′ with aisles between rows 8 feet wide and a heighth of ceiling of 14 feet, we see that the space thus allotted to a horse is about eight hundred cubic feet, and it is plain that to furnish the animal with proper respirable air, the air of this space must be entirely renewed each nine to ten minutes. The windows and doors which have been suggested in such quantity as to admit abundant light, particularly if supplemented with fresh air ducts piercing the walls opposite the head of the stall rows, will be sufficient for the entering supply of air. What shall be the size of the exits or air shafts? Not to detail the mathematical calculations by which an answer to this question is found, suffice it to say that where the air shafts run through not more than two stories, and are properly arranged above the roof, they should be made in the proportion of 18 inches square to each horse. They should have above roof, moveable slat sides, that may be shut against the direction of a blowing wind and opened with its current, so that downward draughts are avoided and suction for the removal of the heated and impure air promoted. In winter a costless system for the introduction of fresh air into the stables and one that is simplicity itself is of the following construction:

The lower sash of each window is raised from three to six inches, and in the space between the sill and sash a piece of wood is introduced to fill up the space. The lower sash at its upper part is thus brought a few inches above the lower part of the upper sash, which it by so much overlaps. In this manner there is left in the middle between the two sashes an open space up which the air is constantly passing from the outside into the stable room, and thus at all times air is finding its way in, and as the current is directed in an upward course, draft is not felt, even when the air is blowing in freely. Shaft ventilators with gas jets beneath, or air forced from a central fan through and out the pipes, extending along the ceiling over the aisles between the horse rows are often used to increase and secure proper ventilation.

In this connection let it be said that more care than is usually observed should be given to the location and construction of the stable, manure pit or yard. This should be isolated and no passage for its gases, harmful, chemically and disagreable in odor, should be afforded to stable or car house. By carefully covering it and providing it with ample roof ventilation carried to a sufficient height above the roof of surrounding buildings, this secure isolation may be provided. At the stables of the Belt Line in New York City, with stall capacity for 1,600 horses, the manure pit is at the rear of the stable, a room upon the ground floor walled in on three sides with a driveway to the street. This room is 40x35 feet, having a height of ceiling of 20 feet. Light and air are admitted to it by two windows opening upon an area away from the building. Two large drains in its floor keep it dry, while a ventilating shaft 6 feet by 6 feet is carried 12 feet above the roof of the building a total distance of 56 feet in height. In this shaft upon each floor of the three floors above are sliding doors three feet square, through which the refuse is thrown to the room below. These doors are weighted to close except when in actual use. The sun and rain thus being shut off from the manure receptacle and good ventilation being given it, even when well filled its contiguity is unnoticed in the adjoining buildings.

As to drainage, let it be said at the outset that main soil or drainage pipes should never be constructed of tile or brick, for with numerous joints leaks and settlings are almost sure to occur. Only the best heavy cast iron pipes should be used. In a majority of the recently constructed street car and private stables, stall drainage is effected as follows: The stall floor is laid solid in asphalt and level to a length 3 feet from its head; from this point the solid floor pitches with an inclination of 3 inches at the foot of the stall. This inclined space is laid with racks ¾ of an inch apart, each slat 3 inches wide (of spruce or maple generally) tapering on the floor side so that their upper surface corresponds with the head of the stall. This construction gives the horse a level surface to stand upon, while the spaces between the rack having a 3 inch inclination toward their outlet give drainage way for fluids to a gutter running transversely to the foot of the stall. This gutter should be of cement where the stable floor is next the ground, but where horses are kept above stairs, this may be made of timbers scooped out to a pitch of at least 1-6 of an inch to the foot toward the catch basin and drain pipe. This gutter is usually coated with pitch and covered either by iron plates perforated for stall drainings or with a two inch oak plank notched on its under side opposite the spaces between the stall racks to admit their contents to the gutter, and having rings on its ends to lift it from its place that the gutter may be swept, flushed and disinfected daily. It is well to carry overflow pipes from water troughs, of which in passing we would recommend an abundance, into these gutters which well serve for flushing purposes. All sewer connections ought to be throughly trapped and ventilated to the roof of the buildings.

These few suggestions touching stable construction in reference to light, ventilation and drainage, are presented mainly as addenda to what has already been so fully stated by Mr. Wright in the report and his manual to which we have heretofore alluded.

In the matter of the location of stable buildings we note that it is usually the custom of street car companies to fix upon a place for their stables at or near one of the termini of their lines. In large cities where the route lies from a central point in the city outward to the suburbs, the selection of a location is often properly dictated by the lessened cost of outlying property, coupled with the fact that a location uncrowded with other buildings promises purer air and better light. One other consideration should be allowed weight in this selection, namely: from what point on the line can the horses be worked to the greatest advantage. Since the matter of light and air may be made to depend so much upon mechanical construction, in the last analysis, the determining of the best place for building comes to be a question of cost, affected on the one side by the first cost of property and on the other by the subsequent and continual cost of the motive power to be used. A deal of thoughtful investigation has been given to the question as to the cause of the great loss by death and inefficiency of street car horses. Selected as they usually are with care, acclimated to their work by easy stages, used but four or five hours at the most out of twenty-four, watched and carefully tended, care on the part of their drivers, duly impressed by rule and discipline, it seems strange that the average life of the street car horse should so seldom rise above five years and so frequently fall below it. In our opinion the most fertile cause of this early disability of our horses is the jarring which they get upon the hard rock pavement in the cities, while traversing a continuous route of twelve or fifteen miles at a rapid pace.

A distinguished medical authority has said with reference to such jarring of the human city dweller, that "few realize that we, who were designed to tread upon soft Mother Earth, have become a race of dwellers upon rocks and stones. In walking the jar of the fall of our 150 pounds comes entirely upon the heel, since it first strikes the ground; the ball of the foot and the instep serve only to raise us for another downfall, small, it is true, but equal to the weight of our bodies falling through one-half to one inch in a little less than one second. The ill effect of these thousands of daily concussions accumulate and, after a

time, concur with other causes in producing that state of disability called nervous exhaustion."

If the jarring effect of the concussion between the heel of a man, protected as it is by the rubber-like mass of cartilege there placed and this again shielded by the boot heel that is itself not entirely unelastic, be injurious, how harmful must this jarring be to the horse, who has no fulcrum or lever-like action in his foot and who at the point of contact with the pavement is shielded by no more elastic a substance than an iron shoe. Nervous exhaustion means an invitation to all sorts of ailments which run riot in the weakened system of the animal and destroy him.

Now the location of the stable usually determines the length of time to which each horse shall be subjected to this harmful jar, and therefore we suggest that on this score that location be suggested which shall permit the strain of this pounding on the pavement to operate for two or three short periods rather than during one long one per day's work.

Again, in the majority of northern cities during the summer months, it is necessary to establish horse relief stations upon most of the lines and frequent changes of horses. At these stations, if protected at all, the horses stand under an open-sided shed and are there sponged and watered, but a sudden shower drenches them, a change of temperature inducing founder and colic occurs before they can all be brought in; the flies, harness and restless companionship fret and bother them, and all together the relief station becomes but a choice of evils. If their trip could be shortened and they could be put into a stable about midway of a two or three-hour journey, for example, the harness taken off and rest and quiet with proper water applications afforded them, it is probable that they would be able to resume their journey in safety after a short time and be effective for a much longer one than they would have been without the depot change. By way of illustration: In the city of New York a street railroad line has two divisions running from the same depot; one is eight miles long, making sixteen miles for the round trip, called the Eastern Division; the other is five miles long, or ten miles to the round trip, called the Western Division. The horses selected for the Eastern or long service are the best in the stable, weighing from 1075 to 1150 pounds. They make but one trip per day, requiring, including rest at the terminus, only three hours and, moreover, rest one day per week. The horses on the Western Division or short service are smaller and proportionately inferior in point of strength and physique. Resting one day per week as are those upon the sixteen-mile division, they make two round trips per day, that is, twenty miles, but have a stable rest between the tri, s, and the mortality and disability from their ranks is by the statistics thirty-three per cent. less than that from those of the Eastern or sixteen-mile Division. Moreover, many horses taken from the Eastern Division because unable to make a round trip thereon, when put upon the Western do full work and regain health and strength. If a fair allowance be made for the increased loads pulled continuously over the sixteen miles as against the ten, it is still the experience of the Company in question that their horses who have a stable rest during their time of duty are effective for twenty per cent. more of work than those who do not. Therefore, where the horses of a Company must travel upon a stone pavement and in localities of sharp climatic changes, we have no hesitation in urging the economy, so far as motive power is concerned, of locating the stable at such point on the route as shall permit the horses to be afforded a stable rest at the end of at least eight to ten miles of work—less would be better.

Passing from location to construction, in addition to proper light, ventilation and drainage, another desirable feature to be sought in stable construction is quietness for the horses. "An injurious influence which pertains exclusively to city life is incessant noise. This may not be very intense at any time, but when continuous it acts as certainly upon the nervous system of the horse as water falling upon a harder or softer stone. Recent experiments upon animals subjected to the sound of a continuously vibrating tuning fork for a number of hours, one or two days, in all show that the first effect is that of an irritant to the nerve centers, as certainly as an acid or an electric shock is to the muscle fibre. A secondary visible effect is opacity of the crystalline lense of the eye. The most perfect are the most noiseless machines, and this applies to horse homes as well as to social organisms."

On the score of noise, stone floors, unless they are deadened with a covering either of wood or a layer of litter, are to be condemned, and iron gutter covers for the same reason. Where iron mangers are used, the tie rings should be so fastened that the chains of halters will not rattle against the manger, double stalls with swing bars beside being more generally comfortable for their inmates, afford less pounding surface and therefore give less noise. The horseshoeing shop, mills, hay cutters, and repair shops, should be separated from the stable proper in such a manner as to admit to it little or none of their din. Where the horse room is a large one, cross-walls to such an extent as will not interfere with light and ventilation, will diminish noise. At the principal veterinary colleges of Europe, it is customary to arrange the floors of the hospital connected therewith, that not only the stalls, but all the passage ways may be covered with a thick layer of peat moss to deaden sound, and the exclusion of noise is certainly a desirable thing in our hospitals, wherein idiopathic and febrile diseases that debilitate especially the nervous system, are treated.

The location of the hospital, therefore, should be apart from the stable floor, and in construction and fittings it should insure quietness to patients. The main horse room should also be arranged so that horses going to and returning from work may pass to or from their respective stalls quietly.

Some companies have separate stables for their day and their night horses, that those used during the day may be undisturbed during the night, and those who work at night may take their rest in quietness during the day. So much has been said in previous reports and publications, concerning specific stable fittings, that we will not pause to speak of them, except to mention the drying racks for the straw bedding which are now adopted by not a few companies.

In the stable recently built under the writer's supervision in New York, racks ten feet long, four feet wide, with slatted sides and bottoms, there being four inches of space between the slats, are apportioned one to each row of eighteen horses. These racks, with the damp straw taken from the stalls in the morning, are suspended at the ceiling by ropes and pulleys over the horse aisles, during the day, and beside dissipating the odor from the straw, dry it thoroughly.

The comfort of a dry bed to the horse, and the economy in material, these racks afford, it is needless to comment upon.

Every stable should be planned in structure with reference to disinfection. We have already pointed out, when speaking of quietness, the benefit of separating the hospital from the main horse floor, and for purposes of disinfection such separation is also urged. The spores of infectious and contagious diseases are not destroyed by the ordinary so-called disinfectants, most of which are in reality nothing more than deodorants. To positively kill disease germs, the room containing them must be hermetically sealed and saturated with some life-killing agent. Where it is possible to run cross-walls or partitions so that the stable floor may be divided into a series of rooms, a sliding door which shall successively close these rooms, that the horses may be removed from them, and that each in turn may be sealed up and then properly disinfected, is recommended.

At any rate, some room aside from the general hospital, should be so fitted that to it any horse of which suspicion of infection or contagion is had may be sent, and after the removal by death or otherwise of the suspected animal or animals, it may be sealed up as before suggested and disinfected.

Protection against fire is another feature to be provided for in our buildings. The oil and lamp rooms ought to be fire-proof. When the repair and paint shops connect directly with car house and stable they should be shut from them by fire-proof doors and cement sills. The runways for the exit of horses should also be fire-proof, and, of course, of sufficient number and location to empty the stable quickly in case of necessity. The dust room of mills is especially dangerous and should be amply protected. The different good sprinkler systems, by means of which every 5 to 8 feet of surface in the buildings may be drenched from small sprinklers dependent from a pipe system fed by tanks upon the roof, afford a very good automatic fire protection. In New York City four railroad companies have already furnished their buildings with sprinklers. We will not speak of other fire apparatus which the carefulness and good sense of railroad managers will suggest as necessary to the safe furnishing of the buildings under their charge.

For grain rooms and hay lofts, we stop only to urge good ventilation and separation from the dust and gases of the stable, and we bespeak these requirements for car houses.

The rooms for conductors and for drivers (for they should where possible be separate) ought to be cheerful and comfortable, with lockers for caps and clothing, ample washing accommodotions, boot blacking boxes, shelves for books and racks for papers.

We have but cursorily glanced at some of the main principles and their constructive suggestions, which should in our opinion find expression in the plan, arrangement and equipment of our street car buildings, and yet we have exceeded the limit set for this paper. Concluding we have only to say that the furnishing of a horse railroad company with a depot and stables that shall be architecturally pleasing, healthful to its occupants and convenient and economic in use, is a work, the successful accomplishment of which will involve the comparison and investigation of a wide range of personal experiences, patient study, and the exercise of independence and good judgment.

Respectfully submitted,

C. DENSMORE WYMAN, Committee.

The Secretary said that he considered that in the line of this question was the matter of provision of a suitable room for the drivers and conductors where they could be provided with suitable conveniences, and useful literature, which would tend to keep them from other less desirable places. He called upon Mr. Holmes to state the system on his road.

The President then said that his company had equipped each of their depots with a nicely furnished reading room, the expense of which were divided between the men and the company, the cost to the company being one hundred dollars a month for each depot. It was provided with the best reading matter obtainable. The company considered the matter an excellent undertaking.

The report of the Committee was then adopted.

A letter was received from James Gunn, Secretary of the Toronto Street Railway Company, Toronto, Canada, asking for information as to the durability of wooden block pavement.

Messrs. Lawless, of Kansas City, Frayzer, of Memphis, Bailey, of Toledo, and Bull, of Quincy all volunteered to communicate with Mr. Gunn upon the subject.

The report of the Committee on Street Railroad Taxation was then read by the Chairman, Winfield Smith, as follows:

STREET RAILWAY TAXATION.

GENTLEMEN: I do not claim there is any justification for the course of one of your members, who, having agreed in the winter to read to you at this meeting a paper on the subject of street railway taxation, before thinking and further on the matter, goes to Europe, and returns barely in time to appear at this convention. Nor can I claim that while in Europe I have been considering the subject on which I have promised to address you. It is only in the intervals between pressing matters, since my return, that I have been able to see how little I might hope to instruct you upon this subject.

Railway taxation is a fact, and not a principle; a very complicated fact, insomuch that the laws of every State and the laws of almost every city on this subject, differ from all others. I have been scrutinizing the statistics which have been in time past collected by this Association and will give you the benefit of such information as is to be gleaned from them; from which you will probably conclude that, notwithstanding the lack of uniformity in taxing street railway companies, there is not, in most cases, a disposition to be unfair or unjust.

In Wisconsin the constitution of the State requires that the rate of taxation shall be uniform, and consequently most of the taxes on street railway property are assessed and collected as those on other property. The exception are that there is added, under the name of a license, an annual charge of $15 on each car run at any time by the company, and there is also added the burden of requiring the street to be kept in repair for the central space of about fourteen feet and a half. I can not help but think that the taxation of street railroad property ought to be like that of all other property; that the real estate should be taxed as the real estate of individuals, and the personal property as the personal property of individuals. I do not know any reason why street railroads should be compelled to bear any burden beyond that which would be imposed upon other property. The vehicles run by street railroad companies should not be taxed any more than the vehicles run by individuals. They are for the accommodation of people as are hacks and omnibusses, and if hacks and omnibusses ought for any sound reason to pay a license, it is quite possible that street railroad companies should pay a license on cars, provided the same sound reason exists. It is supposed ordinarily that a license fee is charged against hacks and omnibusses, not as matter of taxation, but for the sake of preserving a certain control over the owners of that class of property, for the purpose of better holding hack drivers and other drivers amenable to municipal regulations. This reason does not ordinarily exist in the case of street railroad companies, for they are not usually irresponsible persons, but are easily subjected to any city or State legislation — sometimes, it may be truly said, they are the victims of it. The drivers of a railroad car are in the employ of those whose capital invested is so great that they can not hope to escape the commands of the law; whose vehicles are by their own nature so fastened to the track that they never can be removed from the jurisdiction of the courts. They can hardly be sold out, or in any way placed beyond the control of the authorities; and there occurs to me no just reason for placing upon them an annual license. Probably it is really a tax, and ought to be so considered by the companies and by the courts.

In some States, corporations are organized under special acts of the legislature, and have peculiar privileges, and perhaps should therefore bear peculiar burdens. In Wisconsin, and in other States, the formation of corporations is free to all, and there seems to be, therefore, in the nature of a corporation, no reason for the imposition of burdens that are not common to unincorporated individuals, or to other industries. In Wisconsin, for instance, there is no exemption of street railroad property from taxation, and as it pays all, and in some respects more than its proportion of taxes, it is not easy to see on what ground special burdens should be placed upon it. The chief burden which is imposed on that property in Wisconsin, and also in many other parts of the United States, is the duty of keeping in repair the street for a greater or less width. In Pittsburg I understand that some companies are forced to keep the entire street in repair. Perhaps they have corresponding advantages in relief from other taxation. This particular charge is extremely burdensome, and I believe is not uncommon, and amounts not infrequently to far more than the sums exacted in ordinary taxation. I know that the company which I represent pays for this particular species of taxation twice as much as for all others combined, and in consequence it may be fairly said that our rate of taxation is three to four times the rate which is imposed on individuals carrying on other pursuits, or dealing in other property. The only claim I have ever heard made in support of the requirement is, that cars use a large portion of the street, almost to the exclusion of other vehicles, and that, in order to run them, rails are laid upon the street which are an inconvenience and injury to other vehicles and interfere with them; that, in effect, a certain part of the street is set apart to the use of street railroad cars, and it is therefore reasonable that their owners should keep such parts of the street in repair.

It is proper to consider whether, as a matter of principle, these reasons justify the requirement upon the street railroad companies to repair the streets. I assume that ordinarily streets are kept in repair by the municipal authorities through taxes imposed, sometimes upon the real estate along the streets, but usually upon general property. These streets are built and maintained for the express purpose of being run over and used by all sorts of vehicles It is expected and desired that passengers shall pass over them and that loads of all sorts shall be carried upon them. The pavements are made for that object, and it is deemed just in respect to all other than street railroads, that the burden of such pavement, and such maintenance, should be borne by the public at large. Hack drivers and omnibusses carry passengers over the streets for purely private gain; other vehicles carry passengers for private gain or pleasure. The public reaps the advantage, and the public pays the expense. The public ride, and individuals pay. There is no difference in principle in this respect between the street car and the omnibus, hack or carriage. The car is run for the gain of the owners, and for the convenience of the public. The

blic enjoy the advantages, including that of an extremely eap rate. There is nothing in the mode of use, there is thing in the nature of the benefit to the owner or to public at large, which distinguishes the street car from hack, or which justifies the imposition of a tax on the mer that is not placed upon the latter. If we consider amount of wear and tear, the advantage is decidedly th the street car company. The company furnishes its ls, and only its animals wear the road. Other vehicles ar with their wheels, often excessively. The street car en carries on any one street more passengers than all ier vehicles together. This means, then, that the public rive more benefit from the street cars than from all other hicles together. But that is not a reason for a special on street cars, rather the contrary. The streets are ilt and repaired for the very purpose of carrying passenrs, an object recognized as a public object. Street cars simply carrying out that object when they furnish facilis so cheap and convenient that they are more prized and ore used than other vehicles. If paving and repairing eets constituted a work proper to be done because of the cessity of accommodating the people that ride, then it ould be particularly done for those vehicles in which the ajority of the people do ride.

Another reason sometimes is assigned: that the street ilroad companies place rails in the street which are in a gree inconvenient to other vehicles. That is true. It ll be seen, and is probably a fact within the experience you all, that, unless the cars are so frequent as to prent it, the rails are also an actual convenience and of eat utility to ordinary vehicles, excepting the light, fastnning carriages. The heavy loads seek the railroad acks and occupy them, often hindering the cars. The eet rails are the smoothest part of the ordinary road, and e consequently chosen by the drivers who wish thus to lieve their horses. I think it is not incorrect to say that e street rails on the whole are of more advantage than pediment to other vehicles. And it is also to be noticed at while other vehicles impede travel in exercising their restricted right to cross from one side to the other of the eet and to occupy any portion of it, the cars are confined to a narrow space in the street, leaving the wider ace to the vehicles which carry the fewer passengers. If e street cars are so frequent that other vehicles are prented from running on the railroad tracks, it proves that e passengers in them are numerous and consequently at the majority of the public is served by them; the legitiate inference from which is that the street cars should favored and not be oppressed,

It is also said that the street cars are protected by ordinances and laws; that they are authorized to collect fares, ceive monies from passengers for riding. So are all her vehicles. There is really nothing worthy of consideation in an argument so trivial.

The last argument used, but perhaps the first one ought of by the defender of this peculiar charge, is that e street car companies, by virtue of the rights given em, are profitable and therefore can afford to pay. I say is is the argument least used, because upon the face of it is unsound. Men are ashamed to utter it. If the comny is profitable and its property therefore increases in lue, as it must in order to be profitable, it is taxable and ually it is taxed very freely in proportion. There is no ore propriety in a double tax on a street railroad because is prosperous than on any other business. It should be stly taxed in proportion to its property, and not beyond. is quite well known to you all that the pitch of prosperity which some of our street railroad companies have ached is by no means attained by all, and that many of e street railroad companies of the United States have had om the beginning a hard struggle to maintain themselves id now have; while those which have now an established id handsome income have usually succeeded to that relt after long and painful struggles, during which the vners have been forced to advance large sums of money on the uncertain hope of ultimate return. It is rare, deed, according to my observation, that the money insted in street railroads would not have proved equally munerative if invested at the same time in real estate on the same streets. The increased prosperity of the ansit company results from the growing wealth of the ty or of that part of the city where the company's tracks e laid. Even in our largest cities where the street railad companies have seemed to enjoy a phenomenal inme, the owners of the lots and buildings by the side of e tracks have shared the increase in value without being bject to the cares and burdens of a control by municipal thorities. The freedom which the owners of the lands joy affords a pleasing contrast to the restrictions placed on the street car owners, and those restrictions, as many us have had occasion to see, are not always the determiations of calm reason, but sometimes proceed from ignonce, jealousy or revenge.

It may be interesting to you to know that the Cream ity Railroad Company has tested the question arising nder our laws and an ordinance of the Common Council ssed last spring, which increased the rate of license 50 r cent. During my absence the Company thought best dispute the power of the Council to pass that ordinance; it they were defeated in the contest, the Supreme Court our state holding the subject to be within the control of e Common Council which had originally passed the ordance and fixed the license. The company's claim in this se was that the license having been fixed by the original rdinance which granted the right to lay tracks and run rs, and having been accepted, formed a contract which ither side could disturb.

There seems to me to be no just principle on which rect railway property should be taxed in excess of other operty. While, however, modes of taxation are so rious, it can hardly be expected that justice and unifority will be applied in this regard to municipal dealings ith our companies.

From our tables, representing 94 companies, it appears:

1. That with rare exceptions the property of railroad mpanies is subject to taxation.

2. That the real estate of the companies is generally taxed, usually about as that of individuals is taxed. The taxation does not in any case exceed the rate of about two per cent. on the actual value of the real estate; it is in many instances less.

3. The receipts of companies are not usually taxed. In 21 cases out of 94, the gross receipts appear to be taxed at rates varying from five mills to eight mills upon the dollar. In Baltimore only is there in one case a tax stated to be 9 per cent. on the gross receipts of the company; but if I understand the returns from that company there is no other taxation. Still, an amount so enormous seems utterly unaccountable as unreasonable.

The capital stock is taxed in 37 cases out of 94. From this tax is generally deducted the tax paid upon assessed value of property, and usually when tax is paid on the capital stock, it is not paid upon the property of the company. There is nothing in the tables which I have examined to indicate that this mode of taxation constitutes a peculiar hardship.

5. Dividends are sometimes taxed, but in only nine or ten cases. And this tax is usually closely connected with the tax upon the capital stock. In Wisconsin no taxes are imposed upon the capital stock of corporations, but always upon its property of every kind.

6. When railroad tracks are assessed, they seem to be rated at from two to five thousand dollars per mile of single track. Although in some instances the assessment is as doubtless it ought to be, as low as one thousand dollars per mile.

7. Licenses greatly vary. On 58 roads no licenses are reported as paid. On the remainder the licenses seem to vary from one dollar a car up to fifty dollars per car per annum.

8. The area of paving, and repairing of roadbed required to be done by the companies, also greatly varies. In some cases no such requirement is made. In 65 reports the companies are required to pave or keep in repair all the tracks between their own rails. In the remainder no work of that kind seems to be required; (but the city or village probably does that work.) In Pennsylvania some roads seem to be required to keep in order the entire street from curb to curb. The apparent injustice is however mitigated, if I understand the reports, by a diminution of other taxes.

9. Sweeping and cleaning the tracks are not usually required of the companies, but probably the cleaning is frequently done by them.

There is so great variation, as appears from the returns, that I do not think that general deductions can be drawn, or any useful purpose subserved by giving further details. Each company, member of this association, knows its own interests, the laws which regulate the taxation of its own property, the difficulties with which it has to contend, the hardships it endures. Probably those companies are most fortunate which are working under unchangeable regulations, or are subject only to the control of intelligent commissioners, and not of a body of municipal legislators who are utterly ignorant of the subject, and yet desirous to show how great is their sympathy for individual tax payers and, how little they care for justice to corporations.

Respectfully submitted,

WINFIELD SMITH, *Chairman.*

William McCreery, of Pittsburgh, stated that his company was required to pave the street from curb to curb; that the road crossed a bridge on one side of which they had to pay a license fee of fifty dollars for each bob-tail car, and on the other twelve dollars and a half for each car; that the company paid one hundred and twenty-five dollars per car for crossing the bridge; paid the city of Allegheny five per cent. on all dividends, and the State of Pennsylvania five per cent. on all dividends, and eight-tenths of one per cent. on gross receipts.

D. B. Hasbrouck, of New York City, stated the conditions of taxation there to be, a tax by the city on the tracks as real estate, at a high figure; taxed by the city on the personal estate; also on the capital stock; taxed by the state on the gross earnings, and on the net earnings; also on the dividends. The State also imposes a tax for the support of the Railroad Commissioners.

INVITATIONS.

The following invitations were then read from

Hon. James W. Hyatt, Treasurer of the United States, and President of the Norwalk Horse Railroad Company, Norwalk, Conn., to visit the Treasury building.

George Truesdell, President of the Eckington and Soldiers' Home Electric Railway Company, Washington, to visit the line and inspect the system.

Ross Thompson, President of the Battle of Shiloh Company, to visit the panorama at the convenience of the delegates.

All these invitations were, on motion, accepted.

The following gentlemen were appointed a Committee on Nomination for Officers, and to select a Place for the Next Meeting: Messrs. Linch, of New York City; Cleminshaw, of Troy; Littell, of Louisville; Longstreet, of Boston; Rugg, of Minneapolis; Ackley, of Philadelphia and Walsh, of St. Louis.

The Meeting then adjourned until Thursday morning.

THURSDAY MORNING SESSION.—The report of the Committee on Street Railway Mutual Fire Insurance was read by the Secretary:

REPORT OF COMMITTEE ON STREET RAILWAY MUTUAL FIRE INSURANCE.

WASHINGTON, D. C., Oct. 18, 1888.

The Committee on Street Railway Mutual Insurance Company, at a meeting held this day, adopted the following preamble and resolution:

Whereas, This committee, some two months since, prepared and sent to the companies, members of the association, a request that each company express to the committee its opinion as to the feasibility of the formation of a Mutual Street Railway Insurance Company, and

Whereas, But few responses have been received from the companies as yet, and

Whereas, The general features of the formation of a Mutual Insurance Company have been heretofore so fully set forth in previous reports and publications, that there appears to the committee to be no need for further elaboration upon these points.

Therefore, be it *Resolved*. That the committee report to the association the fact of the sending of said notices to the different companies, the meagerness of the returns therefrom and the consequent inability of this committee to submit such a report as will reflect the general opinion of the members of the association:

We therefore respectfully suggest the continuance of a committee upon this important subject, in the hope that it may be able before the next meeting of the Association to secure such information from the respective companies as to their desires in the matter as shall enable the committee to present a report that will embody the views of the members, and a plan of organization and operation in case said views are favorable to the formation of such a Mutual Insurance Company.

C. C. WOODWORTH,
C. DENSMORE WYMAN,
R. DUDLEY FRAYZER, } *Committee.*

The report of the committee was received and placed on file. On motion of Mr. Henry Hurt, of Washington, the same committee was continued in charge of the subject.

ELECTRIC RAILWAYS.

THE PRESIDENT: Gentlemen, I have seen somewhere the picture of a stalwart man, elevated high in the air, and both hands full of forked lightning; and that man, I find, was Calvin A. Richards, of Boston. He had not the slightest fear of lightning at all; he had just all the bravery that it was possible to put into a man's heart and fiber: but unfortunately for every one of us, that man, who is so endeared to all our hearts, has left the street railway business and feels that, in the hitherto existing condition of things, it would not be proper for him to be present at this meeting. We are thus denied the pleasure of listening to his glowing terms, as he would describe the power of electricity and lightning in moving our cars. It is a loss to every one of us; but I trust that no one will hesitate to express his views frankly, and give us all the information possible about this interesting and progressive subject. The subject is open to the meeting, and whoever gets on his feet first, will have the floor.

Wm. Bracken, General Manager Julien Electric Company, New York City: Mr. President and Gentlemen, I have hesitated to undertake the preface to this discussion. This is always the most disagreeable part, like the preface to a book. It is the more difficult on the present occasion, simply because I do not profess to be an electrician; it is only a few years since I had the honor to be ranked among the gentlemen who represent your great industry. I am one of that dangerous class of men known as a Philadelphia lawyer; who, in a moment of folly, left his profession some two and a half years ago, and directed his attention to electric traction. I am not able to discuss the subject by the use of technical terms, which men skilled in the science are accustomed to use; neither am I a mechanic, nor do I know anything about the street railway industry. I have had the opportunity of devoting two and a half years in the capacity of an officer of a company engaged in electric traction, The Julien Electric Company, New York; and I came on here to be a looker on in the convention, rather than with any hope that I should have the privilege of addressing you. I trust, therefore, you will extend me your indulgence if I make statements which your practical sense may deem to be impracticable or not to the point. I think it a very auspicious thing that the electric traction men and the hard-headed, practical, common-sense, intelligent street railroad men of this country should meet as they do to-day, and exchange views. I think it shows

(*Continued on page 157.*)

The
Street Railway
Gazette.

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S. L. K. MONROE, - - - - - - TREASURER.
E. V. CAVELL, - - - - - - MANAGER.
WILLIAM HUGHES, - - - - - - EDITOR.
EDWARD J. LAWLESS, - - - ASSOCIATE EDITOR.
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Articles and papers on subjects relating to intermural transit always appreciated; the GAZETTE'S columns are open for the expression of independent opinions, and the discussion of all matters connected with street railways—on the surface, elevated or underground. A special column is devoted to the publication of trade notes and items from manufacturers and dealers.

THE STREET RAILWAY GAZETTE for November, as usual, is issued before its ordinary time (the middle of the month) in order to furnish its full and carefully prepared report of the Washington Convention of the American Street Railway Association; the reports of these annual gatherings being awaited with great interest by the bulk of our readers. While not sacrificing correctness to undue and unreasonable hurry, the GAZETTE will be on the desks of the delegates by the time that several of them may reach home; and those who rely upon their GAZETTE for information concerning the "Seventh Annual," will find in it the most complete and accurate report of the proceedings obtainable, and may thus be enabled to know all that was "going on" to the fullest extent possible unless they had been there.

EXHIBITORS at the Washington Street Railway Convention were unanimous in their praise of the course pursued by the STREET RAILWAY GAZETTE, during the past year, in advocating an organized exhibition of street railway appliances in connection with the annual meetings of the American Street Railway Association. And President Holmes said the GAZETTE, which was the only paper that advocated such an exhibition, had rendered very good service in doing so. The Association was slow in responding to the wishes of manufacturers and supply men, as expressed in our columns, and did not announce their arrangements for an exhibition until Secretary Richardson's letter appeared in the August GAZETTE. Arrangements will be made earlier next year, of course, and a still more successful exhibition will surely be the result.

THE STREET RAILWAY GAZETTE was highly honored, reflectively, at the convention. Our associate editor, Mr. Edward J. Lawless, was one of the most popular speakers, and was often called upon. So was Mr. Augustine W. Wright, whose edifying articles on the construction and maintenance of American street railways were published in the first two volumes of the GAZETTE, and have since been issued in book form.

Is Marriage a Failure?

This question has been discussed, pro and con, for some months past, on both sides of the Atlantic Ocean. Some people, on this side of the Atlantic particularly, state that the matrimonial knot is not successful. Our married street railway men, and their wives, are decidedly of opinion that marriage is the best step a man can take. This was evinced during, and subsequent to, an impromptu address by Mr. E. J. Lawless, at Marshall Hall, while the delegates, with their wives and daughters and friends, were enjoying themselves there the day after the Washington Convention was adjourned. The party were on their return from Mt. Vernon. They had lunched at Marshall Hall, and while waiting for the return of their steamer, the "W. W. Corcoran," the company drifted into speech making, music and dancing. The vivacious Major Evans led the band to the front of Marshall Hall, where they played "in honor of the ladies," and thereafter several gentlemen were called upon for speeches, among them Mr. Lawless, who was escorted to the verandah and requested to make a speech on "Cable Railway Practice," the title of his widely read articles in the STREET RAILWAY GAZETTE. Mr. Lawless turned his thoughts from the cable, and quite unexpectedly delivered a brief oration on the blessings of marriage. He referred to the happy condition of those who were married, as an inducement for men bound in the miseries of "single blessedness" to seek the comforts of matrimony. The applause which his remarks drew forth was most enthusiastic. And afterwards he was heartily congratulated by several of the married ladies present on the felicitousness of his observations. "You spoke well, Mr. Lawless; that was the best part of the Convention," said the first lady who complimented him. "It was a word in season," said another. "I was close behind you, and I never heard anyone speak so well," said a third. Others followed in a similar strain. Mr. Lawless blushed! The hearty applause in the course of his speech and the spontaneous congratulations afterwards, showed plainly that there was the strongest opinion in favor of marriage.

And what is more, the attendance of ladies at the Convention this year afforded a special opportunity to unmarried street railway men to fall in love with worthy helpmates. No man need remain unmarried, provided he owns a prosperous street railway, and is also handsome and manly. Those who have marriageable daughters will do well to bring them to the annual meetings of the American Street Railway Association, where men of sense predominate and "dudes" are few and far between. Acquaintanceship may be made which may ripen to happy friendship.

But the chief object, and principal advantage of the presence of ladies at these annual meetings is to extend and cement the friendship already formed between street railway men from different parts of the country, who are strengthened and edified by the exchange of opinions and sentiments at their meetings from year to year. It may be supposed that the wives and daughters of street railway presidents do not bother themselves with street railway questions; but they do. And some expressed the hope, at Washington, that ladies may be admitted to all the meetings of the Association. They may contribute some new ideas, and call attention to some interesting points that may otherwise pass unnoticed. A case in point occurred at Washington. Mr. C. B. Holmes had his thoughts concentrated on the power of the cable, and the profits derived from operating it properly. His statements concerning it have been wired all over the United States, Canada and abroad, and favorably commented upon by numerous newspapers. But it was Mrs. Holmes that brought to light a "side issue" which was not generally known (and which President Holmes never thought of mentioning) although it may have considerable to do with the very successful operation of Mr. Holmes' extensive street railways, upon which strikes are unknown, the conductors, gripmen and horse-drivers being always content with their lot and continually anxious to perform their duties faithfully. Mrs. Holmes, in course of private conversation with Mr. Secretary Richardson and Mrs. Richardson, happened to remark that Mr. Holmes provides news-rooms for his men at each barn and depot, where all the principal newspapers and magazines (including the STREET RAILWAY GAZETTE, of course) may be read quietly and comfortably. Mr. Richardson did well to tell the convention of this, and to call upon Mr. Holmes to explain how his literary work among his men is managed. Mr. Holmes' statement that a few hundreds of dollars paid for publications, reading rooms, and keeping them in order is money well spent, was listened to with great interest. Probably it would not have been known had not the ladies attended the Convention.

The Thomson-Houston New Railway.

The latest electric railway of the Thomson-Houston Electric Company, the Eckington and Soldiers' Home Street Railway, of Washington, D. C., of which Mr. George Truesdell is president, has been in operation since the 15th of this month. This road, which is one of the finest and most ornamental roads that this company has constructed, is 2¼ miles in length, and is built along New York avenue terminating at the corner of 7th street.

On the 15th of the month the first trial trip was made, the party including President Truesdell, Capt. Eugene Griffin and Mr. G. W. Mansfield, of the Thomson-Houston Railway Co., and several street railway managers who were in Washington attending the Railway Convention. After inspecting the engine and dynamo in the new building erected at the Eckington end of the line, the visitors boarded one of the handsome new cars, which were made specially for this road. These cars are very handsome indeed, although the exterior does not differ much from the ordinary street cars, the interior is very nicely fitted up with slate-colored plush cushions and electrical lamps which illuminate the car so that a newspaper can be easily read anywhere in it, and other appliances which are found in other cars of first-class construction. In spite of the fact that the road was new and that the cars had never been run over it before, excellent time was made on the first trip and without accident of any kind. The cars run smoothly and without slightest noise over the roadway, ascending the grades and around the curves without any apparent additional exertion more than when on the level. On the 18th, at invitation of the Thomson Houston Electric Company, the delegates of the Convention of the American Street Railway Association inspected the road from end to end and carefully noted all the points in the overhead construction, construction of the motor truck and the electrical appliances in general. They all, without exception, say that it is the finest electric railway that is in operation at the present time in the United States, and say that it possesses features of superiority in form of construction and ease and certainty of operation not possessed by any other system in use at the present time. The dynamo supplying the current is 80 horse power, engine, 100 horse power. Mr. Truesdell, president of the road, has assured the Thomson-Houston Co., through its representatives who were in Washington when the road was started, of his perfect satisfaction at the way in which the cars operated on the trial trip and says that he is perfectly confident that the road will be successful in every particular.

Leonard & Izard.

We learn of a change in the firm of Leonard & Izard of the Rookery building, Chicago. They have been fortunate in associating with themselves Mr. W. S. Andrews, formerly superintendent of construction of the Marr Construction Co. Mr. Andrews has been connected with the electric lighting business since it has been a business and has just completed the construction of the Chicago Edison central station, which is considered to be the most complete central lighting station yet built. Leonard & Izard are at present constructing the large Edison central station at Minneapolis.

They make a specialty of construction for electrical railway systems, the last contract they closed for this kind of work being for the Sprague railway at St. Joseph, Mo. They have recently closed there other railway contracts, the particulars of which we have not yet learned.

(*Continued from page 155.*)

that the electric traction men deem it necessary to co-operate with the street railway men; and I trust that the street railway men will regard it in the same light. There has been a great deal of misapprehension, I think, on both sides, in relation to the application of electricity as a motive power. I think the electricians have led the street railway men to expect too much; and I am afraid that on that account, and for other reasons, the street railway men have been too exacting with electricians. Of course, it is natural in an industry entirely new, like that of electricity—a science that has certainly until very recent years been regarded as an occult science—that a certain air of mystery should surround it, and have two effects, viz.: that of making people, who are naturally very sanguine, to expect too much; and to lead people who are accustomed to spy into abuses, to regard it with some degree of skepticism. But, gentlemen, there is nothing mysterious about electricity; electricity is energy just as steam is. It is necessary to consume coal, or some other material, in order to develop electricity. It is handled just in the same way that steam is handled; and when you direct your attention to it, if you will not be afraid to look into it and study what you may deem its mysteries, you will be surprised to find how simple it is, and how docile. I am not one of those over-sanguine people who think that electrical traction is going to supersede every other method of traction; and neither am I sufficiently conceited to imagine that storage battery electrical traction, which I represent, is going to supersede every other method of electrical traction. I think there is a sufficient field for all, and the sooner we come to recognize this and pull together in harmony and exchange of views, as to the best methods of applying our systems, the sooner we will succeed.

No man will say, no matter how sanguine he may be, that the President of this Association, Mr. Holmes, would dream for a moment of exchanging what, from his description and what I have heard from others, is a magnificient system of cable traction, for any system of existing electrical traction at the present day. In the economy of his system, in the method and manner in which it works, I should hardly deem that it would be judicious for him to do so. I cannot see myself any difference in starting from a central station and moving a cable, which gripped onto will move a car, and running that same energy through a wire which grips the car instead of being gripped, and takes it to the same destination, provided the economy in both should be the same. I will not discuss this matter, however, as I am here to discuss the merits of the storage battery system of electric motive power; and if I may be indulged, I will tell you about it.

Two years ago, and over, I was in the city of Brussels, on professional business; and in coming out of my hotel one morning, I saw a car moving along the street, neither over head wire, nor cable, nor horses, nor any indications of the means by which the car moved. I got on the car, and was told it was run by accumulators—storage batteries. I knew nothing of the system, and took an interest in it, and saw the counsel of the road that was engaged in that method of traction, who explained to me all that he knew about it. I came back very enthusiastic over what I had seen. The result was we made arrangements to apply it here. I got Messrs. Julien to forward us a car to New York, in order to put it in service and demonstrate what could be done with it. You may not all know that the shortest curve in Brussels is forty-two feet radius; we have to describe a curve on the Fourth Avenue road, New York City, of twenty-one feet radius, and up hill at that. Consequently the car that Messrs. Julien sent to us was illy adapted to do the rough, hard service that a street car in this country is expected to perform. We not only had those difficulties to encounter, but the methods of producing the machinery, especially the storage batteries, at that time, although it is only two-and-a-half years ago, certainly seemed to us, and proved afterwards in the light of experience, to be very crude. Messrs. Julien sent over to us the most improved methods of manufacturing storage batteries; the furnaces, molds, and all the adjuncts they had in Brussels were reproduced and sent here, accompanied by an electrician, who was supposed to be skilled in the mysterious art of making a storage battery. We went to work; and, fortunately, the company had secured the services of bright, intelligent American mechanics and skilled men, especially a chemist (which is invaluable in the storage battery manufacture), and we soon discovered the crudeness of the art, although we had the best methods and appliances that were to be found in England or in Europe. From what was deemed, and has been deemed, and is generally deemed as a forbidding thing in storage battery traction, that is, the cost of the storage battery and its life, which have been considered too expensive for general adoption, we have reached the point where we are prepared to set down at the doors of any street railway man a factor of force in storage batteries more cheaply than he could secure his horses, and we will produce that and supply the force more cheaply than he can maintain his horses. The storage battery, if I may say so, is nothing mysterious; it simply consists of plates made of lead or other metal; usually of platinum, of which you must all have heard. We treat it with a chemical suffusion which changes the properties of the metal, and makes it a receptacle for electrical energy. In order to fill these plates with this suffusion or mixture, we had to employ a large number of men. Each man had before him a small piece of board on which he had instruments or cups for measuring the quantity of mixture to put on each plate, and that was spread on with a trowel, and no matter how diligently the man worked, he could not make more than sixty plates a day. That is the method in Europe to-day. You can imagine how expensive that was. Our Mr. Henry G. Morris so improved this, that two girls are able to make more batteries to day than fifty men were able to make a year ago, and they are more uniform and better in every respect; so that instead of charging eleven dollars a cell, as we were obliged to a year ago, if you were to offer us, say, six dollars a cell, or even less, you would be in danger of being taken up. Of course, we had a great deal to contend with, owing to the ignorance of men whom we had to employ in this storage battery manufacture. It is very easy to drill men in matters of horse traction, or even in cable traction; you can secure a number of men capable of handling your cars or engines at the central station; but we were engaged in an industry that was entirely new, unknown; there was not a factory in this country when we began manufacturing storage batteries. Mr. Brush had played with them some, but never had produced commercial results. I want to show you what this country can do with an industry like this. Although we run our factory night and day, in Camden, New Jersey, we are very much behind in our orders. We are lighting the cars of a large number of railroads; among others, the Boston & Albany, the Pullman Vestibule cars, and a large number of cars on the Pennsylvania Railroad; also the watch factory at Waltham, Massachusetts, is lighted by the Julien storage system. I am not saying this, gentlemen, in order to extol the company I am connected with, but simply to show you what progress has been made in this industry.

People ask, why are you not running more cars? The chief reason is because we have been unable to find men who were skilled in the knowledge of handling our batteries and other electrical apparatus. We want to send cars on the streets that will take care of themselves, and carry passengers, and stop and start, and get back to the car-house; and this requires a great deal more care than is commonly understood. We have started to do the most difficult thing that has been done or attempted; we intend to do the thing which calls for the highest degree of electrical skill. We have a great deal of respect for gentlemen who will attach a car to a current on an overhead wire or a conduit; but it requires a great deal of care and industry to take a car that is propelled by its own energy, and which must take care of itself throughout, and must get back, on a journey of twelve miles, without any but necessary stops in a crowded street, and without interfering with public traffic, it is no easy matter to attain, and to do it economically. We are attempting to do something that has not hitherto been undertaken; certainly never with a fair degree of success as the result. I will say this, that never has a car of the weight which is now run on Fourth avenue and Madison avenue, New York, an eighteen foot car, with large platforms, and capable of carrying when crowded, some seventy or seventy-five people, been run successfully by electricity. We put one car in service on the seventeenth of September, and it has been running on that line every day up to the present day, in actual service carrying passengers, and in that time we have never had an accident whereby we have stopped traffic or whereby the car has been disabled, and not been able to return to the station with its passengers just as it started out.

I thank you very much gentlemen, for the indulgence which you have extended to me, and hope I have not intruded on your time.

Mr. Holmes: Before the gentleman takes his seat, I would like to ask him if the cars operate regularly, day after day carrying passengers.

Mr. Bracken: They do.

Mr. Holmes: On how large a scale; please give us all the information you can.

Mr. Bracken: In relation to your question, Mr. President, as to what progress in operation we have made, I would say that the car we received from Mr Julien some two years ago was entirely unadapted to the work required of the American street car. The motors were not sufficiently powerful. They took the car along, but just as a single horse might take it up a heavy grade—with a great deal of difficulty. We were thus compelled at once to adapt our car to the work required. We had a great deal of correspondence with street car gentlemen throughout the country, concerning our system, and desiring us to make guarantees; but we were not in a position to do it at the time. We intended to start out and exhibit ourselves for our own benefit on a street that presented heavy grades (as Fourth avenue and Madison avenue, New York), do in a crowded city, like New York; and we determined to put on ten cars, in order that the street railway men of America might inspect our system for themselves. On the seventeenth of September we put this car on, car number one, and every day since that time, with the exception of Sundays, that car has been running in regular passenger service, carrying passengers. Car number three was put in service but two or three days ago; car number two will be in service today; certainly by the time any of you gentlemen may be passing through New York it will be in service, so that this week there will be three cars in actual daily service; and of course, we shall follow them up day after day. Mr. Brill, who is building our cars, says that the remaining seven cars will be forwarded to us as we are ready for them. We have suffered under some disadvantage in our present undertaking, in the fact that the space is small. We have found it no small task to put in the space which you would allow to four horses sufficient batteries to run ten cars. We are compelled to put enough batteries to run ten eighteen foot cars in that small space, and you can imagine that we have difficulties to contend with. We cannot rush into a big lot and take all the space we require. Mr. Vanderbilt places at our disposal a portion of his stable at Eighty-sixth street, and we must be content with that.

Mr. Holmes: What rate of speed do you make?

Mr. Bracken: To say we could make any rate of speed would be exaggeration; but the present car is geared to run about ten or twelve miles an hour, maximum.

Mr. Holmes: Does it actually do that?

Mr. Bracken: It actually does that. I think there are a number of gentlemen in the room who know it makes that rate. You can see that there is no object in the present instance in putting a car on Fourth avenue which would not make seven miles an hour. If you run at less speed than that, the expenditure or waste of force would be greater, in consequence of the machine being geared to make a high rate of speed. We geared car number three up to make seventeen or eighteen miles an hour; we do not want it to do it, but we were compelled to. I should say that with a storage battery car properly geared, you could attain a speed of twenty miles an hour.

Mr. Holmes: Can that rate of speed be maintained for any length of time?

Mr. Bracken: Yes, sir; it can be maintained throughout. It is merely a matter of energy; you have it there; it is stored in your battery, and you can apply it *ad libitum* until exhausted. We put it in our batteries; we have enough energy in the battery to take the car about twenty-three miles; theoretically we ought to go forty miles; but you cannot safely do it in the city of New York; you may carry two hundred and fifty passengers on the trip, or you may carry only twenty; you cannot afford to run any risks, because your car must get back. The result is that we go to work and take out our batteries at the end of each trip, and place them in the charging circuits in connection with the dynamo, and we get sufficient energy while the car is out with the other set. The battery that has just made the trip is taken out and the charged battery put in; and the battery taken out is charged sufficiently while the car is making a round trip to the city hall and back, about twelve miles, and taking about two hours; so that we get along with two sets of batteries.

Mr. Augustine W. Wright: Mr. President, I would like to ask the gentleman what is the weight of the battery and car, exclusive of lead; and how long it takes to charge the batteries, and what is the length of service when they are charged. The gentleman has anticipated the question as to the amount of space required.

Mr. Bracken: The weight of a sixteen foot car, which is the kind that will be in universal demand, and which we expect to equip, exclusive of passengers, will be about six and one-half tons. The number three car, which is a sixteen foot car, in which Mr. Julian has put a great deal of iron, in order to brace it, weighs nearly seven tons. Our eighteen foot car weighs over eight toes, exclusive of passengers, with the battery, motor and everything else. This car has double trucks, and eight wheels. The weight of the battery is over two tons. A single truck car, like number three car, would weigh about six and one-half tons.

Mr. Edward J. Lawless: There are several gentlemen here, as well as myself, who are very desirous of investigating this question thoroughly, with a view to adopting electricity in our own cities. How many miles—I mean now for actual running purposes—how many miles will one of these storage battery cars run without any recharging?

Mr. Bracken: It depends on the track and grade. I should say on a level road that a battery ought to run forty miles without recharging. The battery contains about sixty or seventy electrical horse power hours, when it is charged, and on a level, with a car of that kind, with an economic motor, such as are now used, it would propel the car on the level with a little over one horse power expenditure per mile. You have so many electrical horse power hours in your battery.

Mr. Lawless: So that a car would have to be charged twice a day in order to do a day's work?

Mr. Bracken: It depends on the number of miles.

Mr. Lawless: The financial result is what we want, principally; can you give me any idea of what the cost of these cars placed on the road, ready for work, how much it will come to?

Mr. Bracken: It ought not to exceed four thousand dollars.

Mr. Lawless: Would that include the duplicate cells?

Mr. Bracken: Two cells, two motors, and the car complete.

Mr. Lawless: How long do you think it would take to recharge one of these cells; suppose we had to take it in, how long would it take to charge the set; that is, to put the car out for the purpose of running again?

Mr. Bracken: Just the time it takes to change the horses; perhaps two minutes.

Mr. Lawless: How long would it take to fully recharge the cells?

Mr. Bracken: About six hours.

Mr. Lawless: How many men would it take to recharge them?

Mr. Bracken: One man in charge of the dynamo; one man in charge of the whole station.

Mr. Lawless: For say an equipment of about twenty or thirty cars, how many generators would you require in the power house to charge the cells?

Mr. Bracken: Eight horse power for each sixteen foot car.

Mr. Lawless: What is the lifetime of the cells?

Mr. Bracken: As to the lifetime of the cells, I would require to answer the question fully. Any man who thinks he knows exactly the lifetime of a battery knows more than I do. There are some men who maintain they do. I do not know, but I can say this, that I know of storage batteries that have been in use over two years, subjected to hard work, that to-day are in service and doing good service. I will instance the Pennsylvania Railroad, to whom we sold batteries on June 28, 1886, and if there is any gentleman who is interested in applying to the Pennsylvania Railroad, they will inform him that these batteries have been in constant use since, two years, and not a single cell exchanged. The executive mansion at Albany is lighted by our batteries; they have there over two hundred lights in Gov. Hill's executive residence, and we are informed by the gentleman in charge, whom I have never seen—entirely disconnected with us—that he has not changed a single cell in that time. I will go further and state that if the batteries will last only six months, as I believe the most skeptical will admit they do—I do not care if they last only three months—it will be cheaper than horses.

Mr. Lawless: What is the cost?

Mr. Bracken: The cells will cost six dollars. It would be dangerous for you to offer less; I might give them to you for four dollars and a half. I believe it requires eight horses to run a car for a day, and you can see for yourself the difference.

Mr. Lawless: Mr. President, what I want to get at is the financial result, in order to be able to report to my company whether it would be a financial success for them to adopt electricity.

Mr. Holmes: I am ready to equip ten lines to-morrow if I can get the right sort of thing to do it with. I want to know fully about it, and all these gentlemen do.

Mr. Hurt, of Washington: I would like to ask the gentleman the cost of renewal of the batteries?

Mr. Bracken: Two men, to whom you will pay a dollar and seventy-five cents or two dollars a day, and two girls and a machine that will cost five hundred dollars, with one-third of the original cost of the battery, will in four days replace the battery. In Camden we pay forty cents a day to the two girls. It is heartless, we know, but then we are trying to protect them all the same. (Laughter.) Say that the cells cost five dollars apiece, the material of your cell, with the exception of the active matter, is never destroyed, and is perfectly good to cast over and remake, and by putting your elements into the solution in four days you can re-produce the battery of the car.

Mr. Keefer, of Ottawa, Canada: The cost of the material in re-production?

Mr. Bracken: It varies; some people buy the lead cheaper at one time than at another; it may be cheap now and next week it may be dear. Assuming, however, that the active material and the lead itself would amount to five cents a pound, for two tons that would be two hundred dollars for the material in the whole battery.

Mr. Richardson, of Brooklyn: Do you use copper?

Mr. Bracken: Nothing but lead; lead is the chief ingredient, ninety-four and one-half per cent.

Mr. Eppley, of Orange: I would like to ask the gentleman what is the cost of the motive power equipment exclusive of the car? He said the car cost four thousand dollars complete. I want to get at the cost of putting the machine under a new car.

Mr. Bracken: I assume the car body costs one thousand dollars; that makes the other equipment three thousand. If you please, I will make one statement more in relation to the Fourth Avenue car. I went over the line in an electric car with an officer of the New York Central road the other day just about dark. This is simply an illustration of the effect it produces. It is lighted with sixteen candle power incandescent lights. We got off at Seventy First street to return to our hotel, and took one of the horse cars with dim, straggling lights, one at either end, and the officer looked about and he said, "Skitt, this will never do; we must have electric lighting." (Laughter.)

Mr. F. J. Sprague: I feel somewhat at a loss in addressing you upon this subject. I do not wish to urge any particular methods of working, except so far as they bear my name. By that I mean I do not present either the storage battery, the overhead or the conduit system alone. Each of these three systems has its merits, and each of the three will succeed, as each of them has its own independent field of work. There are some planes where the cost of each of any two of these systems meet. The experiments which have been carried on during the past year have proved what electricity can do. We have been, possibly by good fortune, perhaps by hard work, somewhat prominent in carrying out these experiments. One year ago to-day we did not have an electric road running in the United States except one car in the East Boston Sugar Refinery. On the second day of last February, the Richmond road, of which I spoke to you at the meeting last year, was opened. This is a road which, whatever its defects, stands to-day somewhat historical in the fact that it is the largest, and the first large successful electric railway in existence. When the contract was made a year and four months ago, not a foot of track had been laid, and we did not know what we had to meet in the grades or curvatures on the road. The specifications did not give the grades with any accuracy and only in a very general way. We took the contract simply because we saw an opportunity to develop on a large scale the possibilities of electric traction by our overhead single wire system. Twelve miles of track, including switches and turnouts, with twenty-nine curves were laid; straight grades were met as high as ten per cent., and grades on curves of forty foot radius as high as seven, eight and nine per cent., giving a straight track equivalent, of at least thirteen per cent. On the second of February the road started, and since then it has made nearly five hundred thousand miles and carried nearly two million passengers. The road is no longer under our control; it has been bought and paid for. The cars have been run as high as eight thousand miles without being sent inside a car shed. This is extraordinary in view of the fact that the cars have no proper care but are for the most part housed in the streets. The motors have been run without any covers on them; they have been run until you could hardly identify a motor, it was so covered with dirt and slime. Yet under all these disadvantages, these motors have, as I said, many of them made records as high as eight thousand miles without even being properly cleaned. The motors which are in use in Richmond were never designed for the work they do. They were designed to operate up to seven or seven and a half horse power, normal capacity. They have been worked up to eleven horse power, an outrageous overloading. A year ago it was not possible, six months ago even, to design an electric motor to meet all the exigencies of street car service. There was not that intimate knowledge of street car service in the possession of electrical engineers to make this possible; and on the other hand, there was not that knowledge of electrical machinery on the part of street car builders to enable them to materially assist us in this matter. There had not been in the early state of this work a car properly constructed, properly braced, with its brake apparatus properly made. Two ways of attaching motors to street cars have been developed, both recognizing the variation of distances and position of car body or truck and the wheels. One was to place a motor on the car, and to yieldingly connect it to the axle. The other was developed by us and constitutes one of the particular features of our system. It is to center the motor upon the driving axle, and to flexibly or yieldingly support the other end from the car body or car truck. This is to allow, of course, the axle to retain its present freedom, and also, when we use a spring, to ease the strain on the gears.

Experience during the past year has taught us much in the matter of detail. It is the details that yet remain to be mastered. That

is only a question of time. We have already spent a hundred and fifty thousand dollars in Richmond, and many thousands in other places. We have on hand some twenty-eight or twenty-nine contracts already. We have several roads in operation now, and will have a large number in operation during the winter. In all of these roads which we are to build, there is not one in the form of an experiment; every one of the twenty-eight or twenty-nine roads are to be paid for in cash or its equivalent and are not put in for advertisement. They are not to be put in to be taken out again; but to do hard every day service, running from ninety to one hundred and twenty or one hundred and twenty five miles a day, with sometimes as high as ninety-five or ninety-six per cent. of the gross working force in use.

So far as the actual cost of operation is concerned, it would vary with the different systems. The actual power expense, the expense in the central station—which includes all depreciation of dynamo machines, engines, all expenses of attendants and of engineers and electricians, the use of oil and waste, and the consumption of coal, in fact, everything in the station, will on a road with a direct system of supply (and it will be about the same thing with a conduit as with the overhead system) not exceed one dollar and a half a day for cars making seventy five, eighty or ninety miles a day. In Richmond a local electric light company supplies the power to the electric railway company at one dollar and sixty cents a day, and they make money. At Harrisburg, with a very much smaller line, with six cars, maximum grades of about six per cent. making about seven or eight hundred miles per day, they run at a consumption ot about one hundred pounds of coal per hour in their central station, making an average of about six or seven horse power per car. In Richmond, the average loads in our central station for the thirty cars in operation, is about five or five and a half horse power.

There have been a good many objections raised against the overhead system, and one of the most frequently asserted objections is that of appearance. This objection is largely brought about by careless construction, and it is simply a question of dollars and cents to get rid of it. It is quite possible to construct an overhead system that will be ornamental. Such will doubtless be the case with the Beacon street road, Boston, which the West End Railroad Company is to build, and which calls for an expenditure five times that of the Richmond road. The road has got to be put up in the best possible manner. We are going to use a wire that has a tensile strength of over one hundred thousand pounds per inch, and we use for our span wires a wire that will practically never break. The trolley wire is of silver bronze. That wire is not liable to come down ; and if, by any accident, a section of it does come down, that goes out of operation, and the rest of the road remains in operation. There will be in the Boston station over four hundred horse power of dynamos and steam engines, and it is our intention to show what is possible on an overhead line on that road. So far as the conduit system is concerned there is no possible question as to its working, having certain abnormal conditions of drainage. The Bentley-Knight people are putting in two to three miles of conduit in Boston, to be in operation this winter, and the street railway people can look to that city this winter for the best possible trial that has ever yet been given to electricity as a motive power. The use of electric railways has been largely confined to milder climates than that of Boston, but our company will have several roads in operation in Northern cities during the winter. Twelve cars in Akron, twenty in Cleveland, twenty in Scranton, twenty in Boston, with at least three more heavy cleaning cars. These are all Northern cities, and the objection against the trial in Richmond, that it proves nothing about winter (which is not so because they have the worst sleet storms there) will be met by the operation of these Northern roads. These roads will prove more to street railway people about the practicability of electricity than all the other roads put together. Our present policy is simply to devote our work to the existing contracts on hand. We do not care for any additional work at this time, but wish to devote ourselves to the necessary detail supervision of every element of our work now in hand, which means either the success or failure of electrical railways in the Northern cities ; and next spring we propose to know all there is to be known about electricity in the winter ; and, of course, next spring we expect to take any contracts that are offered. It seems to me to be the part of wisdom for street railway people generally, to see what these people who are putting in the various systems are going to do in the ice and snow.

Mr. Wason, of Cleveland : I would like to ask Mr. Sprague if any of the officers or directors of the companies he has referred to are connected with the Sprague Electric Motor Company.

Mr. Sprague : I am glad to say in answer to that question, that no man connected with our company, directly or indirectly, is interested in the electric railway company at Richmond. The parties who had that road put in did so on a commercial basis, and paid for it. The transaction was wholly of a business character. The Sprague Electric Motor Railway Company is controlled by three persons : one of them is the President of the Edison Electric Light Company, acting entirely in his individual capacity, the other is myself, and the third is one of the most prominent financial men in the United States. Not one of them has had any interest in any electric road which we put in, or expects to have ; and we do not want them to have any financial interest in it. We do not care to buy testimonials about our work. We are in a position to know as much as anybody can know about electric propulsion. I think I have about me the best force in the United States to-day. It requires trained men to do the work, and it is, in this new business, difficult to get them. So long as they report to us any defects which may exist, and are faithful and loyal to our interests, we will take care that we will get over any troubles which may develop. We are half over a trouble as soon as we know just what it is. One of the troubles you have on an overhead line is the liability of the line being struck by lightning. There has never been to my knowledge, any lightning device that has been entirely successful in diverting lightning strokes until quite recently. We have now got lightning pretty well harnessed. We have had lightning strike the car when the man was operating it ; he simply hears the "click," and sees the spark and that is the end of it. I am perfectly willing to ride on the car in the heaviest thunder storm that was ever known, with our latest devices. The lightning cannot get into the station or into the motor except to go where we wish it ; it is a trouble of the past, and is now entirely remedied.

Mr. McCreery, of Pittsburgh: Will Mr. Sprague say how many cars he intends to run in Boston?

Mr. Sprague: The total length of the line will be about twelve miles, two or three miles of conduit put in by the Bentley-Knight Electric Company, the balance, which is about six or seven miles of double and single track, aggregating ten miles of single track, is to be operated by the overhead line; there will be twenty cars, and three cleaning cars run. The central station, which is at a place called Alston, near the middle of the line, is equipped with over four hundred horse power of engines and dynamos. This is in excess of the needs required for the trial; but the president of the West End Street Railway of Boston is one of the most progressive of street railway presidents; and he is fully confident that electric railway propulsion in some form or another will succeed. The station will be large enough to do the haulage of a good many cars if the road is equipped with electricity, whether it by the conduit, overhead or storage battery system. He will have a station which can handle all the cars that he will need for the service on that line as easily as it will handle the twenty cars with which the experiment is to be made. When you are putting in a dynamo it as easy to make arrangements for a hundred horse power as it is for ten.

Mr. Edward J. Lawless: On September 12th I was in the city of Richmond, and I found that the car houses at either end of the road contained twenty-eight out of the forty cars, which is the full complement of the road, and they were evidently idle. I asked what the reason was, and they said that the motor on the cars burned out. We asked what was the cause of it, and were told that there had been twelve days of very rainy weather. I then went to a point where I could see the cars quite a distance both ways as they came along, and I found that they were running from a quarter of an hour to an hour and a half apart. Now, I should like to ask whether that condition of things occurs often; I should also like to ask what the cost of repairing the motors is after they are burned out, and thus we can get at something practical. I know positively what I assert, that on the day mentioned they were running in the condition mentioned. I do not assert the cars were burned out; I was only told that.

Mr. Sprague: The management of that road has been characterized by the grossest mismanagement. I want to place the responsibility for an accident on electric roads where it belongs. If you have got a cable and some ignorant fellow shoves a spike into it and lays up the system, are you going to blame the cable? And so with the electric railway; if it is run through mud and slush in the street seven inches below the water line, and by so doing the machinery is deranged and the motors are left in the streets uncovered, and not even cleaned in nine months, if anybody is responsible it is the men in charge. No machine will stand this sort of usage. So far as natural and expected depreciation is concerned, this company is amply able and willing to make a reasonable guarantee as to the depreciation on motors where instructions as to their use and care are faithfully and intelligently carried out. They are not to be abused and left in the street and treated as if they were solid iron. To-day there are not less than thirty-eight out of the forty cars ready for operation. We have now got a good careful man there, and he wrote to me the other day that there is no difficulty whatever in maintaining twenty-nine out of thirty in operation; and out of forty cars there should be thirty-six ready for actual operation. I have told you the Richmond machines are overloaded. Nobody knows that better than I do. The machines which are built for seven horse power are obliged to operate up to ten or twelve horse power, and consequently are greatly overloaded. The Richmond motor is only one type of machine to meet one condition of travel. We have now machines whose capacity, working steadily, is thirteen or fourteen horse power, and which may be worked up to eighteen or twenty, and will not only carry the ordinary load in Richmond of twelve or fifteen thousand pounds weight, but will take twenty or thirty thousand pounds up a ten per cent. grade. The new machine is one which can be absolutely and perfectly enclosed, so that it will be water and dust and oil proof. You can not get water into them, and I believe they will run for a month without oiling. But you can not yet take an electric machine through six or eight inches of water with no covering without laying it up. So far as depreciation on machines is concerned, ordinary machine practice is to reckon the wear and tear at ten per cent. a year. I believe I am justified in saying that in the near future the depreciation of an electric machine on a street railway car will be but little more than that of the ordinary steam engine, with equal care and duty, but we prefer to put the figure a little higher now and be on the safe side. A reasonable amount of care and attention will save nine-tenths of any trouble which will happen on an electric car.

Mr. Sinclair, of Galveston : What will it cost?

Mr. Sprague : Ordinarily about one hundred dollars per horse power ; sometimes as low as seventy-five or eighty, according to the conditions of the proposed plant.

Mr. Lawless : I just wished to give the gentleman the result of my investigations, as I have visited several electrical lines for the purpose of seeing what was in them.

Mr. Hendrie, of Detroit : I would like to ask if it is a common occurrence in Richmond to have eighteen men in the repair shops there. I counted that many the day before yesterday.

Mr. Sprague : It ought not to be, but I do not hold myself responsible. If you want to inquire about certain other roads which are prop-

erly managed I shall be glad to refer you to the gentlemen in charge of them.

Mr. Littell, of Louisville: What is the cost of repairs to dynamos?

Mr. Sprague: The depreciation on dynamos not over five per cent. and on motors it ought not to exceed about twelve per cent. We are willing to guarantee it, provided your men will give that ordinary and proper care to the machines which should be given.

Mr. Pratt, of Worcester: When the armatures are burned out from any cause, what does it cost to renew them?

Mr. Sprague: I do not know that I am justified in answering that question; it is a commercial matter and depends on circumstances. Your bill might be fifty dollars, more or less, and certainly would be reasonable.

Mr. Pratt: It is commonly stated that it would cost two hundred dollars.

Mr. Sprague: I will guarantee the depreciation if you will pay me so much and observe ordinary care in the use of the machines. It makes no difference what is deranged, we will keep it in repair. The manufacture of this class of machinery enables us to take out an armature which has burned out and substitute another for it without much loss of time. These things develop, as everything connected with electricity has developed, to more and more perfect work. We are gaining experience every day; and to know what the trouble is is more than half the battle. The motor that is built to stand four or five hundred volts and a ground circuit will be the best for either the storage battery, conduit or overhead systems. The motor that is built to meet all these varied conditions of service, the most arduous conditions as well as the lightest, must eventually be through evolution a practical, hard-headed sort of machine.

The President: The President will say, on behalf of the Association, that we are very gratified to Mr. Sprague for his remarks and the many points and facts of interest to us all which he brought before our attention.

Mr. Robert W. Blackwell, of the Bentley-Knight Electric Railway Company: A year ago I had the pleasure of addressing you at the Philadelphia meeting. I spoke of a good many things then that we would do during the year to come; and we have fulfilled most of them. We were at that time about to run the road at Allegheny City a little over a mile in conduit and about three miles overhead. We have run that road now with two cars since the middle of December. Since the middle of February we have run four cars, and for the last six weeks we have run six cars. That road is doing to-day, I think, the heaviest work done anywhere in the world by electrical motive power. Of the entire length of the road, 60% is in curve and there is a total rise of two hundred and ninety-five feet in 4,900 feet, the steepest grade being twelve and a half per cent. We are using exceptionally powerful motors; the heaviest in the country, there being 30 nominal horse power on every car, and each pair of motors develop at times seventy-five horse power. The road, I think, is subject to the worst conditions of any road in the country. After a storm the water comes running down like a freshet through the side roads and rushes into the conduit; the mud is phenomenal, the pavement is bad, but there has never been a stoppage caused by any defect in motor mechanism or conduit construction. While the road was still in the constructors' hands a fire in the car house destroyed half of the cars, and in consequence the road was not deliverable until the early part of June. Since that time the road has been operated by the Observatory Hill Passenger Railway Co. As to expense I would briefly say that the entire operating cost of the road, including interest upon the investment, is under $65 per day. While I was last in Allegheny the receipts of the line were as follows: Sept. 23, $201; Sept. 24, $116; Sept. 25, $151; Sept. 26, $153. During this period only 5 cars were in operation, some alterations in the power station rendering it impossible to get power for all 6 cars. The average daily mileage of each car was 85 miles. During the four weeks while the road was being operated by the railway company on trial, preparatory to its being accepted from us as contractors, the expense, and receipts for four cars (the original number ordered), were as follows:

WEEK ENDING.	EXPENSE.	RECEIPTS.
May 12	$232.64	$453.60
" 19	227.59	443.90
" 26	245.77	527.90
June 2	213 99	664.40

The two succeeding weeks were as follows:

June 9	$240.99	$600.70
" 16	283 91	601.00

The fact that a number of men were, during these weeks, working on the road-bed, accounts for the difference in the expense column for these weeks.

During the above period the average mileage per car per day was 75 miles.

During the time that we have been working on this road, we have met every possible difficulty, and have met it successfully. The grades and curves are, I think, greater than those anywhere yet operated by a self-propelled motor without aids to traction.

The specialty to which the Bentley Knight Company desires to call your attention is the conduit system.

We have laid the only conduits ever worked successfully, and our desire is to introduce the conduit form of construction upon city roads. Of course we put up elevated conductors as well, and build roads partially overhead and partially conduit. We have successfully met every difficulty from insufficient drainage, floods, mud, crossings of other roads, switches, turnouts, excessive loads and the like. I think it is fair to say that the conduit line at Allegheny City, although short, is a practical solution of the question of the adaptability of electrics to city railway service. We are now laying, as Mr. Sprague has just informed you, a three mile section for the West End Street Railway Company, of Boston. Over that conduit, a section of which we have here for your inspection, will be operated motors supplied by several companies; and upon that road, both the conduit and overhead systems will, I think, receive the best and most thorough test that has ever been made of electrics in their application to city street railway service. These cars will be run in competition, undoubtedly, and will be forced to run against each other, both on the overhead and underground systems. The result of that trial, will, I think, decide the future. There can, probably, be no more thoroughly fair and square test than that afforded by the West End Company.

The cost of conduit ranges from $15,000 to $30,000 per track mile—taking into consideration average cost of drainage and average difficulties—the smaller figure applying to our lesser and the larger to our greater cities, the difference being largely caused by the cost of providing against the strain to which the conduit will be exposed from traffic over the slot, and climatic changes.

We do not object to the overhead system wherever the municipal authorities will tolerate the placing of a network of suspended wires. As the cost of elevated conductors should not exceed, at most, $3,000 per double mile of track, that system can be advantageously laid where the cost of conduit would preclude its adoption. As is now done at Allegheny city, elevated wires in the suburbs are a most effective supplement to a conduit system in the paved and sewered streets of a city. The tendency to the cheapest forms of construction where suspended wires are used, is however, to be greatly deprecated and much trouble and uncertainty of operation has been caused by the employment of the cheapest design, material and labor to the general damage of electrics in the eyes of practical men.

I have not mentioned our dynamos, motors and mechanical constructions as applied to the equipment of the cars themselves. All that is good, reliable and efficient is claimed by every electric man for his own particular plant. What has been said by the other gentleman applies therefore to what my company furnishes. We, as well as the others, have the best of everything, and in support of that statement, refer to what we are now doing and to the work laid out for us in the coming year. During the coming winter there will be, not only in Boston, but in Allegheny, and possibly in New York, a thoroughly good, careful test of exactly how an electrical conduit system will work during the winter months; and in each place where it is to be constructed, the difficulties are such that their solution will meet the requirements of every road there is in the United States.

Mr. Richardson, of Brooklyn: Where will the conduit system be seen in New York?

Mr. Blackwell: During the last week arrangements have been entered into between the company that has been trying to put a road through Fulton street, New York, and the opposing company, and at last an agreement has been signed, as I understand, which places the Fulton street line in a position where it can construct half of its road from Broadway to Fulton Ferry at once. I will say that the material for that line was prepared a year ago; and we have endeavored constantly to get the matter in some position where the road could be built. We understand now that half of the line can be built before the middle of November. The cars will probably not be delivered till the month following.

In closing, I would say that there are many motors to-day offered to you by many companies, and that in selecting an electrical machine, the same care, scientific and mechanical, should be taken as is taken in the selection of any other machine for the application of power.

Price is a poor criterion, the cheapest is rarely the best, and furthermore the extraordinary attempts now made by the electric companies to underbid each other and get work on whatever terms, lead to all kinds of disastrous results, not only to the seller, but to the buyer as well.

There is another fact that we have to meet, and that is, that while the electric motor car takes the place, not only of the present car but of the horses as well, it only gets the care that is now given to the car, and none of the care that is given to the horses. Now you cannot expect a mechanical thing to run well and successfully, unless it is well taken care of, and unless the same care and attention is given to it as is given to other machinery. Somebody must take care of all mechanical things; somebody must keep the mechanism in good and proper shape, and unless so kept up, it will be a dismal failure.

Mr. Thomas C. Barr, President of the People's Passenger Railway Company, Philadelphia: I desire to state for the benefit of the gentlemen present, on the storage battery question, that we experimented with a car so operated on our road over about four miles of track for at least two months. The car was run sixteen miles a day; it was erated in the afternoon. It was a twenty-two foot car, weighing in the aggregate, trucks, batteries, car and all, fourteen thousand eight hundred pounds, of which four thousand eight hundred pounds was the weight of the batteries This car was operated and managed by the Electric Car Company of America. In order to get the best results, and as we anticipated introducing electricity as a motive power on our line, it was necessary to give the experiment a full opportunity for success, to relay our line, which we constructed with girder-rail, crossties every two and a half feet; a construction that would practically carry from fifteen to twenty tons weight. The car would seat thirty-four passengers, and would carry crowded one hundred and twenty-five, so that the aggregate weight when the car was crowded would be in the neighborhood of thirty thousand pounds, possibly more. As I said, we ran the car two months, and it was very satisfactory. The car ran smoothly and nicely; and it moved off gently and firmly after a stop without any jerky movement of any kind that would be noticed by any of the passengers. The car was taken off only by reason of the fact that a large sewer was being constructed through the central part of our street, causing us to run over a siding, and we were afraid the weight of car would interfere with the work.

As to the cost of operating that car, we can not give that to you satisfactorily, by reason of the fact that the power for charging the batteries was leased at a high figure. It took three and a half hours to charge a battery which operated the car for sixteen miles. We would roughly estimate it at possibly a cost of fifty or sixty cents for the sixteen miles, taking eighty miles as the day's work for the car; with eighteen hours work for our men, it would make the cost of operating that car for a day in the neighborhood of

nine dollars; but I presume we could reduce that materially by operating our whole line with electric cars. The nine dollars would, of course, include the wages of our men as well as the cost of charging the batteries. We found that the car ran so smoothly that a high rate of speed could be attained and not be noticed by those on the street or by passengers. This car was operated on a level, there being no grades on our road; we had, of course, some four curves at the terminus of the road which the car ran around without any difficulty at all. The same car was operated in the works of the electrical company with one charge some sixty-three miles. This, of course, was very satisfactory when you take into consideration the character of the car, weighing, as it does, some fifteen thousand pounds. In operating the car over your road, where it is necessary to stop at almost every crossing, you will find that the power necessary to start that car at every crossing is wasted to a great extent; in other words, you can operate the car over a level, without stops, at practically about ten or fifteen per cent. expenditure of your power, but when you come to each crossing, and have to stop and start continually, the expenditure of your power will run up in the neighborhood of eighty or ninety per cent. This not only wastes the power, but causes a great strain on your motors as well. Taking it in all, the experiment was very satisfactory as far as the operation of the car was concerned. We have looked into the matter very thoroughly, and have determined that in order to operate a street railway line with electricity, it is necessary to have each car separate and independent of the others in order to get the best results. We have devoted our attention to the storage or secondary battery system. We are wating until such developments are made that the system is brought down to such a point that it will be financially practicable to equip our line. The only difficulty that stands in the way at present is the actual cost of the cars with the storage battery cells and the cost of constructing the road; and I have no doubt that in a very short time this system will be brought down to such a point that a car much less in weight can be operated by a battery, so that the cars can be operated over our present construction, thereby saving that expense, and also save the expense of the storage batteries, which, unfortunately, are controlled by companies which ask a royalty or percentage, and which makes the cost so high that it practically makes your car cost more than you want to put into a plant of that kind. I can say to the gentlemen of the convention that I think the day is not far distant when the storage battery will be a thing of the past, and the primary battery will be in practical operation, reducing the weight one third and the cost proportionately; and thus enable us to run our cars without re-construction of the roads and at less expense. I will be pleased to give any gentleman information who may ask me if I can.

Mr. George W. Mansfield, of the Thomson-Houston Electric Company: Mr. President and Gentlemen of the Association—I know that it is rapidly approaching the hungry man's dinner hour; and I think that the merits of the Thomson Houston system in incandescent and arc lighting, stationary motors and the new railway line are so well appreciated and being so thoroughly recognized by all, that any lengthy remarks that I might make here would be unnecessary. I would, however, like to state one or two facts, one or two matters which I think would be of interest, and that is, first and foremost, that we invite the most accurate and minute inspection of all the street railway men at this gathering or in this country to our system. There is nothing covered up, there is nothing to be hidden, and there is no secret about it which we do not want you all to possess. We clearly recognize that to have our system adopted by the street railway men they must first know about it, and they can only know by thoroughly investigating and knowing all that is possible to learn. For my part I should prefer to have every street railway manager or superintendent an electrician; and I agree with Mr. Blackwell in his remarks that the electrical motor, as a mechanical construction, must have care and supervision, and must have intelligent inspection. They cannot run covered with slime and grease; they cannot run where moisture is prevalent, and where the rain is going to beat down upon them and flood them, and they cannot run under a great many other circumstances, which many street railway men suppose they can run under. We have here in Washington, running from Seventh street out to the boundary line and then beyond to Eckington, about two miles of road. Upon that road is exemplified most of the details of our system, our truck, with its mode of suspension of the motor, this motor being one with the truck and suspended from the car, the form of the motor, the form of the gearing, the contact, the armature, the brush-holder and the brushes themselves, and the manner of controlling and covering the motors, all of which are pertinent points that every one of you gentlemen must familiarize yourself with before you can intelligently select an electric motor for your roads. Upon this road you will see two cars running. We did not intend originally to hurry the line through so rapidly, but to take proper time and adjust everything carefully, but due to solicitations we have pushed matters, and now, as I say, we have two cars in operation on the line.

Regarding the overhead work—and it is entirely constructed with the overhead system—I would say that the three methods most generally in use are there shown. One method which exists there has not been applied in any other city in the United States, to my knowledge; and one that is destined to take a prominent position in the construction of overhead lines in large cities; and that is the location of the poles in the center of the street, it being a two track system. New York Avenue is broad, and, therefore, this method is permissible. Along through a cut just beyond the boundary is what we call the "bracket method;" that is, one pole over the side of the street and arms extending from that pole. Further out is what we call the cross suspension. In this method, the poles are upon both sides of the street, with the wires reaching across. If you give this road your careful inspection, you will see there these three methods exemplified. We would like to call your attention to our commutators and our cone insulators; also to our attachment of the car to the top of the conductor, so that it allows a perfectly smooth and free surface of the under side of the wire for the trolley wheels to roll upon. We would like to call your attention to our tracks for cross-overs and our curve tracks.

I note that the electricians and electrical constructors of different companies are sometimes prone to offer apologies and excuses, and say we are not quite ready and have not got everything done; but we are going to do such and such a thing, and are going to do this and that. We have done in the limited time which the United States Senate would allow to us, we feel, a fairly creditable amount of work. This line, it must be remembered, was put up under some opposition. There was a law framed by the District Commissioners that no more wires should be put up after a certain day. This law bothered us a good deal, and we have had to push around very lively to get our overhead work up before the expiration of this date. But we succeeded in accomplishing our object, and two cars are now running, and we invite your careful inspection of the same. Before taking my seat, I would like to ask one other favor of the street railway men; and that is, that the electricians do not know today all there is to be known in regard to street railway management and street railway requirements; and, on our side of the house, we would like to ask a question of you; we would like to have your hearty co-operation; we would like to hear from you every time we can. In that way the Thomson-Houston Company feel that they can build what you require, and will construct apparatus that will meet your wants quicker and better than to go along thinking that they know it all, and that they can manage a street railway as well as you. Trusting that we shall have the pleasure of seeing you at the road this afternoon, I will take my seat, unless there is some question that you would like to ask in regard to the Thomson-Houston system.

Mr. Sinclair, of Galveston: I would like to hear from the gentleman in regard to the relative danger or safety of the system, in regard to accidents to passengers. I ask that question for the reason that I believe that was the Van-Depoele system originally.

Mr. Mansfield: The single connection of our system, as put forth to-day, with the VanDepoele system is, that the Thomson-Houston Company purchased all Mr. VanDepoele's electric railway patents, and they have the service of that ingenious and practical man. While the system which we put forward embodies a great many of his ingenious points and ideas, and which are protected by his patents, yet the motors, the method of suspension, and a great deal of the other work is done purely and entirely on the Thomson-Houston system and principles.

Mr. Sinclair: I ask the question for this reason: I am told that the road at Montgomery, Alabama, has had a number of serious accidents resulting from the electrical conductors.

Mr. Mansfield: That road was built by Mr. VanDepoele before the Thomson Houston Company decided to go into the field. They have absolutely no connection with the road, and the question of danger cannot be thrown upon their system any more than on any other. I presume the only danger you had reference to was the liability of the construction wire to fall or roll off, or something of that kind; or possibly the question of shocks from the potential used in a very heavy conductor. The potential which we have used varies; in some instances it is four hundred, and in some cases six hundred volts; it usually averages about four hundred and fifty. That question was very carefully considered, and gone into in detail by the Committee appointed by the United States Senate; and that Committee decided that the Thomson-Houston system was not dangerous at all; and, therefore, granted the permit to put it up. In regard to the only accident which I have ever heard of, personally, occurring at Montgomery, I believe it was caused by the falling of some wire, telegraph wire or something of that kind, which came in contact with the overhead wire of the railway, and then a portion of it fell to the ground; and some man drove his horse upon the wire, and the horse received a shock. But we protect our wires by means of guard rails, so that any falling wire cannot touch the conductor; and our methods of construction are so well known and are so practical, that no one need have any accident. The Thomson Houston Company means to do what is right and safe.

Mr. Francis M. Eppley, of Orange, N. J., called the attention of street railway men who were contemplating the erection of electric railway lines, whether overhead or conduit, to the rights of adjoining property owners who had easements in the streets; and that trouble might be caused to the companies, unless these matters were attended to beforehand. He cited the cases of Story vs. The New York Elevated Railroad Co., and Lahr *vs.* The Metropolitan Elevated Railroad Company, both decided in the New York Court of Appeals, and which showed that adjoining property owners had rights in the streets.

A discussion took place as to the best method of preventing cars from sliding on grades.

Mr. Lawless, of Kansas City, thought there was nothing more reliable than a man with a bucket of sand, to sand the hill as often as was necessary for safety.

Mr. Small, of Jersey City, described an auxiliary brake which he had in operation, in conjunction with an additional rail in the center of the track. As soon as the car should begin to slide, this brake could be applied, and would act in the manner of a wedge, and the car would be stopped.

Mr. King, of Springfield, Mass., described a similar arrangement in use on his road, and stated that in addition each car in moist weather was supplied with a pail of sand on the front platform; and, in his judgment everything depended upon the prompt use of sand.

The question of the admission of supply dealers to associate membership in the Association was discussed at great length; and the vote resulted in 44 in opposition, and 12 in favor: each company being entitled to one vote.

Votes of thanks were extended to the retiring President, Mr. Charles B. Holmes, and to the Secretary, Mr. William J. Richardson, re-elected.

The Washington Street Railway Companies

were thanked for their great hospitality, as evinced in the manner in which the delegates had been entertained.

The next meeting will be held in Minneapolis, Minn., the third Wednesday in October, 1889.

Officers for 1888-9.

President, George P. Kerper, Cincinnati, O.; 1st Vice-President, Jesse Metcalf, Providence, R. I.; 2nd Vice-President, Henry Hurt, Washington, D. C.; 3d Vice-President, W. H. Martin, San Francisco, Cal.; Secretary and Treasurer, William J. Richardson, Brooklyn.

Executive Committee.

Charles B. Holmes, Chicago, Ill.; John Scullin, St. Louis, Mo.; J. H. Johnston, Savannah, Ga.; Henry A. Sage, Easton, Pa., Edward J. Lawless, Kansas City, Mo.

The Banquet.

As is customary, the proceedings of the Washington Convention closed with a magnificent banquet at Willard's Hotel, on Thursday evening, October 18. There was a numerous attendance of ladies on this occasion. The fair sex did not attend the meetings of the Association, and their presence at the banquet added much charm and enchantment to the festive gathering. The evergreens and flowers were abundant and elegant, and a full band discoursed musical harmony.

Ladies at the Banquet.

We are not able to give the names of all the ladies attending the banquet; the following were recognized:

Mrs. E. C. Peters, Atlanta; Mrs. Horace B. Rogers, Brockton, Mass.; Mrs. C. B. Holmes, Chicago; Mrs. George B. Kerper, Cincinnati; Mrs. H. A. Sage, Easton; Miss Frayzer, Memphis; Mrs. William Richardson, Mrs. William J. Richardson, Miss Louisa Richardson, Brooklyn; Mrs. George W. Linch, New York; Mrs. Geo. S. Hart, New York; Hon. Mrs. James Hyatt, Norwalk, Conn.; Mrs. Thomas C. Barr, Philadelphia; Mrs. Charles Atwell, Mrs. James C. Cotton, Pittsburg; Miss Bull, Quincy, Ill.; Miss Clegg, Dayton, O.; Mrs. J. L. Douglass, Reading, Pa.; Mrs. C. C. Woodworth, Rochester; Mrs. and Miss Wyard, Orange, N. J.; Mrs. W. L. Johnson, St. Louis; Mrs. Henry Hurt, Washington; Miss Lanius, York, Pa.; Mrs. J N Reynolds.

Absent friends take interest in reading the list of eatables and drinkables enjoyed by the delegates, etc. Therefore we here give the

MENU.

BLUE POINTS.
GREEN TURTLE AU QUENELLES.
BROILED SPANISH MACKEREL, ANCHOVY BUTTER.
POTATOES A LA DUCHESSE. *Sauterne.*
CUCUMBERS, OLIVES, CELERY, TOMATOES.
Chateau Margeaux.
BOILED CAPON, Sauce Supreme. ASPARAGUS ON TOAST.
DIAMOND BACK TERRAPIN, A LA MARYLAND.
FILET OF BEEF, A LA FINANCIERE.
SADDLE OF MUTTON, Jelly Sauce, YOUNG TURKEY, Chestnut Dressing, FRENCH PEAS, BAKED MASHED POTATOES.
ORANGE SORBET AU NATURAL.
RED HEAD DUCK. BROILED PLOVER.
FRIED HOMINY. DRESSED LETTUCE.
CHICKEN SALAD.
Mumm's Extra Dry.
CHARLOTTE RUSSE AU CHARTREUSE, CHAMPAGNE JELLY.
ASSORTED FANCY CAKES. NEAPOLITAN ICE CREAM.
EDAM. WATER CRACKERS. ROQUEFORT.
FRUIT. COFFEE. COGNAC. CIGARS. LIQUEURS.

TOASTS.

Greeting.

1. A Welcome to the Ladies. "Oh Woman, lovely Woman, nature made you to temper man; we had been brutes without you."

President Charles B. Holmes responded: He felt it a great privilege, on behalf of the American Street Railway Association, to welcome one and all to the festive gathering. "It is not good for man to be alone," and he emphasized his welcome to the ladies on that their first occasion to appear at the banqueting board of the Association. The influence of womanly presence is akin to the command, "Peace, be still."

2. Washington. Name revered by every true American. Fair city; guardian of our liberty and honor; Crown Jewels of the Republic.

Mr. William B. Webb said: "This city is worthy of the great name it bears. Its progress has been phenomenal during the last decade—due, in a great measure, to street railways, which are managed by such patient and saintly men as Hurt, Willard, White, etc."

3. Corporations. Their duties to the people, and the people's indebtedness to them.

The Hon. G. Hilton Scribner was to have responded to this toast, but he was "detained." The Hon. R. Dudley Frayzer, Memphis, "filled the bill," and made a string of humorous allusions to the "soulless corporations", who had built the Brooklyn Bridge, established the National Bank, held a street railway employees' day at Cincinnati, opened the Holmes Libraries, etc.

4. The Press. The greatest blessing and the deadliest bane of modern society.

Mr. Stillson Hutchins, editor of the Washington *Post*, responded in a happy vein. The press "is no classical chestnut," he said. It is seen to best advantage from a distance, the same as we should look at a statue. Great responsibility rests on those who conduct the newspaper press. The editor guides public opinion; and yet, if he would keep afloat, he must often allow himself to be carried by the tide of public opinion. For instance, if a cry is raised against bob-tail cars, a popular newspaper must take up his cue at once, and pile up the horrors connected with bob-tail cars (laughter).

5. Street Railways. Their past and their future. Reflections, criticisms and suggestions thereon.

Col. Thomas Lowry, Minneapolis, responded to this toast, and wound up a pleasant address, illustrating the troubles of street railway managers with the well-known epitaph of the dead man, who said:

Beneath this stone my wife and I,
Back to back, together lie,
More blessed than, when in life's short space,
We lied like others, face to face;
Now free from trouble, free from fear,
If she should scold, I could not hear.
When the last trump the air shall fill,
If she gets up, then I'll lie still.

Col. Lowry drew out roars of laughter by his reading of the following:

Lament from Walnut Hills.

I am dying, mother, dying.
My life has run its course;
I have pleurisy and neuralgia,
I've diphtheria and I'm hoarse.
Each disease that flesh is heir to
My frame with anguish jars,
I've caught my death o' cold, mother,
In Kerper's open cars.

I am dying, mother, dying,
For I rode on Kerper's cable;
I have rheumatism in every joint,
To move I am quite unable.
The rain came down in streams, mother,
You should have seen it pour;
But Kerper ran open cars, mother,
For they carry a few fares more.

I have been in the Arctic zone, mother,
Through the coldest seasons there;
I have spent ten seasons south, mother,
In the yellow fever's lair.
I've never quailed in face of death,
I was counted bold and brave,
But Kerper's "pneumonia cars," mother,
Have brought me to my grave.

Please say a prayer each night, mother,
For the dwellers on Walnut Hills;
'Twill not be a very long time, mother,
Before all have malaria chills.
It is only a question of time, mother,
When each one, near or far,
Will catch his death o' cold, mother,
In Kerper's pneumonia car. —V. M. A.

Walnut Hills, Sept. 29, 1888.

6. "Sand on the Track" was a special toast very humorously handled by Mr. Winfield Smith, Milwaukee. He said no man can be successful in street railway business without a good deal of "sand," without which he might as well stop at home and fold his arms. Mr. Smith availed himself of the opportunity to make renewed thrusts at the oppressions of street railway companies, and showed that he himself is well supplied with "sand."

7. Our President-Elect, was the final toast of the evening. Col. George B. Kerper responded, out of the tremendous bigness of his heart, and concluded with the following acrostic:—

Kerper's Blessing.

God reigns supreme o'er all the earth,
Ev'ry blessing He doth disperse.
Oh, may a thousand be for you,
Radiant as the sun, so true;
Given by His own right hand,
Evil durst not show her brand.

Kind and affectionate though you be,
Evil thoughts may oft tempt thee;
Remember, then, there's One above;
Place in Him your trust and love.
Even when all friends have gone,
Read His word, and still hope on.

Floral Street Car.

The banqueters had a special object to look at on this occasion. On a table in the middle of the banqueting hall stood a perfect imitation floral car, with horses, conductor, driver and fourteen passengers (in the form of little dolls) all complete. One horse was black; the other was a white one. The car was numbered "18"; on the top sign board was "Navy Yard, Capitol and Treasury," and on the lower sign board was "Washington & Georgetown RR." The words, "Johnson Girder Rail," in purple immortelles, were elegantly worked in the ground on each side of the car, and alongside of the rails on which the car stood, the said ground being composed of white Cape (of Good Hope) flowers. All the flowers were from the Cape, and the pink, black, green and white were worked together in such a manner as to imitate a variously colored car to perfection. Nine dollars' worth of pins were used in the construction of the car and its adornments. The whole cost was understood to be $150. It was constructed by John N. Small & Sons, florists, Washington, to the order of Major Evans, of the Johnson Steel Street Rail Co. At the close of the banquet, Mr. O. G. Staples (proprietor of Willard's Hotel) presented it to President Charles Butler Holmes, Chicago.

The Excursions.

It is the custom of the American Street Railway Association, at each annual gathering, to devote the third day to visiting places of interest. In addition to that, this time, the delegates and friends visited the Soldiers' Home, in carriages provided by the street railway men of Washington, and drove round the charming territory now being built up to the northwest of the city. This was on Wednesday afternoon (the first day) between the morning and evening sessions. On Friday the delegates and friends responded, almost unanimously, to the invitation of Mr. Hurt and his friends to visit Mt. Vernon in the steamer "W. W. Corcoran." The weather was splendid; the scenery was charming; and the old home, as well as the final resting place, of George Washington (great in peace, great in war, and great in the hearts of his countrymen) excited keen interest and loving admiration in the breasts of the guests of the day. On the return journey a long halt was made at Marshall Hall, to partake of luncheon (for which Mr. Holmes returned thanks in a most elegant speech) and to dance, make impromptu speeches and enjoy the country. The understanding was that the visitors should return to the city early in the afternoon, but the time passed merrily, and it was half past seven in the evening before Willard's Hotel was reached. The full moon rose while the steamer and its merry cargo glided along the Potomac, and colored the scenery a beautiful red. "Oh, how elegant!" was the exclamation of all beholders.

This was unanimously declared the best part of the Convention. The Executive Committee had complained that the approaching Presidential election had a depressing effect on street railway business, and the ardor of the delegates was somewhat damped, and the proceedings generally were less vivacious than those of last and previous years. But the excursion to Mt. Vernon, and its accompaniments, fully made up

for any defects in the regular proceedings. Without it there would have been some degree of disappointment. With it the Washington Convention was a pleasant success.

The Street Railway Exhibition.

Next to the attendance of ladies, the exhibition of street railway appliances, etc., was the most interesting new feature connected with the Seventh Annual Meeting of the American Street Railway Association. The holding of such exhibition, directly under the auspices of the association, was advocated by the GAZETTE, and only the GAZETTE. Exhibitors expressed their appreciation thereof. All the allotted spaces were occupied, and more also, Mr. Hurt turned none away, and secured spaces for late applicants in the lobbies and entrance of Willard Hall, where the exhibition was held.

Being anxious to avoid even the appearance of partiality, we here record the list of exhibitors alphabetically;—

THE ADAMS & WESTLAKE CO., Chicago, exhibited various styles of their lamps, etc.

FRANK H. ANDREWS, New York, exhibited wheels, springs and castings.

ARMINGTON & SIMS, Providence, R. I., were represented by their general manager, Mr. Gardiner C. Sims.

THE BAKER HEATER CO., 556 West 34th St., New York, introduced their heating apparatus.

THE BALDWIN LOCOMOTIVE WORKS' exhibit, in charge of Mr. Frederick Woollven, consisted of a very neat, pretty and compact noiseless steam motor of their six-wheeled type, and attracted a great deal of attention. It was the desire of the Baldwin Locomotive Works to run this motor under steam while on exhibition, but the charter of the Washington & Georgetown Railroad Company, of whom permission was asked, forbids the use of other than horse-power. The fact, however, that thirty of these motors are in daily use in Brooklyn, and a similar number in Kansas City, about twenty in Birmingham, as well as many in some of the principal cities throughout the Union, is sufficient to attest to their satisfactory operation, and to sustain the well-earned reputation of this firm. The motor referred to was shipped to Augusta to be exhibited together with a very fine passenger locomotive, at the Augusta National Exposition.

THE BALTIMORE CAR WHEEL COMPANY exhibited a running gear for a cable or electric motor car, and a gear for a cable or electric combination car. They were represented by their secretary, Mr. J. Paul Baker, and Mr. John S. Pugh. President W. S. G. Baker was there also

E. BEADLE, New York, showed his car mats.

T. L. BEAMAN, Knoxville, Tenn., exhibited various styles of his fare boxes and safety chutes.

THE BEMIS CAR BOX CO. were represented by F. T. Pullen and Chas. G. Stearns.

THE J. G. BRILL COMPANY, Philadelphia, concluded to place their exhibit of an arrangement to prevent the pitching of cars, in Willard Hall, with the rest of the exhibits, and not in a parlor (as intimated in our last issue). They had also a model of their patent independent rigid trucks. Mr. John A. Brill was in attendance, as well as Mr. J. A. Hanna. Three of the Brill cars were running on the new electric road, the Eckington and Soldiers' Home Railway.

THE BENTLEY-KNIGHT ELECTRIC RY. CO. were represented by Mr. R. W. Blackwell, who addressed the convention as reported in the proceedings. They distributed neat little pamphlets (Nos. 1, 2 and 3) on "electric street railways," "storage-battery system *versus* the direct system," and "the Observatory Hill Passenger Railway." Mr. J. L. Blackwell was also present.

THE BROOKLYN RAILWAY SUPPLY CO., of 90 Chambers St., New York City, had a very attractive exhibition of snow plows, snow and street sweepers, and automatic switches. We noticed that Mr. E. P. Millett, their representative, was taking a good many orders for the Swem switch, the "Boss" and "Walkaway" snow plows, and the two-horse four-wheel snow sweeper, which is something of a novelty for street railways.

C. H. BROWN, Syracuse, showed his car starter.

THE BROWNELL & WIGHT CAR CO., St. Louis, exhibited an armless reversible seat; also a car truck, etc.

THE CAMBRIA IRON CO. exhibited specimens of their rails.

THE CANDEE JOURNAL BEARING CO., 13 Dey Street, New York, and 302 Walnut Street, Philadelphia, were represented by Pres. Lance and Vice Pres Candee. Their prospectus (in pamphlet form) was distributed, containing a description with history of Mr. Candee's invention, with testimonials, etc.

J. P. CLASPEY'S automatic fare-box attachment was brought to the Convention by Supt. E. C. Peters, Atlanta St. RR. Co.

THE DAVID B. CROCKETT CO. Bridgeport, Conn. (and 84 William St., New York), were represented by Mr. Lane (who gained the name of Drum Major at Marshall Hall).

J. W. DAVIS & CO., New York, exhibited their snow plow and scraper.

AUGUSTUS DAY, Detroit, was there with his track cleaners and snow plows literature. Many of his friends (and all who deal with him become friends) shook him heartily by the hand.

DORNER & DUTTON, Cleveland, exhibited their wheels, transfer tables, stable gutters (graded), track cleaners, rope traces, etc.

THE DUPLEX SUPPLY CO, Norwalk, Conn., showed specimens of their registers.

W. L. EVERIT, New Haven, Conn., exhibited his street car floor, which is highly spoken of by those who have tried it. Also his remedies for the ills that horses are heir to.

FROST & PETERSEN, New York, represented by Mr. W. P. Seguine, made an attractive display of ceiling and panel work.

THE HALE & KILBURN MFG. CO., were represented by Mr. George F. Small. They were late in applying for space, so were located in the hallway between the hotel and the exhibition hall, and right in front of the entrance to Lewis and Fowler's exhibition apartment. Their seats, etc., attracted special attention.

HATHAWAY & ROBISON, Cleveland, held forth the merits of their well-known transfer table.

THE JOHNSON STEEL STREET RAIL CO. were represented by their New York agent, Major H. C. Evans (formerly at Boston) and Mr. Daniel Coolidge, Philadelphia. They exhibited various sections of rails, showing their bulb chair, also the joint chair which goes on a cross-tie directly under the joints; the joints being supported by slice bars, such as are used for steam track construction. They also exhibited a transfer table, as well as their new style of ball turn table. And their automatic switch attracted crowds of inspectors.

THE JUDSON AUTOMATIC RY. CO. exhibited a model.

THE JULIEN ELECTRIC TRACTION CO., New York, were represented by their managing director, Wm. Bracken; electrical engineer, C. O. Mailloux, and mechanical engineer, Hy. G. Morris. A pamphlet explaining the merits of the Julien system was freely distributed.

HORACE A. KEEFER, Kansas City, exhibited Price's improved fare box and specimens of the Providence girder rail.

THE LACLEDE CAR CO., St. Louis, were represented (as usual) by Mr. Sutton. They did not send a car to the exhibition as the time was too short.

LANCE SONS, 4724 Germantown Ave., Philadelphia, exhibited their scraper mat or flooring for street cars, and distributed handbills explaining its merits, etc

THE LEIB LUBRICATING CO., Buffalo, were represented by Mr. Sutor, who furnished strong testimonials in favor of their "Dux" journal grease.

THE LEWIS AND FOWLER MNFG. CO., Brooklyn, exhibited the J. W. Fowler's special brake; also changing slides, Slawson's change box, Van Tassell's patent brake rod, sash and blind springs, stove pipe rings and blocks for car roofs, door sheaves, seat back castings, door catches, sash holders, handles, hinges, gongs, lamps and burners, chimneys, match strikers, brackets, trimmings, rubber treads, strap guides, brooms, coupling pins, conductors' caps and buttons, etc., all placed in convenient positions in a little room close to the exhibition hall. Outside the hall (in front) was a street car of their building, for the East Cleveland RR. Co. President J. W. Fowler, with Messrs. Packard and Simpson, were in attendance.

H. H. LITTELL'S track scrapers were in great demand.

C. MAHON, Washington, showed a device for preventing accidents on street railways.

RUFUS MARTIN, New York, was represented by Mr. O. W. Griffith, and exhibited tickets, coupon books, etc.

MILTON I. MASSON, 365 Avenue A, New York, exhibited Slawson's fare box.

J. D. MILLER, Washington, exhibited his draw bar and draft attachment for horse cars.

MORRIS, LITTLE & SON, Brooklyn, had a series of shelves on the southeast corner of the stage, on which were placed samples of Little's "soluble phenyle," etc.

THE NATIONAL BRAKE-BLOCK COMPANY, 524 Twelfth St., Washington, D. C., showed specimens of their brake shoes for street cars.

A. W. NITSCH, 68 Wall Street, New York, exhibited his German and Dutch peat moss stable bedding at the front of Willard Hall. This moss is said to be conducive to improve health and longevity.

THE PECKHAM STREET CAR WHEEL AND AXLE CO., 239 Broadway, New York, were represented by Pres. E. Peckham, Mr. Geo. L. Fowler and Mr. F. T. Lerned (their general agent in the Middle and Western States). The Peckham wheels and axles have been fully described in previous issues of the GAZETTE.

B. C. POLE, 310 Chestnut Street, Philadelphia, exhibited his street car motor energizer in the Kellog building adjoining Willard Hall. Our readers may expect to hear more of the B. C. Pole inventions in the near future.

POMEROY & FISCHER 30 Frankfort Street, New York, had a prominent stand on which were placed samples of their famous varnishes and colors, including Nobles & Hoare's celebrated English varnishes (for which P. & F. are sole agents in the U. S.) The obliging Mr. Joseph Pomeroy was in attendance.

H. K. PORTER & CO., Pittsburgh, were represented by their Mr. Thos. W. Bell, who, while at the convention, received a telegram ordering two locomotives for Japan.

POST & CO., Cincinnati, were represented by Mr. Jos. Leidenger. Their exhibit attracted much attention.

PRATT & LETCHWORTH, Buffalo, exhibited several styles of hames.

THE PROVIDENCE GIRDER RAIL CO. exhibited specimens of their rail, and were represented by their president, Mr. Gardiner C. Sims, as well as their western agent, Mr. Horace A. Keefer, Kansas City.

PULLMAN'S PALACE CAR CO. exhibited a couple of extremely handsome cars, a description of which appeared in a letter from them, published among our exhibition list in the September GAZETTE. The combination cable car was the object of universal admiration; it was simply splendid. The 16 ft. closed car was indeed elegant, eclipsing anything of the kind seen before. There was also an interesting Pullman exhibit inside Willard Hall—a model of one of their car trucks on the Pennsylvania R. R.

THE RAILWAY REGISTER MANUFACTURING CO., New York, were represented by Messrs. E. Beadle and John Courtney.

THE RAILWAY REGISTER CO.'S register was there, in accordance with Major Blodgett's declaration months before.

THE RIES ELECTRIC RAILWAY AND TRACTION INCREASING SYSTEM, of Baltimore, Md, was represented by Messrs. Elias E. Ries and A. H. Henderson, of Baltimore, Md., who exhibited a complete working model of their electric traction-increasing apparatus for street railway motors. Probably none of the many exhibits in Willard Hall attracted so much attention as this, or made a more favorable impression upon the delegates in attendance. Many of the railway men who came to the convention with little or no faith in electricity, were entirely converted after witnessing the almost incredible performance of one of the motor cars ascending grades of 40 to 45 per cent. on a smooth and slippery track, with no other adhesion than that produced between the driving wheels and track by electro-magnetism, and several afterward expressed themselves as ready to believe anything of electricity. The electric brake for motor and street cars shown in connection with this exhibit, likewise proved to

be a very valuable feature, and the almost instantaneous, yet gradual stoppage of the car while rapidly descending a steep grade, by its means, was quite a revelation to all who witnessed it. This feature is applicable to cable as well as electric roads, and Messrs. Ries and Henderson expect shortly to apply it to cars on several prominent lines of railway.

The John A. Roebling's Sons, Trenton, N. J., exhibited models of cables manufactured by them (under the Seale patent), and such as they have supplied to all the cable railway companies, with only one exception.

W. Ruoff, 131 Green street, Philadelphia, had his jack-screw in a prominent corner.

The Sprague Electric Ry. and Motor Co. New York, whose headquarters for the occasion were on the main floor of Willard's Hotel, had an interesting exhibit in front of Willard Hall, consisting of a Sprague street car motor (type 2, size 1) which was inspected by many beside the delegates. Mr. F. J. Sprague, whose interesting address before the Convention is fully reported in the proceedings, gave an explanatory address on this motor outside also. Mr. H. McL. Harding was in attendance, together with Messrs. Chadbourne and Hazelton, the Sprague agents at Philadelphia.

The St. Louis Car Co. exhibited a charming card on an easel.

Chas. E. Struck, 82 Court street, Newark, N. J., distributed a good number of hand bills describing the "Merit" safety car heating apparatus.

The Swem Automatic Switch Co., Denver, were represented by their president, Mr. Jas. M. Swem. He challenges the world to beat them, as regards lightness, simplicity of construction, weight, easiness of repair, and above all the price. The Swem switches can be made to fit any kind of rail. Mr. Swem took a nice lot of orders at the Convention. A Swem switch is adapted to electric and cable railways. Execution of order is guaranteed within 30 days from its date. The following, among others, are able and willing to testify as to the goodness of the Swem Switches: R. Dudley Frayzer, Memphis; D. F. Longstreet, general manager West End St Ry. Co., Boston; H. H. Littell, Louisville, Ky.; Supt. Duty, East Cleveland Ry. Co.; Supt. Mulhern, Woodland Ave. and West Side Ry. Co., Cleveland, Col. Randolph, Denver, and "Uncle John Stanley," of Cleveland. On his return from Washington, Mr. Swem called on General Manager J. B. Parsons, West Chicago Street RR., and sold a carload of his switches.

The Thomson-Houston Electric Co. have moved to their new head office, 620 Atlantic Ave., Boston. They were represented at the Convention by Mr. Mansfield, whose address before the Convention is reported in the proceedings, and Mr. W. J. Clark (Boston), as well as Mr. T. P. Bailey (Chicago). Descriptions of their new electric road appear further on, and on page 20 of our Directory Supplement.

Valentine & Company, 245 Broadway, New York, had their railway representative Mr. A. G. Barber, in attendance.

Richard Vose, 13 Barclay St., New York, was well represented by Messrs. John S. and Wm. S. Silver, W. P. Williams, J. C. N. Guibert and A. W. Slee.

Wm. Wharton, Jr., & Co., Philadelphia, exhibited specimens of their Nos. 1, 2, 3 and 4 (48 lbs. per yard) girder rails, automatic switch, a transfer table, etc., placed on 14th street alongside of Willard's Hotel. Mr. Wm. Wharton, jr., was in attendance.

Fred H. Whipple, Detroit, distributed hand bills with the contents of his new book on "electricity as applied to street railways." (See advertisement in our present number.)

A. Whitney & Sons, Philadelphia, exhibited various wheels for all kinds of street cars.

Mr. J. Zimmerman (Zimmerman Machine Co.), Cincinnati, exhibited the street car heater described in the September Gazette.

Our Card Basket.

Among the cards presented at the headquarters of the Street Railway Gazette, beside those mentioned in other parts of this number, were those of Mr. W. W. Bean, Cincinnati; Edgar S. Fassett (secretary Metallic Street Ry. Supply Co.), Albany, N. Y.; Thos. C. Keefer, president, Ottawa St. Ry. Co., Ontario (the only representative from the Dominion of Canada, as far as we noticed); H. B. Prindle (of the Thomson-Houston Electric Co), Boston; Chadbourne & Hazelton, Philadelphia; Col. John C. Love, Philadelphia. Also Major H. C. Evans and D. Coolidge, both of the Johnson Steel Street Rail Co.; Wm. H. Sinclair, Galveston; B. M. Foreman, Texarkana, Kansas; Dr. Wayt, Stanton, Va.; E. P. Millett, Brooklyn; T. L. Beaman; J. Higdon, Washington; Geo. F. Small, Philadelphia; John N. Reynolds, New York; and J. Zimmerman, Cincinnati.

Personal Notes.

Col. Geo. B. Kerper had hardly registered at Willard's Hotel before several of his whilom military friends flocked around to express their joy and good wishes; among them N. B. Albright, of Washington, and Col. Thos. Fister of the Treasury Departmemt; also Col. B. F. Owen and J. L. Douglas.

The John Stephenson Company (Limited), New York, had no car on exhibition, but cars of the Stephenson make were plentiful along the street railways of Washington; and their popular representative, Mr. Daniel W. Pugh, seemed as happy as if he booked a large number of orders at the convention.

Messrs. Elias E. Ries and A. H. Henderson were both in attendance at the exhibition, and were kept quite busy in illustrating the operation of their electric traction-increasing apparatus. An advance circular containing an interesting description of some of the various features of the Ries Electric Railway and Traction-Increasing System was issued, and proved to be very acceptable to those in search of information on this subject.

Mr. Winfield Smith, president of the Cream City Railroad Co., Milwaukee, has traveled in Europe with two of his daughters and some friends from March to September last. He enjoyed his trans-Atlantic holiday immensely, and has returned full of "sand," as those who attended the Washington Convention readily perceived. He is quite a new man. He was very good before. Now he eclipses himself. His wit is overflowing, and his usually keen observation has become like a two-edged sword. Those who have oppressed him and others with taxation, should have heard his cutting remarks. We should be glad of Mr. Smith's observations on the tramways of Europe as far as he noticed them. His opinion of England's weather is not very favorable; what of her tramways?

Mr. Andrew S. Hallidie, of San Francisco, the inventor of the cable railway system, was the subject of many inquiries. It was announced in the Gazette several months ago that he would be present at the Washington Convention. Our readers had not forgotten it, and inquired whether Mr Hallidie had arrived. He did not materialize, and many were disappointed at his absence. We hope Mr. Hallidie will be kind enough to favor us with an explanation.

Mr. Calvin A. Richards, of Boston, who has hitherto played very prominent parts in the annual meetings of the American Street Railway Association, was not present at the Seventh Annual, and regret for his absence was repeatedly expressed.

Mr. Henry Hurt, president of the Washington and Georgetown Railroad Co., has fully earned the heartiest thanks of the street railway community in general, and the American Street Railway Association in particular, for the admirable way he controlled the exhibition, which was a source of much interest to the delegates and their friends, and especially for the very handsome manner in which he and President Geo. W. Pearson (of the Metropolitan RR. Co.,) as well as Mr. Clapp and the other street railway officials of Washington entertained the delegates and those who were with them. The ride to the Soldiers' Home and through the beautiful country adjoining Washington, as well as the voyage to Mt. Vernon and the capital lunch at Marshall Hall, were all provided by the modest Mr. Hurt and his friends

Mr. Thomas W. Bell, the amiable representative of H. K. Porter & Co., whose light locomotives are well known to street railway men, became enthusiastic during the Soldiers' Home excursion. Mr. Bell was among the first to engage in active service at Washington at the commencement of the late war. "That night" when the company he was connected with made their first march under cover of the night, was vivid in his recollection. His explanation of the many changes that have taken place in and around Washington since then was very interesting—only excelled by the recital of his pedigree way back to his eminent Irish ancestors.

Mr. Joseph Pomeroy (Pomeroy & Fischer) was perhaps the most prominent, and at the same time the most obliging exhibitor at Willard Hall. His Aquart's Eureka varnish polish, with various varnishes and fine colors for street cars and other vehicles, stood at the west edge corner of the stage, and could be seen from all directions. The position also afforded Mr. Pomeroy good vantage ground to see all that was going on in every part of the hall; and when any one needed tacks or a hammer or any ordinary help, Mr Pomeroy was there instantly.

Cable Railway Practice, by Mr. E. J. Lawless, is held over this issue. This subject is treated fully in the convention proceedings, which are entitled to precedence, as usually accorded by the Gazette.

McCormick, Courtad & Co., Sandusky, O., state that they find a good demand for their champion patent spring doubletrees from all over the country, and that their business is increasing very much. Their prospect is very bright

Electricity, as a means of propelling street cars, is making headway. The Thomson-Houston Company have just equipped an electric street railway in very close proximity to the Capitol, as stated elsewhere in this number. With this they have 19 roads in operation; and they have 10 more contracted for (some of which are in course of construction) it seems. That makes 29 electric railways of the Thomson-Houston system. The Sprague Company, according to their announcement of October 1st, are only one behind—they have 28 roads (including extensions) in operation or in course of construction. What makes the Sprague record most extraordinary is that they had not a single road in operation nine months ago. These are the leading companies, but not the only ones, who equip electric railways. They and others were represented at the Washington Convention. From our report thereof, it will be seen that each company is quite sanguine, and means to "get there." It was unfortunate that no paper had been prepared for this convention on the "Progress of Electric Motive Power," for the "discussion" without the "paper" was not half so lively and edifying as that at Philadelphia last year. And it is not unlikely but that the keen interest hitherto manifested in electric railways may become somewhat blunted, until it may be sharpened again at the meeting in Minneapolis next year. In the meantime, our columns are open, as hitherto, for fair discussion, pro and con, of the important question of electric propulsion. Our readers want to know more about it. And we have no hesitation in predicting that that company will succeed the most who will be most open in its statements and the most willing to give information.

RAILWAY REGISTER CO.'S

REGISTER.

Simple in Construction and Will Not get out of Order

COLLECTS MORE FARES THAN ANY OTHER REPORTER IN THE WORLD.

NOT A WHEEL ENTERS INTO ITS CONSTRUCTION

APPROVED AND ENDORSED BY EVERY RAILROAD MAN THAT HAS EXAMINED IT.
IT IS IMPOSSIBLE TO RING THE BELL WITHOUT REGISTERING.
IT IS LIKEWISE IMPOSSIBLE TO REGISTER WITHOUT RINGING THE BELL

OUR STATIONARY REGISTER

is so far superior to any other Stationary Register on the market that there is no comparison

"Out in the Sunshine and the Bells Ring Merrily."

U. S. Circuit Court,
NORTHERN DISTRICT OF ILLINOIS.

RAILWAY REGISTER MANUFACTURING CO.
vs.
RAILWAY REGISTER CO., ET AL.

SAME
vs.
CHICAGO WEST DIVISION RY. CO., ET AL.

Without saying that the first and second claims in the Corbett reissue are not for the same invention claimed in the original patent, in view of the state of the art I hold that if a patentable invention is described in the reissue, it is limited to Corbett's special constructions and combinations of special devices, and that thus limited, the defendant *does not infringe* the first and second claims.

Second :—That the Commissioner of patents had no authority to issue the Benton patent sued on, and that it is void.

Third :—That, if not void, the defendant does not infringe the third claim.

Fourth :—That if the Harris patent was not anticipated, the defendant's device does not infringe the fifth claim.

The bill is dismissed for want of equity.

W. Q. GRESHAM

This Register has been adopted by every St. Railway Co. in Chicago.
The Grand Ave. Cable Road, Kansas City, Mo.
The Kansas City Cable Railway Co., Kansas City, Mo.
Peoples Cable Railway Co., Kansas City, Mo.
The Cable Tramway Co., of Omaha.
Los Angeles Cable Railway Co.
The Minneapolis Street Railroad Co.
St. Paul City Railway Co.
Citizens Street Railway Co. of Indianapolis.
Grand Rapids Street Railway Co.,
And others, and we refer you to any of them and are willing to trust our reputation in their hands. Address

RAILWAY REGISTER CO

59 State Street, CHICAGO.

The Street Railway Gazette.

VOL. III. CHICAGO DECEMBER, 1888. NEW YORK No. 12

The Hon. M. A. Hanna.

PRESIDENT OF THE O. S. T. ASSOCIATION.

At the close of the seventh annual meeting of the Ohio State Tramway Association, held at the Burnet House, Cincinnati, on the 21st of last month—the proceedings of which are fully reported in our present number—Mr. M. A. Hanna, president of the Woodland Avenue and West Side Street Railroad Company, of Cleveland, was elected president of the association. Mr. Hanna is so well known to many of our readers that we cannot tell them much more about him than they know already, probably. At all events, we avail ourselves of the pleasure of presenting his portrait and autograph, together with a brief biographical sketch.

This is not a new experience for Mr. Hanna, by any means; for he has been placed in the "picture galleries" of several publications before, and his career affords much food for reflection. An excellent portrait of him appeared recently in the *Magazine of Western History*, together with an interesting account of Mr. Hanna's brilliantly progressive career, which we here reproduce, with the exception of a splendid panegyric on his political principles; the STREET RAILWAY GAZETTE treats of no one's politics. But it may not be out of place simply to mention that Mr. Hanna is a Republican; was one of the delegates at-large from the Ohio Republican State Convention, in 1884, to the national convention at Chicago; and he was a delegate to the Chicago Convention of 1888, as a warm supporter of Senator Sherman for the presidency.

"Mr. M. A. Hanna, who is identified with the banking interests of Cleveland through his presidency of the Union National bank, has had so large a share in various lines of commerce and business during the past twenty years, that one would hardly imagine that he is still a young man so far as activity and enthusiasm are concerned, and yet but one year over fifty in the matter of age. He is an Ohioan in every nerve and fibre of his being, and by birth and nature in full accord with the best forms of Western Reserve thought and sentiment. He was born in New Lisbon, Columbiana county, Ohio, on September 24, 1837. His father, Dr. Leonard Hanna, was one of the leading men of that section of the country, and in 1852 removed to Cleveland, where he became one of the members of the wholesale grocery house of Hanna, Garretson & Co., his partners being his brother Robert Hanna and Hiram Garretson. The location of the firm was on Merwin street, and it was one of the leading business houses of the city; and among the many ways in which it aided in building up the trade of Cleveland was the establishment of a vessel line between here and the then opening region of Lake Superior.

"The early boyhood of the subject of this sketch was spent in Columbiana county; and the vitality, energy and capacity for work which so greatly characterize Mr. Hanna had their foundation in those days. Those who knew him then say that he was never a laggard at his tasks. On the removal of Dr. Hanna to Cleveland in 1852 the son was given a thorough education in the Cleveland schools, and supplemented by a season in the Western Reserve college at Hudson. At the age of twenty he entered the employ of the firm of which his father was a member, and continued with that and its successor, Robert Hanna & Co., until 1867. During his service in that house, where he showed the possession of the finest business qualities, and

M. A. Hanna

performed his duties with industry and faithfulness, he originated the Buckeye Oil company, which he managed in connection with his other duties. On September 27, 1864, he was married to Miss C. Augusta Rhodes, daughter of the late D. P. Rhodes, and in 1867, on the retirement from business of the firm of Rhodes & Card, he went into its successor, the firm of Rhodes & Co., that consisted of Robert Rhodes, G. H. Warmington and Mr. Hanna. They were heavy dealers in coal and iron, with office and yards on the river, and for a number of years did a most extensive business. Their mines were located in the Tuscarawas valley, while their trade extended all over the country. Their office was afterwards removed to Water street, and more recently to the Grand Arcade block on St. Clair street. In April, 1885, the partnership was dissolved, and was succeeded by the firm of M. A. Hanna & Co., which purchased the business, and continued it as heretofore.

"While Mr. Hanna's labors were for a number of years mainly given to this great enterprise, he was interested in many ways in other lines of commercial and business activity. In 1872 he organized, in connection with other leading Cleveland capitalists, the Cleveland Transportation company, which built a line of steamers and their consorts for the Lake Superior iron ore trade. Mr. Hanna has been one of its directors from the first, and was for several years its general manager. When his other business interests grew to such an extent as to demand the most of his time, he resigned that position. In 1881 he organized the West Republic Mining company of Marquette county, Michigan, and was elected its president, which position with that of director he still holds. He is a director and president of the Chapin Nut and Bolt company. In 1882 he organized the St. Paul & Pacific Coal and Iron company, with headquarters at St. Paul, Minnesota, and was elected its president and continues in the same position. It is a large and important company, working in connection with the Reading Coal and Iron company of Pennsylvania, and having built large docks at Superior City, on the head of Lake Superior. He was a director in and vice-president of the Hubbell Stove company of Buffalo. In 1882 he purchased a controlling interest in the West Side Street Railroad company, and with his usual courage and enterprise put money and management enough into it to make it a street railroad in fact as in name. He was elected the president of the company, and on its recent consolidation with the Woodland Avenue Railroad company, was continued in the same capacity under the new regime.

"Mr. Hanna was one of the founders of the new Union National bank in 1884, and was elected one of its directors and president. The position is not regarded by him as a merely honorary one, but he gives to it the same care, close attention and business sagacity that he has displayed in other enterprises. It has ever been one of his fundamental principles of action to give the same honest care and good faith to the interests of others when reposed in his hands, as he expends upon his own. In 1877 he purchased the Euclid Avenue Opera house, which he still owns, and which he has made one of the finest and most popular theatres in the west. In 1880 Mr. Hanna purchased an interest in the *Cleveland Herald*, a Republican newspaper which had been seeing hard times for a number of years, and was chosen president of the Herald Publishing company, which position he held until its sale to the *Leader and Plain Dealer*, in 1885. He has also been interested, through the holding of stock or otherwise, in other enterprises needless

to enumerate here. * * * While in control of the *Herald* and giving direction to its policy, his instructions were that the Republican party should be upheld and defended while it was in the right, and criticised and not supported when in the wrong. Its editor was left to a perfect freedom as to details of policy, and during his entire control, Mr. Hanna never gave one word of instruction that could be construed into an advancement of any personal or political interest of his own, as against that of any one else. In August of 1885 he was appointed by President Cleveland as one of the government directors of the Union Pacific railroad. The position was unsought, and was accepted because it was an honorary one to which no salary was attached, and in which he could serve the public without the charge of personal motives. In the fall of the year he was summoned west by reason of labor troubles along the line, and gave several weeks to a careful and proper settlement of the questions in issue, in connection with the other directors of the road.

"The best estimate of a man's powers and qualities can be found in the work he has done, and in the repute in which he is held by those who know him well. Judged by these standards, Mr. Hanna must be set down as a business man who has commanded the highest success before reaching the years of his prime, and as a recognized financial and personal force in this community. His capacity for work is immense. His industry and energy are qualities suggested in his tone and bearing. His honesty and honorable methods of business have never been questioned, and the moment he becomes connected with an enterprise it can command all the capital it needs. His word is, according to the old saying, as good as any man's bond, and when he outlines a course of policy or conduct, his associates and employés understand that he means what he says and will stand by it. Personally he is pleasant and sociable in disposition, is open to the approach of any one, and all in all is a fine and robust representative of the younger business men of America."

The Thomson-Houston Factory at Lynn.

The accompanying engraving shows the extensive factory of the Thomson-Houston Electric Company at Lynn, with the new additions which it has been found necessary to make to accommodate the tremendous increase in its business, especially in the direction of electric railway work. We also show their first factory.

Ever since the Thomson-Houston Company commenced to build electric railways, this branch of their business has been steadily increasing, and the present factory has been taxed to its utmost capacity; finally it has become necessary to build new factory buildings, which are here shown on opposite page.

Some idea of the vast amount of business which the company is doing can be gained from comparing its original factory with its present one. The Thomson-Houston Company first started business in '80 in New Britain, Conn., in the small building shown in the illustration, employing about fifty men. It has kept on growing and each year increasing the capacity of its factory, until it has the largest and best equipped factory in the world for the manufacture of electrical appliances, employing more than 1300 hands, and having a floor space of more than four acres.

AN IMPORTANT REMOVAL.

THE THOMSON-HOUSTON ELECTRIC COMPANY, of Boston, finding that its quarters in the John Hancock building on Devonshire street were too small for its rapidly increasing business, has removed to the Hathaway building on Atlantic avenue, where it occupies the entire south side of the second floor, and has a suite of offices which is much better suited for its immense business than the old one.

The corner office and the one directly in the rear are used by Mr. C. A. Coffin, the vice-president and treasurer of the company. The adjoining office is occupied by Mr. G. W. Davenport, general manager of the Thomson-Houston International Electric Company, and Mr. Peck. This office opens directly into the large room given up to the railway department. Directly across the corridor are the offices of Capt. Eugene Griffin, manager of the street railway department, and Mr. Clapp, the company's attorney. Directly back of Mr. Coffin's offices is the office of Mr. E. I. Garfield, secretary of the company. To the rear of this is to be found the book-keeping department, and directly back of this the engineering and supply departments.

The offices are finished throughout in cypress wood, and fitted up with electric bells and annunciators, and lighted by incandescent lamps operated from a Thomson-Houston dynamo, driven by a 10 h.p. motor of the company's make. It would be difficult to find a better set of offices than these, and they are admirably suited for the needs of rapidly increasing business.

THOMSON-HOUSTON ELECTRIC RAILWAYS.

The progress that the Thomson-Houston Company is making in the direction of the equipment of new roads is shown by the following brief summary of the new business which the company is doing:

Omaha and Council Bluffs.—The electric railway between Omaha and Council Bluffs has been opened for the general passenger traffic, and is now operating both to the satisfaction of its owners and the admiration of the general public. The road is nine miles in length, and at present is operating sixteen motor cars and sixteen cars without motors, each motor car towing one of the others. The cars are operated in a manner quite unusual on street railways. They are made by the Pullman Palace Car Company, and are connected by the vestibule device, in use for the first time here on street railway cars; they are very popular, and it is fully believed that this method will ere long come into more general use.

Although the motors work equally well in either direction, a loop is made at each end of the track so as to permit the motor car to always be ahead.

This road opens a new means of rapid transit between Omaha and Council Bluffs, which is highly appreciated by the residents of the two cities, they having been previously compelled to travel by special trains on the Union Pacific Railroad, which ran once an hour, upon which twenty-five cents was charged.

The fares upon the new line have been reduced to the usual street railway rates, but a speed equivalent to that of the steam road is made over a large portion of the track lying between Council Bluffs and the bridge over the Missouri River.

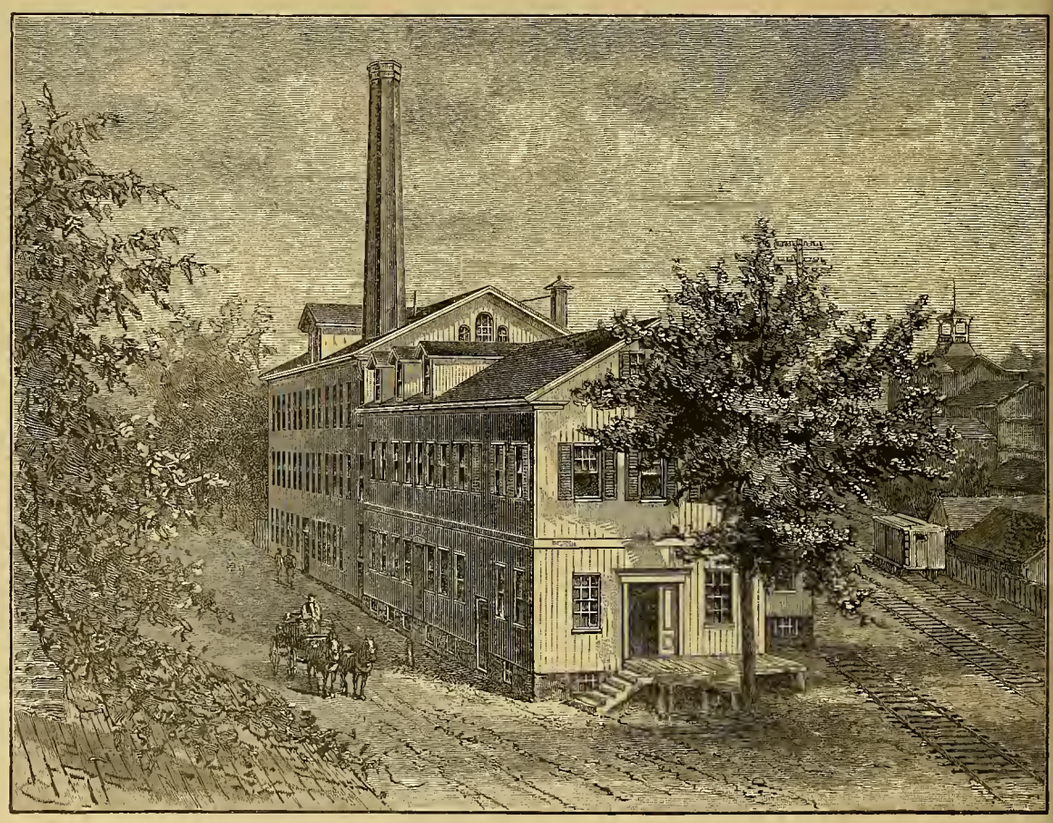
Great credit is due Mr. T. J. Evans and his associates in carrying through this entire project of rapid transit between the cities, they having expended not less than half a million dollars in constructing a magnificent bridge, 3,000 feet in length, over the Missouri River. No expense has been spared in making the railway one of the finest, if not the best, electric railway in the world.

Mr. Evans' original idea of arranging his cars is one which will eventually find favor upon many lines, as the carrying capacity is greatly increased over that of ordinary cars.

While this difference over the usual equipment strikes the visitor immediately, there are many other features of the electrical construction and equipment that strikes him forcibly as he progresses with his investigation. The neatness and simplicity of the overhead construction is considered superior to anything in that line that has yet been done, while the operation of the cars without noise is a matter which the believers in electrical power scarcely believed could be accomplished until they witnessed the smooth running Thomson-Houston cars upon this line.

Wichita, Kansas.—Within the past few days the new Thomson-Houston railway has been put in operation here, and is working more successfully than any one in Wichita believed was possible for an electrical equipment to do, the faith of Wichita citizens in electrical propulsion having been greatly shaken by the failure and removal of another electrical system from one of the street railways there some time ago. The residents, however, have all become converted to the opinion that electricity is the power for the operation of street railways, and they look upon the Thomson-Houston system as almost perfection itself. The cars are crowded with passengers who ride apparently for pleasure, and the receipts of the road are much larger than its most sanguine projectors dreamed of.

The overhead construction is one of its most striking features, and is actually considered more of an ornament than otherwise, while the noise which was feared would be made by the running



THE THOMSON-HOUSTON FACTORY, IN 1880 AT NEW BRITAIN, CONN.

of electrical cars is found to not exist in the Thomson-Houston system.

Lynn, Mass.—The electrical equipment of a portion of the Lynn & Boston road running through the most thickly settled part of Lynn, which has been furnished by the Thomson-Houston Company, has been put in operation. The overhead construction upon its line is the admiration of all that have seen it. In the construction of this road many difficult problems were met with and successfully worked out. The road has many curves and grades as high as 12 per cent., making the construction work exceedingly difficult, yet all who have seen it speak nothing but praise for the successful manner in which the Thomson-Houston Company has done the work. The directors of the road had every confidence in the Thomson-Houston Company when they made their contract, and a glance at the work done in Lynn fully confirms the fact that this confidence was not misplaced.

Ansonia, Conn.—The Derby Horse Railway Company, operating with the Van Depoele electric system, is about to increase its equipment by the addition of considerable Thomson-Houston apparatus.

Syracuse, N. Y.—The Third Ward Railway Company (Thomson-Houston system) is to be started at once. The equipment and overhead construction are very fine, and railway men of Central New York are looking anxiously forward to see it put in operation.

Des Moines, Iowa.—The electrical equipment furnished by the Thomson-Houston Company for the Broad Gauge Street Railway Company is almost ready to be put in operation. Manager Peachout is exceedingly pleased with the apparatus furnished him, and the thorough manner in which the construction work has been done by the experts of the Thomson-Houston Company.

Topeka, Kansas.—Work is progressing rapidly for the installation of the Thomson-Houston plant to operate the Rapid Transit Railway under the Thomson-Houston system. This road, when put in operation, will be the largest electrical railway in the world, being fourteen miles in length.

Alliance, Ohio.—Arrangements are being made to rush the construction and equipment of the new Thomson-Houston electric railway here, and it is proposed to have the line in operation within a few weeks.

North Adams, Mass.—The electrical equipment of the Hoosac Valley Street Railway under the Thomson-Houston system, which it had been intended to defer until next year, will now probably be completed this season.

Peat Moss Stable Bedding.

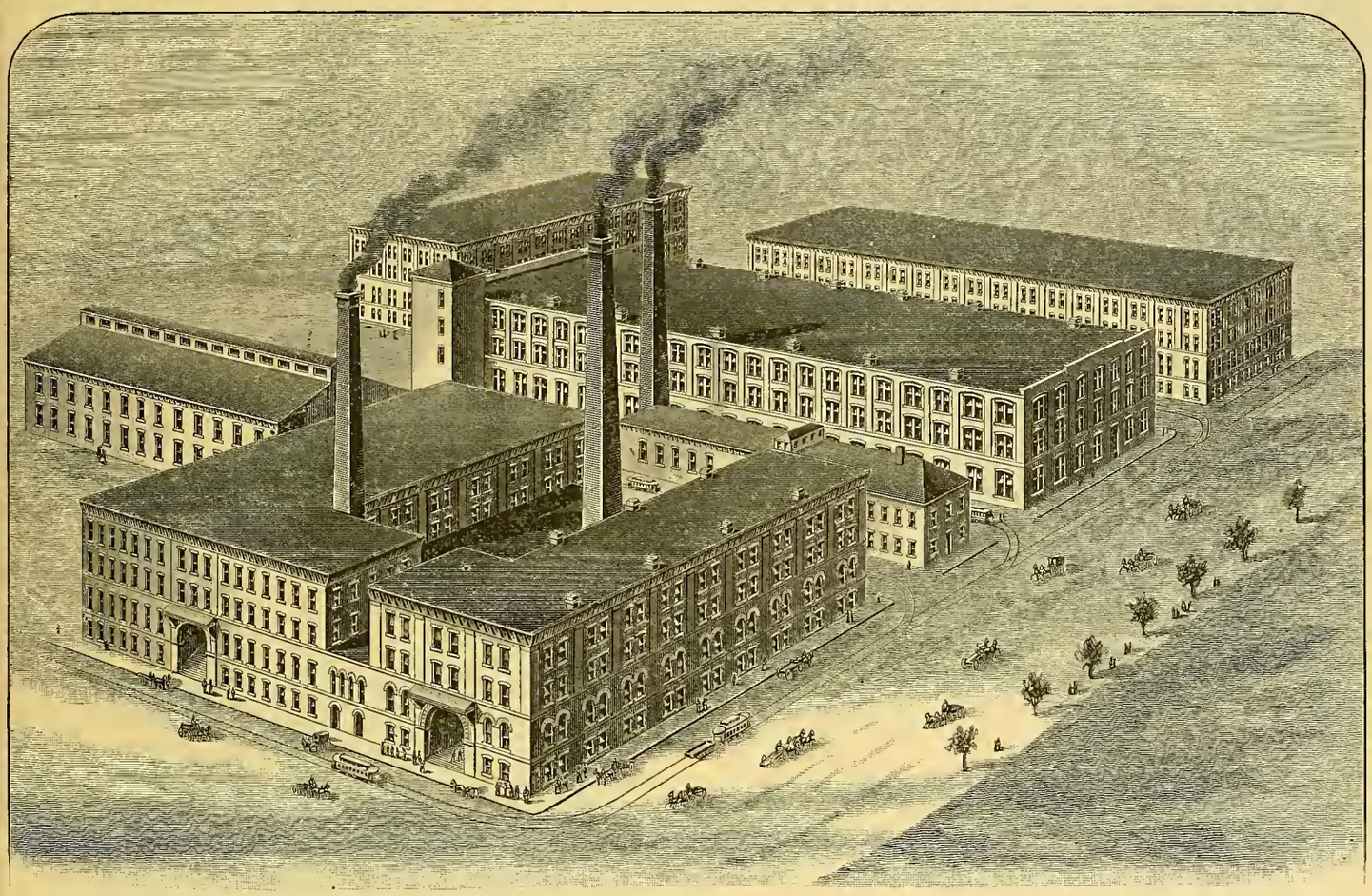
A striking peculiarity of the present time is the new uses to which old things are being put. Natural gas is as old as the "eternal fires," but its value for domestic and manufacturing purposes has been discovered only quite recently. Electricity has also been known many centuries, but its great value is only beginning to be known.

"It has been left to the last decade to apply a product of thousands of years of existence for the comfort of the animal, and its superiority over the old method being once demonstrated it makes its way rapidly into every stable. We refer to peat moss. There exists in some parts of Germany and Holland large deposits of decomposed vegetation, probably of cranberry bushes, which centuries ago, having grown in low lands, were periodically submerged in the water; then rotting, a new growth would appear on top, which again decaying, have finally formed bogs of a depth of sometimes fifty to a hundred feet. The lower part of these bogs is mostly hard and of dark color, and is being used as peat or turf for burning, the same as in the green isle. On top there is a mossy growth of spongy fibre of a light brown color. This is the peat moss or moss litter, which from time immemorial has been used in the districts of its production as a stable bedding, but its bulkiness made it difficult of distant transportation, and it was only in the year 1880 that its use began to extend beyond those limits, when a factory was established in Germany for the preparation of this peat moss into a marketable commodity. It was dug and dried; a machine cut up the entangled fibre; it was pressed into bales of the smallest possible compass, held together by slats and wires, and which now come to the market covered with burlaps. These bales measure generally twenty-one cubic feet, and weigh from 300 to 360 pounds. Since that time several factories have sprung up, and it has become generally adopted by the brightest and most wide-awake owners of horses, cattle and sheep.

"It is in general use throughout Germany, England, and other European countries, and has become an important article of commerce. In its early days small shipments were made to the United States, and it has been used ever since by several stock farms and stables near New York. Importations, however, were of small extent until 1886, when Mr. A. W. Nitsch, now of 68 Wall Street, New York, began his travels to introduce it throughout the United States, and the business, in the last two years, has developed into an importation of 60,000 bales this year. When we say that 60,000 bales is only a result of six days' production during the season in Germany, it can be estimated what large quantities Europe absorbs of this bedding.

"The sanitary properties of the moss consists in deodorizing the manure, a capacity of absorbing 1,000 per cent. moisture and retaining the ammoniac gas. This makes the atmosphere in the stable almost perfectly odorless, and the animals are consequently less liable to diseases of the eyes and lungs. Being springy and elastic, it is incomparably better than straw for the preservation of the hoofs, and the chances of disease of the feet are greatly lessened by its use; the fetor from cankered feet is removed by it in a short time. Aside from its sanitary proprieties it recommends itself to the owner of the animal by its cheapness, as it is so durable that one bed can be used for many months with proper care, and to the groom by saving him much labor, as it keeps the horse bright and clean. Peat moss yields a manure exceeding in richness not only the ordinary kinds, but even the various high-priced artificial fertilizers.

"There is no place east of the Mississippi where peat moss cannot be laid down in car-lots at a price cheap enough to make the annual cost of this bedding less than straw, even if the latter should sell at $6 per ton."

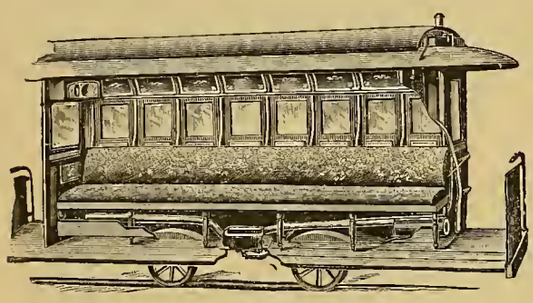


The Thomson-Houston New Factory at Lynn.

The Steele Street Car Heater.

General Manager J. B. Parsons, of the West Chicago Street Railroad Co., thinks that Col. Wilbur F. Steele has solved the Street Car heating problem. And the Steele Kerosene Gas Heater has been adopted for street cars and fixed on a number of the West Side Cars, as well as on hundreds of those of the North Chicago Street Railroad Co. The system has also been adopted by the Pittsburgh Traction Co. and others. The accompanying cut shows the position of the pipes, connected with the heater. No passenger room is taken up at all.

The heat used by this system is produced by a fixed gas obtained from kerosene oil of any desired flash test. This gas is so mixed with air that perfect combustion is produced, the proportions



THE STEELE STREET CAR HEATER.

being 1 of gas to about 4000 of air. One gal. of oil supplies sufficient heat to keep the temperature of a car at 50° for 18 hours, in ordinary winter weather, this degree of warmth, being about the required amount for street cars.

The temperature can be raised by using an increased amount of oil. The heater itself is made of steel and is located underneath the seat midway in the car; in the center of the heater is a cast iron airflue, passing entirely through it. Under the flue is the burner. The cold air is drawn in at one end of this flue and subjected to a high heat as it passes through, into a small pipe underneath the seat, leading to one end of the car, where sufficient heat is expelled to warm that end. The surplus heat and products of combustion are carried by means of a small steel pipe into a spiral drum located at the opposite end of the car, also underneath the seat. This drum is so constructed that it is necessary for the heat to travel a distance of ten feet in going the length of the drum, which is 2 ft. By this means all the heat is radiated equally through the car. The oil is stored on the roof of the car in a galvanized iron tank and is conducted to the burner by a lead pipe which is not visible inside of the car. The tanks, each of which is furnished with a telltale, to indicate when it is filled, are supplied by means of a pump, one pump being all that is required for at least 30 cars. All woodwork, bottom and back of seats, etc., are protected by galvanized iron and asbestos. The heater is covered by a galvanized iron hood, provided with an air space, so that the person sitting directly over it is not at all inconvenienced by excessive heat.

The idea is entirely new, the production of a fixed gas from kerosene oil never having been heretofore successfully accomplished.

The advantages of this heater over any other in the market are: —

1st. Economy of material used; the saving is at least 60 per cent. in the cost of heating over any other system.

2nd. The retention of all seating and standing room.

3rd. Absence of odor, smoke or dirt.

4th. Absorption of all the cold air from the floor of the car, thus ensuring warm feet.

5th. Cheapness and durability of the heater itself.

The device has been patented by Col. W. F. Steele, 103 S. Canal St., Chicago, where a duly incorporated company (The Steele Heater Manufacturing Co.) is ready to fill all orders as rapidly as possible.

This heater is applicable, not only for warming street cars, but also railroad cars, vessels, houses, etc., as stated in the company's advertisement in this number. And the company have good reason to expect a great demand.

Cable Railway Practice.

By Edward J. Lawless.

ARTICLE VIII.

The question of cars next arises: Whether to use the "Combination Car," that is, grip-car and coach combined in one (see figure S), or trains having grip-car and coach separate. There are many arguments in favor of each; both have their advocates, and it is sometimes difficult to determine what style is best to adopt. Uniformity of equipment being particularly desirable, it certainly would not be advisable to adopt both.

One of the principal advantages of the combination car is the easy manner in which it rounds curves. This ease of motion at that point is accounted for by the body of the car being pivoted on trucks, which latter, having a closer wheel-base than the ordinary street car, adapts itself readily to the curve and gradually swings the car body around, making the strain on the running gear comparatively easy, and no disagreeable jar or jolt experienced by passengers.

With the combination car, also, the gripman being at the forward end, always handles the levers the same way, no reverse motion being required. This, on first thoughts, may not seem important, but that it is so is demonstrated where prompt and instantaneous action is required on the part of the gripman in order to avoid an accident. It may be advisable to state here that the levers attached to both grip and brakes should be placed so as to pull on them, not push; it will give the gripman a better purchase on the levers, having the weight of his body to assist him, and leave him in a better condition towards the end of a day's work to act promptly, should occasion demand. The grip box can be so arranged that passengers will not have an opportunity to stand in the way of or interfere with the gripman's movements or vision. Provision should be made to brake the wheels of both forward and back trucks with one lever, if possible. It is not sufficient to brake one truck only. Perfect control of the car can not be had unless this is done. Both trucks should be provided with fenders or guards, running as close to the ground as your construction will permit. It is also advisable to place guards on each side of the car body from truck to truck, with sufficient clearance to allow the latter to round curves without interference. The average length of these cars is about 34 feet, having open space in front about 14 feet. Should heavy travel be anticipated, and cars consequently run close together, consideration must be given whether to allow an exit from the forward end of closed part of the coach, as considerable delay may be occasioned by passengers being obliged to get on and off the rear platform when a car is crowded. The size of wheels for these combination cars is limited, 22 inches being the average diameter used, in order to keep the step at entrance as near the regular height as possible; too high a step or double ones being dangerous as well as inconvenient. The seating capacity in the majority of these coaches is sixteen in the open part and twenty in the closed part.

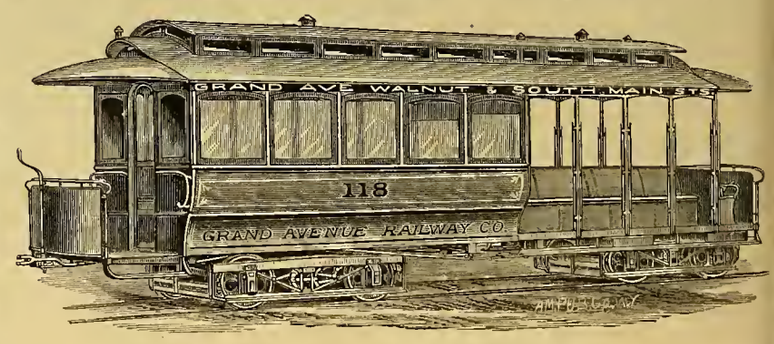


FIG. S.—"COMBINATION CAR."

These combination cars were first introduced for street railway purposes on the Market St. line in San Francisco, and are now in use on the Grand Avenue cable line, Kansas City, North Side cable line, Chicago, and in Philadelphia and Pittsburgh.

The majority of cable lines, however, have adopted trains consisting of grip car and coach, sometimes two or three coaches, as occasion demands.

Grip cars are made with grip box in center between the axles, about five feet long and three feet wide, with narrow passage at each end leading thereto, and having reversible seats on each side for passengers, each seat holding two except those in immediate vicinity of grip box which are single. Some are made with longitudinal seats on the side and cross seats at end. The former, however, are more popular, passengers being better protected from the weather and wagons in the street, as well as always facing forward. Each end of car should be made strong and banded with wrought iron at the corners, as a protection in case of collision with wagons. The steps running along the sides should be supported with strong braces, as passengers will insist on standing on them when car is crowded. The grip frame can be attached to the body or boxes; many advocate the latter, as it prevents any variation of the grip in the conduit, and that easier springs can be put under the car in consequence. For my own part I prefer to have the grip-frame attached to the body of the car, there being less liability for noise and bolts shaking loose. The springs can be limited to a compression of three-quarters of an inch, which will allow the car a sufficient ease of motion, and such a variation of the hanging of the grip can be easily provided for in the conduit. The frame should have a lateral motion of at least one and one-half inches to each side, and also have a heavy coil or rubber spring at each end, (if a combination car at the back end only,) so as to ease the strain when gripping the cable.

Several methods of coupling cars have been devised. Some use a male and female coupler, putting the former on the grip-car and latter on the coach; the objection to this is that when obliged to haul two coaches or another grip they will not couple. Probably the best in use is the radiating draw-bar. This consists of a strong iron-bar, with malleable-iron or cast-steel head, supported by an iron stirrup at the end of the car sufficiently wide to allow the bar to swing almost the width of the platform. The rear end of this bar is fitted in a bracket containing a heavy coil spring, and which bracket is fastened to the cross-beam or grip-frame by a strong pin. The bar on the coach being the same they are fastened together with a solid link, bored at each end for an inch pin. This gives a rigid bar between grip-car and coach when on a straight track, yet being pivoted at the back end allows the cars to swing freely around the curves.

Each grip-car should be provided with suitable brakes, and also an appliance to brake the coach. That in general use is an arrangement by which a chain winding around the axle of the grip-ca applies the brakes on the coach. It is advisable that these grip-cars should be provided with sand-boxes, as sand on the track is indispensable when slippery. Track brakes are not sufficient on an icy or slimy track. The regular wheel brakes, with sand on the track, will stop a train very effectively, and little difficulty will be experienced in keeping comparatively dry sand on hand at all times.

Provide an opening at each dash board to pass the grip through, also for the head light. Do not hang the latter on the outside of the dash or the repairs account for head lights will be more than you can cheerfully stand. Box up the under part of one of the seats, with a door in the gripman's compartment, to hold tools necessary for him to use during the day. The grip gong should be placed on the outside of roof with connecting cord in convenient reach of the gripman.

The coaches being the same as those in use on horse-car lines, it will be only necessary to call attention to the following particulars:

The platforms should be three feet three inches long. This will allow passengers to pass one another on the steps, as they frequently do in spite of all opposition.

Gates should be placed on that side next the return track, on both front and rear platforms. These gates should reach from outside edge of step to the hood. This will prevent passengers from getting any foothold on the step or climbing over the gate. Fenders or guards should also be provided to protect passengers from the running gear in case of accident.

I desire here to call attention to the fact, and which I regret to say there is a gradual tendency to overlook, that cars for cable lines should be made light, yet at the same time strong. It is no reason that, because there is a strong cable and powerful engine to do the hauling, it is immaterial whether the cars are heavy or not. Dead weight is poor stuff to haul and should be dispensed with. A careful consideration of this fact will make a material difference in the life of cable and size of a coal bill.

Comparing the combination cars and trains together I am inclined to favor the latter for the following reasons:

1. Increased leverage on account of the larger diameter of wheels and consequent greater ease in starting.

2. Larger carrying capacity and increased facilities for men (especially smokers), who morning and evening crowd the grip-car, even in extremely cold weather.

3. Greater economy in operation, owing to the fact that two or three coaches can be coupled on to one grip-car.

4. In case of a break-down, greater ease in handling a disabled train, on account of facilities for cutting it in two.

5. Cable lines being largely conducive to pleasure-riding, it is necessary to run open cars in summer. As the cost of a combination car is as much as that of a grip-car and coach, this means, with the combination system, a storing away during the summer of the full amount invested in equipment, while with the train, the coach, or one-half the amount is laid aside.

(*To be continued.*)

The John Stephenson Company's Cars Win Gold and Silver Medals.

A gold medal was awarded the John Stephenson Company, by the Cincinnati Centennial Exposition, for cable passenger car; also silver medal (highest award) for grip truck. The first premium (gold medal) has also been won by Stephenson cars at Barcelona, Spain.

STORAGE batteries now have a chance on the street railways of New Orleans.

THE "silent moveless cable system" is being put to a test by Mr. Henry Martin, Cincinnati, who is having 27,000 feet of road constructed for the purpose.

The Sprague Improved Electric Motor Truck with "Boston" Motor.

We take pleasure in publishing in this issue of our paper a representation of the new and improved electric motor truck now being built by the Sprague Electric Railway & Motor Co., for all their street railway work.

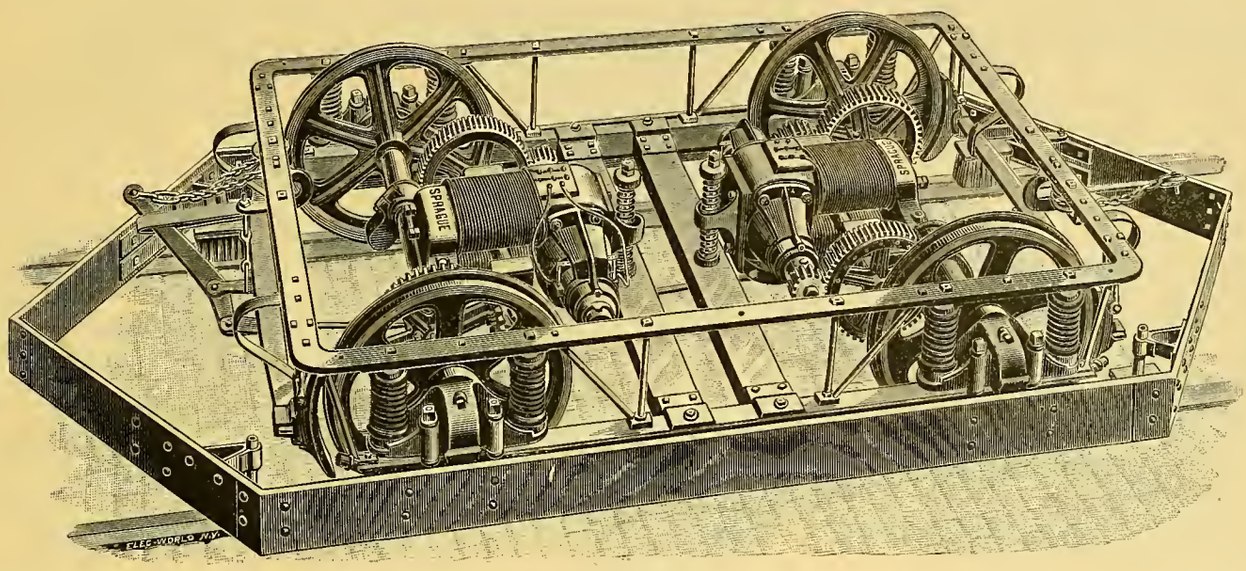
We are informed that the Sprague Electric R'y & Motor Co. has decided to name this new motor the "Boston," the old style being known as the "Richmond."

Great care has been taken in the construction of every part of this truck to make it as strong and light as possible, and a great many new improvements have been introduced to meet the exigencies of street-car service.

All the bearings are self-oiling and dust-proof. By looking carefully at the accompanying illustration there may be noticed projections extending below the axle. These projections are hollow, filled with oil, and in this oil there is a spring which presses prepared felt against the axle, thus insuring perfect lubrication.

This method has been tried with great success in street-car work, and should run at least a month with little or no attention.

The next set of bearings is that which sustains the intermediate shaft, which passes between the fields. These bearings are also made self-oiling and dust-proof. The teeth to this intermediate gear are made of vulcanized fibre, which is perfectly noiseless, and is so constructed that it will out-wear any steel gearings ever made. All these gears and pinions are independently removable, and the whole arrangement is such that the bearings and gears can be removed and changed if necessary without dismounting the machine.



The motors are of new design and of superior workmanship and construction. They are built in two sizes, of 7½ and 15 H. P. capacity each, and are identical in general appearance. They are adapted to be applied to standard cars or to special trucks.

The motors have the regular Sprague mounting, being centered on the axles and flexibly supported. This flexible support is arranged for both directions for driving, so that there is always a spring attachment, which will prevent any rattling, and will also relieve the machinery of any sudden strain. Without this flexible suspension, for both directions of running, it is hard to imagine how a motor can be successfully applied to street-cars and fulfill all conditions of actual experience.

The brushes are of entirely new principle and design, and are remarkable for ease of adjustment, and work with equal facility in running either forward or backward.

A tight-fitting cover, moving with the machine, encloses all the apparatus, rendering it impossible for moisture or dust to get into the working parts.

The design in the construction of this motor and truck has been not only to make the machine very strong and readily accessible, but also to reduce all necessary attendance and care to a minimum. We congratulate the Sprague Company upon the completion of a machine which combines so well the essential qualifications for a street-railway truck, and we anticipate for them a great success in electric street-railway propulsion, and that in the near future.

The Sprague Electric Street Railways.

Since the last issue of this paper there have been a number of electric street railways put into operation by the Sprague Electric R'y & Motor Company, of New York.

Boston. Among them may be mentioned the Brookline branch of the West End Electric R'y, of Boston, which has now been completed, and on which a trial trip was recently made.

The line extends out Beacon St. to Oak Square, in Brookline, having the city terminus at Park Square. The line is equipped with iron-poles throughout its entire length, and is probably the finest and most complete electric railway so far, in the world. The cars run very successfully, and in the trial trips which have been made, run with perfect satisfaction. The power station at Allston, with the adjoining car-house, is of brick, and perfectly fire-proof. In its construction it was the aim of the West End Co. to get the best in every detail. The chimney stack is 100 feet high.

Akron, Ohio. The electric railroad at Akron, Ohio, installed upon the Sprague system, has been in operation now for some considerable time, and has been working very successfully. The road has been visited by a large number o delegations of street railway men from all parts of Ohio, Indiana and Illinois. They have carefully investigated the system there in operation, the management affording them every opportunity for so doing, and the universal verdict has been that the Sprague system is all that is claimed for it.

Davenport, Iowa. The electric railway installed by the Sprague Company at Davenport, Ia., has now been in operation for about three or four weeks, and the president and directors of the road express themselves as being very well pleased with their electrical equipment. It is a significant fact of the confidence which the directors and managers of this road feel in their electrical apparatus, that upon the date of opening the road all the horses owned by the company were advertised for sale. The first portion of electrical equipment included eight motor cars with dynamo and overhead system.

Harrisburg, Pa. A very interesting item has recently appeared in connection with the East Harrisburg Street Passenger Railway, operated by the Sprague system, in Harrisburg, Pa. The average consumption of coal upon this line during the month of September was only ¾ of a ton a day for five cars. The total receipts during the month of September was $3,600. Total expenses during the same time, including charges of every description, were only $1,200, leaving a net earning of $2,400, or at the rate of 30 per cent. per annum on the capital stock. The management feel so well satisfied with their elec-

trical equipment that they have ordered an additional number of cars.

Lafayette, Ind. The Lafayette electric street railway, (Sprague system), is now in operation with nine motor cars, and is carrying a large number of passengers. The road has been visited by a large number of prominent street railway managers, from all sections of this part of the country, who have expressed themselves as very well pleased with the operation of the road.

Scranton, Pa. The work on the electric road at Scranton, to be installed upon the Sprague system. is being pushed forward as rapidly as possible, and it will not be long before all the cars will be in operation. The electrical equipment of this road will include 29 motor cars, to be operated over 12 miles of track.

St. Joseph, Mo. The ability of an electric railway to be operated, even under the most adverse conditions of weather, was fully demonstrated in St. Joseph, Mo., during the last month, up on the Union Passenger Street Railway, in that city. On the 9th of November last, one of the heaviest snow storms that St. Joseph has ever experienced, visited that city, and, according to the daily papers the next morning, completely paralyzed business, broke down the telephone and electric light lines, and delayed all railway travel. In spite of this, the Union Passenger Street Railway, which was equipped on the Sprague system, kept making regular trips, without stop. The overhead system remained intact, and no trouble or delay was experienced. The management feel so very well pleased with their electrical equipment that they have ordered an additional number of cars, and the Wyatt Park Street Railway, in the same city, have signed a contract with the Sprague company for a complete electrical equipment through the president of that road, Mr. J. M. Hoffman.

Wilmington, Del. The electrical railway in operation at Wilmington, Del., installed by the Sprague company, has been working very successfully, and the management of the road feel so very well pleased with their electrical equipment that they have written to the Sprague Electrice Railway & Motor Co., of New York, expressing their satisfaction, and have given orders for an additional number of cars.

A New Sprague Road at Cincinnati.

During the last week of November the Sprague Electric Railway and Motor Company, of New York, has closed another and very important contract for electrical equipment in street railway work.

This is with Mr. H. H. Littell, President of the Inclined Plane Railway Co., of Cincinnati, Ohio, and calls for the entire equipment of the Main Street Line of that railway, consisting of twenty cars operated over six miles of track.

Mr. Littell, whose residence is in Louisville, Ky., is well known as the first president of the American Street Railway Association, and is one of the most successful street railway presidents in the United States. After a careful investigation of all the systems in use upon electric railways, the Sprague system was adopted as being superior to all others.

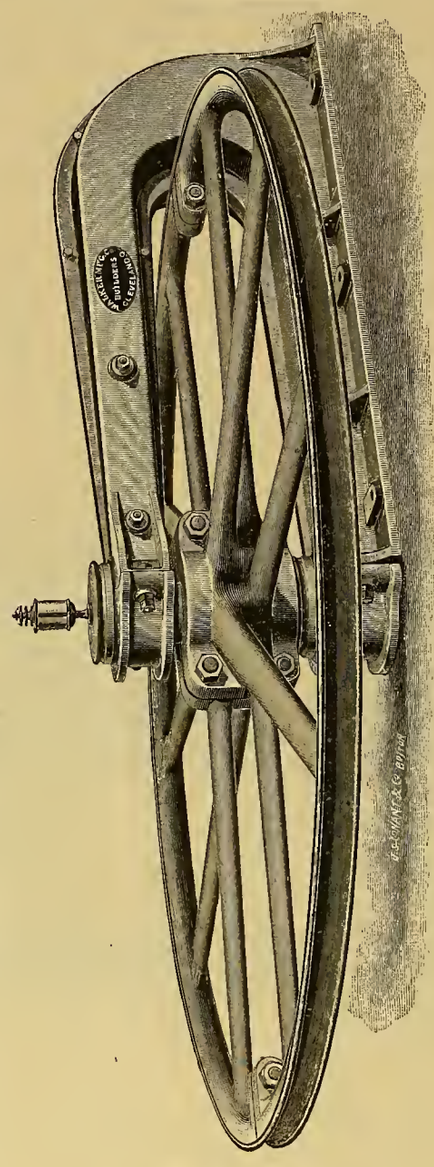
In the equipment of these cars the Sprague improved truck, with improved "Boston" motor, which is described in our present number, will be used.

The overhead system will be of the neatest and best description, we are informed. Iron poles, of a tasteful design and set in concrete, will be used throughout the entire length of the road to carry the overhead wires. The regular Sprague working conductor, less than an eighth of an inch in diameter, will be carried over the center of the street, and the main portion of the current will be carried at the side, according to the regular Sprague system.

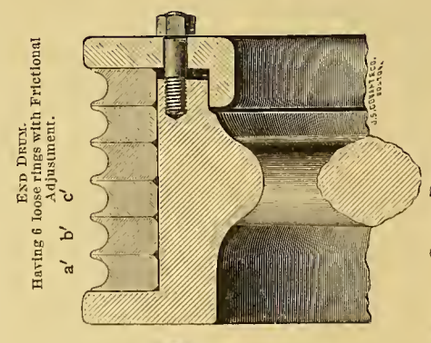
The cars, after leaving the city terminus and running a short distance, come to an inclined plane, where they run upon a platform and are raised to the top of the inclination, after which the road extends, using the overhead system for the rest of the distance.

Both the incline and the cars will be brilliantly lighted by electricity, each car and the power station will be equipped with the Sprague patent lightning arresters, and all the latest and best improvements adopted by the Sprague company upon their roads will be used here.

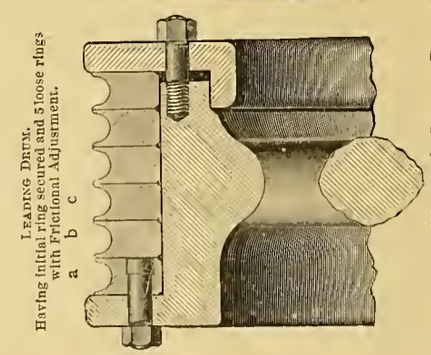
In view of so many difficulties to be overcome by the electric road, the test for the electrical apparatus is peculiarly severe, and the decision of the president and directors of this road to adopt the Sprague system in preference to all others must be particularly gratifying to that company, indicative, as it is, of the confidence which railway managers feel in the strength of their apparatus.



Walker's "U" Frame and Sheave with Staggered Arms for Cable Railway Work.



End Drum.
Having 6 loose rings with Frictional Adjustment.
a' b' c'



Leading Drum.
Having initial ring secured and 5 loose rings with Frictional Adjustment.
a b c

Walker's Patent Differential Cable Drums.
Patented July 31, 1888, by the Walker Manufacturing Co., in United States, Canada, Great Britain, France, Germany, Belgium.

Walker's Cable-Railway Machinery.

We have much pleasure in calling attention to some of the features of the excellent cable machinery made by the Walker Manufacturing Company, of Cleveland, Ohio, whose differential drums, especially, ought to be used by every cable railway company.

"U" Frame and Staggered Arm Sheave.

This "U" frame is cast in two pieces so as to mold easily; it is hollow, with flanges in the center to bolt each half together, and also has ribs inside. The flanges form a back bone to the frame when bolted together. The sides are not pierced with holes as is common in such castings to get core out when cast in one piece; these holes make such castings quite weak, especially so as the metal forming the plate or outside of the castings forms the greatest strength. The castings are securely bolted together and dowell-pinned before they are bored and fitted for the boxes.

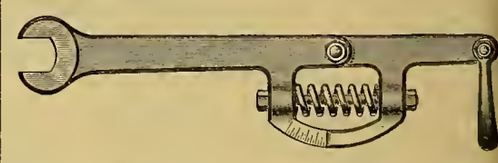
The sheave has staggered arms, which makes a very rigid sheave for either horizontal or vertical motion. The principal advantage of the staggered arm-sheave is a uniform casting, the arms not coming opposite each other dispenses with all undue strains, such as occur in straight arm castings.

The Walker Manufacturing Co. have made a great many of these sheaves already, of 8 ft., 10 ft. and 12 ft. diameter, with the same general success.

As the sheave appears from an ordinary standpoint of molding it would be very difficult, indeed, to mold; but they have a system of molding them which is very simple.

500 H. P. Friction Clutch Coupling.

The outer member of this coupling is a plain ordinary casting with eight arms and hub on out side secured to shaft; the inner member has a boss or center with four bored arms into which



Wrench for Producing and Measuring Frictional Adjustment of Rings.

are fitted segments with corresponding arms to fit into same. The arm part of the segments is hollow and has an inner flange on which rests a spring through which a bolt passes and tensions the segments toward the center of the shaft; this spring can be adjusted so as to make the segment clear the outer member any desired amount when the coupling is not engaged. There are four wedges at the ends of segments which are forced into position by adjusting screws and toggle-lever attached to sliding sleeve as shown; when these four wedges are forced out the result is to lift each of the four segments in a direct line with the bore of the four arms, and directly in opposition to the spring inside of segment arm; of course this spring is only adjusted sufficiently to keep the segments away from the outer member, as any undue pressure of the spring to force segments towards center of shaft would have to be overcome by the wedges. This coupling is very effective, and is doing good service at the 18th street Power House, in Kansas City, Mo. The sleeve is operated by a yoke and lever, with worm and wheel and hand wheel

Walker's Patent Differential Cable Drums.

These drums are shown in section in cuts so as to illustrate the loose differential rings on which the cable rests while in operation. It has long been known that the destruction to cables has been largely due to the grooves wearing irregular in the solid drums, due to the severe strains which the first groove on the receiving drum is subjected to, as a result of the varying loads, the wear is very excessive on this first groove in comparison with its mates in the old style drum wherein the grooves would be turned right into the solid face of the drum. It is quite evident that after the wear progressed to such an extent as to make a very great difference in the circumference of this first groove and that of its mates, this would necessarily require either the cable to stretch a given amount in each revolution of the drum equal to the difference in

circumference of the smaller and larger grooves, or that slippage take place in the groove, either of which would be very detrimental both to the drum and to the cable.

The Differential Drum dispenses entirely with any wear of the grooves, or any wear of the cable while on the grooves. The cable enters on the fixed ring on the leading drum, shown in section on the left hand side (*a*), and is wound onto left hand ring on end drum (a'), and then back to second ring (*b*) on leading drum, and so forth, putting as many wraps on as may be deemed necessary according to the length of the cable. It will be seen that all the rings in the drums are loose excepting the ring (*a*) on which the cable is hauled in from the street. Now should there be any inequality in diameter of the rings, whether by first construction or by subsequent wear in use, the rings will adjust themselves while drum is in motion so that there can be no undue strain on any of the wraps on the drums. The rings on which the cable rests move slightly back or forth to suit the irregularities spoken of. This device was patented July 31 last, in the United States, Canada, Great Britain, France, Germany, Belgium.

A cable is hauled onto drum under very varying loads, according to the resistance or number of cars and amount of traffic on the road; from this it will be understood that the cable is wound on the drums tight or slack, according to the variation of load. While the cable is passing around the drums the tendency is for same to adjust itself or equalize the strains, which cannot be done on a solid grooved drum without cable slipping in the grooves; such slipping will wear the grooves and the cable also; but in the Differential Drums, the rings being loose, will allow the cable to become compensated through the movement of the rings, dispensing with all undue strains. When the cable is at work on these Differential Drums each wrap between the drums appears like a solid bar of iron; and the impression of the cable is left in the tar at bottom of rings, which shows conclusively that there is no slipping of cable in rings.

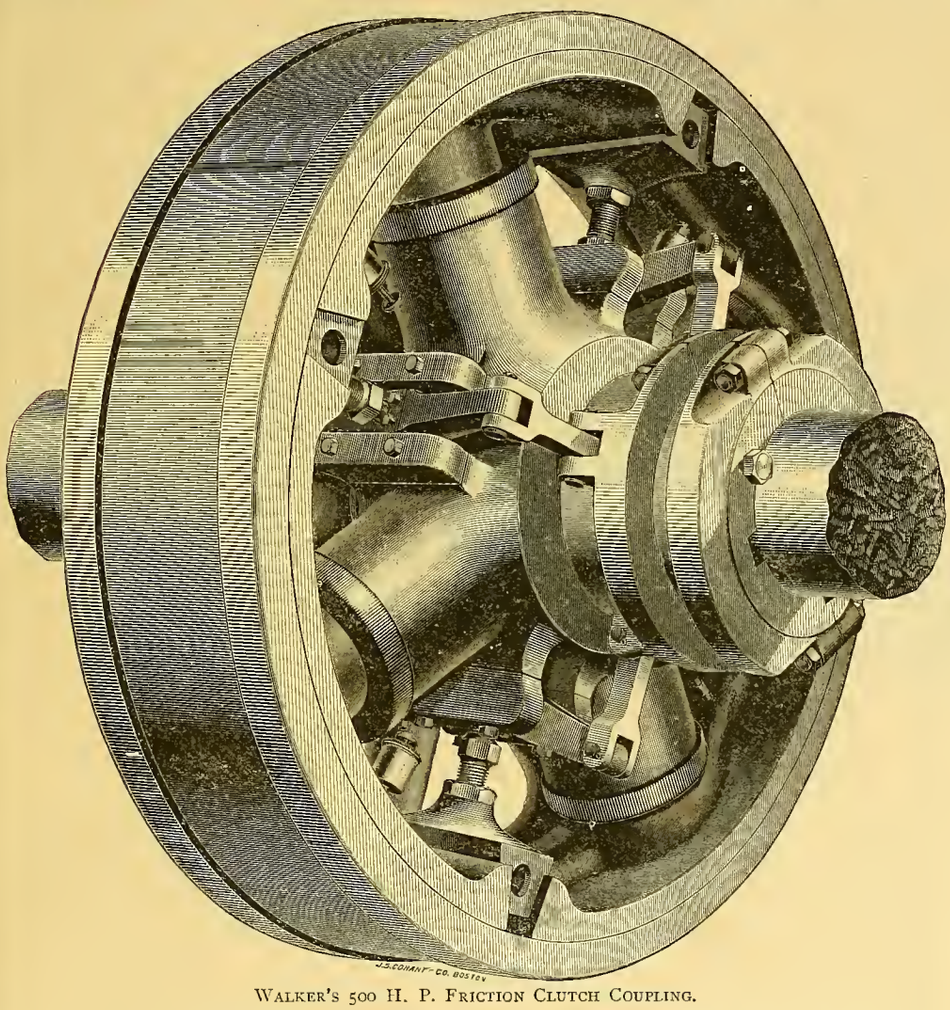
These rings have a diametrical friction due to the pressure of the cable in the grooves transferred to the flat surface of the drum or the underside of the rings. The combined diametrical friction of the various loose rings is sufficient, with the leading ring, which is secured, to drive the cable; however, loose side flanges are provided with side studs and self-registering wrench in order to produce a side friction when necessary. The self-registering wrench will so adjust the studs as to produce an equal amount of friction around the entire circumference of the rings.

Each individual wrap will move an individual ring with about one-fortieth (1-40th) of the strength of the cable; thus the compensation is thoroughly accomplished without any undue strain on the cable while passing over the drums.

The bottom and sides of the rings are thoroughly lubricated by automatic grease cups, inserted in the rim of the drums.

These Differential Drums have been thoroughly tested at the 12th and 18th street Cable Railways of Kansas City, Mo., and the St. Louis Cable & Western Railway Co. of St. Louis, Mo., where they have been giving entire satisfaction. Other plants are being built on which these Differential Drums will be used, of which more anon.

Walker's cable railway machinery only wants to be seen to be greatly admired, and it is in preferred demand at home and abroad.



WALKER'S 500 H. P. FRICTION CLUTCH COUPLING.

Sprague Street Car Motors at Work.

MESSRS. CHADBOURNE & HAZELTON, who have recently closed a contract with the East Reading Railway Co., Reading, Pa., send the following report from their Harrisburg road. This road has been running six months, and they have already ordered four more cars and an increase of dynamo capacity:—

Mr. W. S. Entrekin, of Harrisburg, writes us: "Our Sprague electric street railway has now been running about six months, and has been such a success, operating a distance of three miles for five cents, that stock at $50 par has sold as high as $75. It is now $65 bid and $80 asked. At the present rate of working we expect to declare a 15 per cent. dividend the first year, and to extend the Hill branch about 1½ miles, which will make a ride of over five miles for five cents. I would like to know whether such a record can be beaten."

News such as the foregoing cannot fail to strengthen faith in electric propulsion.

Everit's Car Sash and Car Floor.

The accompanying cuts illustrate Everit's street car sash (Fig. 1), and the Everit street car floor (Fig. 2).

The sash is manufactured in ash or cherry, with black walnut mouldings; and they are furnished glazed and varnished, ready for fitting in cars, or rights may be obtained from the patentee (W. L. Everit, New Haven, Conn.) to make them on royalty.

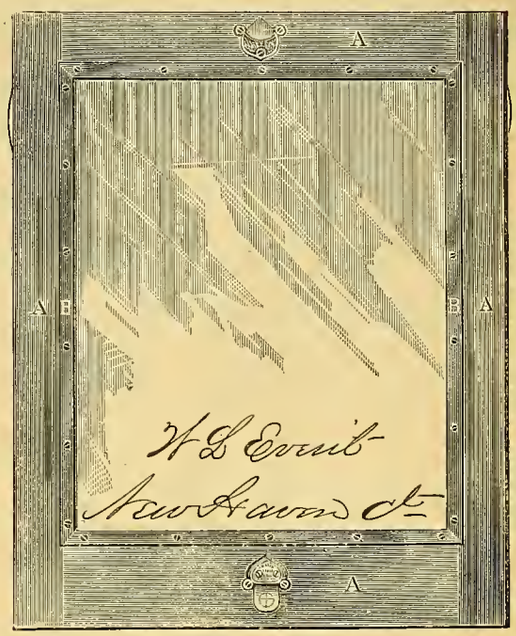


FIG. 1—EVERIT'S STREET CAR SASH.

Everit's car floor is too well known to need any comment. The illustration herewith shows one specially adapted for electric and cable cars.

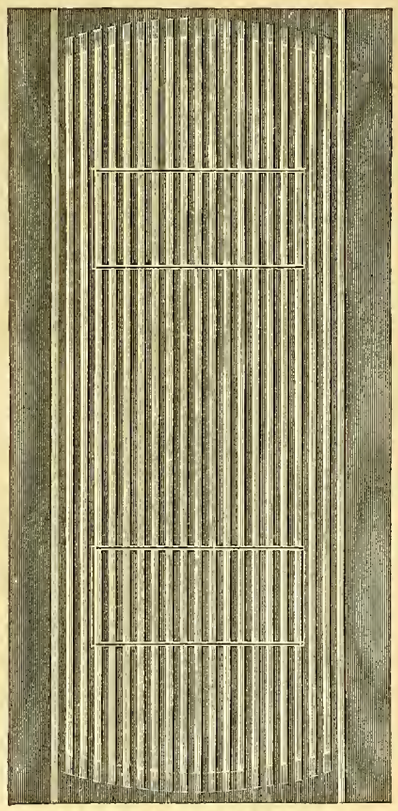


FIG. 2—EVERIT'S STREET CAR FLOOR.

Copies of The "Gazette" Wanted.

MESSRS. VAN AUKEN & MEAD, designers and constructors of horse, cable and motor railways, 100 Opera House, Denver, Col., wish to purchase the following back numbers of the STREET RAILWAY GAZETTE, (of which we are sold out). Numbers 1, 2, 3, 4, 5, 6, 8 and 11 of Vol. III (1888). If any of our readers have any of those numbers to spare they would much oblige by selling them to the parties named.

"Perfection of Street Conveyance."

Such is the top heading of an illustrated article on "electricity by overhead and conduit systems" in *The Beacon*, Boston, of November 24. A description of the electric propulsion systems adopted by the west End Street Railway Co., is prefaced as follows:

"Two years ago, a man standing in front of the State House and looking down Beacon street towards the west saw before him a long and somewhat narrow street, terminating, as it were, in the vicinity of the Milldam, with no especial characteristics, beyond the palatial residences bordering upon it. To-day Beacon street upon the hill is the beginning of what will soon be the most elegant boulevard in the world, a straight, broad avenue, nearly five miles in length, extending from the heart of the city out through Brookline, to its extreme confines at Chestnut Hill reservoir. The major portion of the work of construction upon this great thoroughfare has already been accomplished. It only remains for the reader on some pleasant afternoon to drive out over this roadway to appreciate to some extent what the keen foresight, indomitable perseverance and masterly enterprise of one man, Mr. Henry M. Whitney, has already done for the city of Boston and the town of Brookline in the carrying out of one of the greatest improvements in our vicinity during the past quarter of a century at least. What he will see, however, is only a forerunner of what is to come. The plans of Mr. Whitney and his associates in the West End Land and Street Railway enterprises are far reaching, and the extension of Beacon street out through Brookline to the Chestnut Hill reservoir is but preliminary to the great work of development which these gentlemen have on hand, and which will result in making Boston and its vicinity the most attractive and convenient of access for its residents of any city or country in the world."

Reduced Fares will be granted delegates to the 8th annual meeting of the American Street Railway Association at Minneapolis next October. This is a boon not hitherto granted; and it will no doubt contribute to make the Minneapolis convention a grand success.

Syndicates from the East, syndicates from Boston, and the famous Philadelphia street railway syndicate, are all eclipsed just now by Mr. C. B. Holmes (with his syndicates), of Chicago. Memphis street railways are now added to Mr. Holmes' possessions. A glance at our Street Railway News will show that street railways of other cities are on the tapis; and also that the other syndicates are not idle

The Ohio State Tramway Association.

The seventh annual meeting of the O. S. T. A. was held at the Burnet House, Cincinnati, November 21.

Morning Session. The meeting was called to order shortly after ten o'clock, by president J. E. Bailey of Toledo, in the chair.

The delegates present and companies (members) represented by them were as follows:

Cincinnati: Cincinnati St. R'y Co.—John Kilgour, President. Cincinnati Inclined Plane R'y Co.—H. M. Littell, General Manager, and J. M. Doherty, Secretary and Superintendent. Columbia & Cincinnati St. R.R. Co.—Chas. M. Kilgour, President. Mt. Adams & Eden Park Inclined Railway.—Geo. B. Kerper, President.

Cleveland: Broadway & Newberry St. R.R. Co.—Jno J. Stanley, Superintendent. East Cleveland R.R. Co.—Dr. A. Everett, President, and H. A. Everett, Secretary and Treasurer. St. Clair St. R'y Co.—Chas. Hathaway, President, and A. G. Hathaway, Secretary. Superior St. R.R. Co.—Chas. Hathaway. Woodland Ave. & West Side St. R.R. Co.,—J. B. Hanna, Secretary.

Columbus: Columbus Consol'd St. R.R. Co.—A. D. Rodgers, President. Glenwood & Green Lawn St. R R. Co.—A. D. Rodgers, President.

Dayton: Dayton St. R.R. Co.—C. J. Ferneding, President, and W. H. Simms, Director. Oakwood St. R.R. Co.—Chas. B. Clegg, President. Wayne & 5th St. R.R. Co.—Chas. B. Clegg.

Springfield: Citizens' St. R.R. Co. — Ross Mitchell, President, Gen. Asa S. Bushnell, Director, and W. H. Handford, Superintendent.

Toledo: Metropolitan St. R'y Co.—T. F. Sheperd, Superintendent. Toledo Consolidated St. R'y Co.—J. E. Bailey, President, and John Gilmartin, Superintendent.

The following new members were admitted: Ashtabula Street Railroad, represented by John N. Stewart, Proprietor; Mt. Auburn Cable R'y Co., Cincinnati, represented by Henry Martin, President; and the White Line St. R'y Co. of Dayton, represented by A. G. Clark, and John A. Watson, Superintendent.

Mr. Wm. J. Richardson, of Brooklyn, Secretary of the American Street Railway Association, was present by invitation.

There was also present R. P. Alley, and W.W. Bean, Cincinnati; Mr. Brownell (Brownell & Wight) of St. Louis; J. S. Elliott, representing the Johnson Steel Street Rail Co.; F. T. Lerned, representing the Peckham Street Car Wheel and Axle Co.; J. R. McLaughlin, until he withdrew; John J. Mungen, of the Fleming Manufacturing Co (snow plows); John S. Pugh, representing the Baltimore Car Wheel Co.; Paul Trommlitz, San Francisco; C. J. Langdon, of the Fulton Foundry, Cleveland; E. P. Harris, New York, editor of the *Street Railway Journal;* and Wm. Hughes, Chicago, the editor of the Street Railway Gazette.

The minutes of last meeting were accepted as printed.

Treasurer's Report.

The receipts last year amounted to $122.25, which with balance of previons year ($45.18) totaled $167.43. The payments came to $61.58, leaving a balance in the bank of $105 85. The report was approved and adopted. There was no other report from officers.

Steam and other Motors.

The Association proceeded to consider the "developement of motors the past year." Mr. C. B. Clegg, of Dayton, was called upon for a paper on "Steam and other motors than cable or electricity;" but through some misunderstanding he had not prepared one. Mr. Clegg said: I am very sorry that I am not prepared with a paper, because I would have liked very much to have done something in that direction. I suppose there is no member of the Association that has given the subject more practical attention than I have. I have visited every new motive power that has been presented up to the present time—every electric road in the United States. The last one I have visited was the Allegheny, or Pittsburgh road at Allegheny, which is a conduit system, and I would have been very glad to have said something about it. The subject of motive power in street railway matters is certainly very interesting. It makes no difference what power is finally adopted, the subject will never lose its interest; because, even after we adopt the best, which we will do, the question will then come up upon the economical application of it. There has been a great deal of brain power expended in our interest; I am happy to know this, and I think we all are. I went to New York to investigate the Connelly motor, and I belive that is a very promising motor for our business, although I did not think much of it until I went to look at it. They sent a man over to fire it up and set it going for me and I squandered a whole day there. They unfortunately broke down in getting it ready and I did not see it moving, but the whole thing is very compact and looks very much like a White Line car we rode on in Dayton, with the cab in front, and motor and machinery and all is confined in that much space (indicating a small compass). It is a naphtha engine—gas engine—and all very compact, and does the work very well. Lewis & Fowler of Brooklyn think so much of it that they are willing to handle it and put it on the market. Now, in addition to the Connelly machine, I met the Hon. Benjamin Butterworth, who represents one of your districts in Congress, at West Point, and he

The Sprague Electric Cars on the Beacon Street Division of the West End Road.
(By courtesy of *The Beacon*, Boston, Mass. From an illustrated article published by them Nov. 24th.)

told me that he had a client who had a steam motor that would revolutionize the street railroad business; he was perfectly satisfied of it himself. He might have been a little too enthusiastic from his standpoint as a lawyer for his client; but Mr. Richardson of New York tells me that he has communicated with Mr. Scribner, who is one of the most intelligent street railroad men in New York, and has just returned from Europe, and says that he has found a perfect motor for street railroad motion. "A perfect motor," he says, and when we asked him what it is, he described it as a steam motor without any exhaust, noise or dirt, and he says, "absolutely perfect;" and coming from him, an intelligent street railroad man, I think that is somewhat encouraging, that is Mr. Hilton Scribner, in New York. He found it in Brussels or Berlin, I don't know which. I believe we are coming to something that will do our business. I have investigated nothing, hardly, except this Connelly motor—that I did not see run, it broke down while they were getting it ready—except possibly the steam motor and naphtha motor, but I think we will come to something, and that subject is of sufficient interest to keep us busy for sometime.

The PRESIDENT: What did you find in Pittsburgh?

Mr. CLEGG: I found the conduit. The only conduit road in operation, I believe. I found it working fairly well. They have had a great deal of trouble with their sewerage and drainage, but if they can overcome that, the underground system seems to work just as well as the overhead system, getting rid of all the objectionable features of the over-head system, the poles and wires, etc.

Mr. JOHN HARRIS: I will ask Mr. Clegg if he examined the storage battery system in New York?

Mr. CLEGG: I have ridden on the cars and been down to the office of the people representing it, and that system, I think, with others who have more thoroughly examined the system in Philadelphia, works just as well as the overhead system. There is no doubt about that. The conduit system of Pittsburgh is a very pretty system and not enormously expensive like a cable or anything like that.

Mr. KERPER: I hope there will be some discussion of this question, and if there are any independent motors, such as the Connelly motor, and anybody knows anything about them, I trust they will give us the benefit of their knowledge. We certainly all agree that if we can get a motor that operates in all kinds of weather and that the stoppage of one motor or one machine will not stop the whole line, it is a subject that we ought to bring out. Notwithstanding that we are in the cable business, and when the cable stops our entire line stops, still we have branches of lines on the hill and in the city, where, if we could get a motor that would be economical, a motor that would be independent, and if one was out of order the line would only stop so far as that motor was concerned—and if such a motor could be operated more economically than horses and could be operated at a higher speed than horses—we would certainly gain in the economy of operation and in speed.

Mr. BROWNELL: There was a gentleman at our office yesterday from Denver, a mining expert, and spoke of a storage battery that is being tried by some people there at Denver. He claims great things for it. It weighs very much less than the storage batteries they have experienced with in St. Louis, and they have given very thorough trials of the Denver batteries there. The weight is less and it carries the electricity longer, and they seem to think that it is a very positive success. Mr. Matson, of the Denver Railway, was in consultation with this party yesterday, and undoubtedly the motor will be given a trial on the road as they had two cars ready to use as soon as they got a satisfactory battery.

Mr. HENRY MARTIN, Cincinnati: There is a mechanic in this city working on what he claims will be a perfect motor. He calls it "the silent cable," because he is enabled to overcome any grade whatever; and I am perfectly satisfied in my own mind that it will be a success—so much so that I am advancing him the money to help him along. He can operate it with any power, but his attention is particularly directed to applying it to cable roads; but he claims it will work well with electricity or any other power. I will, moreover, say that I have seen him demonstrate with a little half-horse power motor that he could climb 35 per cent. grade, that is, thirty-five feet in the hundred. The little car was loaded with forty pounds of iron and it climbed the grade readily.

Dr. EVERETT: I have looked the thing over a little as Mr. Clegg did. Wherever I could find a motor, whether electricity, gas, steam, compressed air, and everything out. As for the Connelly motor, of which Mr. Clegg seems to think so much, I do not think it is practicable. There is one objection to it. I know people on one of our lines would not ride on it, and that is the odor, judging from what I noticed at the time I rode on it. And another objection is that it is very noisy. Its road is handsomer than the cable, and much noisier than the electric car. I also investigated the road at Pittsburgh, that is a conduit road for about three quarters of a mile, and the balance of the road is overhead wire. It ran very nicely while I was there, both the conduit and overhead. It was the Bentley-Knight system, which we experimented with four or five years ago. When I returned, the only thing that I reported to my directors was that I was in favor of the Sprague system as seen at Richmond. They have adopted it, and we will be ready to operate eight miles of our road next month with the Sprague motors.

Mr. CLEGG: So far as electricity is concerned, I do not think that you have made a mistake there.

Dr. EVERETT: I adopted it as I understood that no other system could use what they permit, the feed system of lines. A feed wire runs along the side of the street the whole length of the line, and every four or five hundred feet there is run a feed wire from the main line, and if your trolley line should break at one point, between two feed wires running into the trolley wire, your road will run just as well each side of the break as though it had not broken.

Mr. CLEGG: They reinforce the wire.

Dr. EVERETT: If you take a wire fed at one end and that wire breaks, every car stops on that line. The main feature of the Sprague system, and why I recommend it, is because the whole line does not stop. We will probably have eight miles of line in operation by the first of December. They are now using that system at Akron. I have been up there three or four times, and they run those cars very successfully, and run all the way from eight to fifteen miles per hour. I came in on that road two miles or two and a half, from the suburbs, with some pretty heavy grades, including stoppages, at the rate of thirteen miles an hour, and I rode on the cars at Richmond at eighteen miles an hour.

Mr. RODGERS: While I was in the east a few weeks ago, I heard of the storage battery system that was being tested in Brooklyn. It is something different from the Julien, and I understand they are getting very good results at the experiments. Either at this time or later on, I should be very glad to hear from a gentleman who has just entered the room and whom you all know by reputation—Mr. Richardson, Secretary of the National Association. He is connected with one of the Brooklyn lines and would probably know something about it.

Mr. RICHARDSON: Mr. Rodgers introduces me in connection with the subject of electricity; I understand there is to be a paper on that subject, and I suggest that it would be better, perhaps, to defer my remarks on that subject till after the paper is read.

The subject of electricity was next taken up; and the following paper was read by Mr. A. G. Clark.

Mr. CLARK: I do not know what has been done in the State Associations, but the subject at the National Association is pretty well worn.

ELECTRICITY.

In attempting to comply with the request that I should prepare a paper on the subject of electricity as applied to street car propulsion, it must be accepted at the start that I present the matter as a layman, and not as an expert or one versed in electrical science. My experience began with the construction of the Baltimore & Hampden road in 1884, probably the first practical application of electricity to a road doing regular business. The fundamental principles developed in its construction are essentially the same as of to-day, the advance being made in mechanical detail and construction. It is hardly worth while for me to recite the various methods that are being experimented with. The only one known to me which has answered every requirement as to economy, change of weather, etc., is the overhead system. I do not know where the storage battery has been operating an entire road, and to-day if acknowledged a success, it can only be considered so when operated in large cities on account of the large operating expense. As electricians tell me, there has been but little advance over twenty years ago in the results produced by storage batteries; it is to be hoped we are approaching the time when some great discovery will be made which will make them applicable to all street cars—there is no doubt this will be the perfection of street railroading.

Several examples of underground construction are now in operation, but I know of none that have stood a winter test, without it be a road in California, where the construction cost thirty to forty thousand dollars per single track mile, and where the conditions of climate afford us no opportunity of forming an opinion.

If to-day we are to judge of the practical operation by electricity of street cars in all its phases, there is really nothing, in my opinion, but the overhead system. All the various plans for constructing plants of this character are essentially the same, generating a current at a station of about 500 volts, which is transmitted to a wire or wires varying in size and number as the voltage may be more or less. I do not go into a description of the construction, as I imagine every member present has seen electric roads in operation; it is more my purpose to make statements and suggestions which may be of benefit to those contemplating the adoption of this power.

In the first place, do not try cheap and inadequate construction; there is no place where economy can be so misapplied, for electrical machinery, cheaply and poorly constructed, is a most constant source of annoyance and expense.

Second; start out with the knowledge that you will duplicate every part of your construction, both steam and electrical, as the most perfect of mechanism may fail, and nothing is more annoying to the traveling public than delay; in addition to this you are repaid in the economy of operation and the saving of your machinery, as the non-crowding of boilers saves coal and the changing off of machinery gives it a rest, which is most desirable, especially to the electrical part, giving it a chance to cool, and saving many a burn out.

Third; cleanliness is essential to satisfactory operation; the motor drivers should be required to keep their motors free from oil and dust, and everything that tends to this end should be provided for them. A pit should be conveniently located so that frequent inspection may be made of the gearing. All electric roads should have extra cars, not only in case of accident, but that in rotation the motors may be inspected and taken apart and cleaned of oil and of any copper dust from the wearing of the brushes. With proper care and system I have no hesitancy in saying that electric roads can be run economically. Of the two methods of over running and under running trolleys I would decide in favor of the latter, because there is not the weight and strain on the wire, nor is the trolley constantly falling on top of the car, also in case of sleet the water has a tendency to form in icicles on the under side of the wire which the trolley wheels will knock off, while on top it forms a continuous non-conducting surface of ice which must be broken to obtain a contact. The leaning of electric railroad constructors seems to be all towards placing the motors under the cars and making connection by cog-wheels to the axles; in view of this I have some hesitancy in saying my preference, except in case of heavy grades, is to have the motor in front part of car, for the following reasons: First, it gives a better opportunity for the men to keep them clean; second, being always in sight, any tendency towards electrical difficulty can be checked at once, thereby often saving an armature; third, my experience has been that the motor drivers become attached to their special motors like a locomotive engineer does to his engine, and take pride in keeping them in order; fourth, the motor is out of the way of all chance of getting wet or dirty, or magnetically attracting nails or iron material in the streets. Where there are any considerable grades, the more direct method of connection I should consider of advantage. If very heavy grades are to be overcome, a special tow car would be of benefit rather than have the heavy and expensive equipment on each car to simply meet the requirements of certain grades. Before beginning to build a power house, great study should be given to the location of machinery in the building, for if this is done properly quite a saving can be made in expense of operating.

I believe an observance of the points I have so crudely made, as they are regarded or not, will tend very decidedly to make or mar the success of an electric road.

A. G. CLARK.

On motion, the paper was received with thanks, filed and ordered printed in the proceedings of the Association.

Mr. KERPER moved that the Association hear from Mr. Richardson to open the discussion. The motion was unaniously carried.

Mr RICHARDSON: I don't know that I ought to say anything on the question of electricity aside from its development, or perhaps, lack of development, in the city from which I come, for I am, and have been for years, very much of a pronounced cable man. Like the Chinaman who summed up his idea about the cable road saying, "No mannee, no horsee, go like hellee allee samee," I believe for heavy Northern city traffic, the cable is *the* power. As Mr. Clark has said, I believe there is now no really successful—that is successful from the standpoint of com-

(*Continued on page* 177.)

The
Street Railway
Gazette.

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S. L. K. MONROE, - - - - - - TREASURER.
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Articles and papers on subjects relating to intermural transit always appreciated; the GAZETTE's columns are open for the expression of independent opinions, and the discussion of all matters connected with street railways—on the surface, elevated or underground. A special column is devoted to the publication of trade notes and items from manufacturers and dealers.

THE WASHINGTON CONVENTION's products have been extensively discussed by our contemporaries. The *Electrical Review* (New York) correspondent, under date of Washington, Dec. 1, says: "The recent street railway convention, with all its lengthy and intensely interesting discussion, did not settle many questions for the roads in this city. The leading companies are convinced that horse power must soon be superseded; some of them are replacing their old tracks with 80-pound rails at double the cost of ordinary rails, in order to be prepared for heavier cars, and all are hoping that the storage battery will soon materialize and become an available thing. Legal complications are now delaying its development."

ELECTRIC TRAMWAYS is the caption of the portions of our report of the Washington convention relating to electric propulsion, in the *Electrical Engineer* (London), Nov. 16 and 23, and still "to be continued," taken verbatim from the STREET RAILWAY GAZETTE. Our contemporary introduced the subject, saying: "At the seventh annual meeting of the American Street Railway Association, held at Willard's Hotel, Washington, a long discussion took place upon the use of electricity for traction purposes upon such railways. It is well known that at present we are far behindhand in England in this class of work compared with America, and it is to the work of the users of electric traction in America that we must look at present for information. Last week we reported the trial of an electric tramcar at Birmingham, and mentioned that the system was a combination of Julien's and Messrs. Elwell-Parker. It will be seen from the report that we give herewith that the general manager of the Julien Company at New York opened the discussion at the meeting we refer to."

CAPITAL stock and number of passengers carried in 1887 of the Broadway line and Third avenue line of New York, and the Chicago City Railway, are asked for by a St. Louis enquirer. The capital stock of the Broadway & 7th Av. (N. Y.) road is $2,100,000 (in 21,000 shares); that of the Third avenue line $2,000,000 (in 20,000 shares); and of the Chicago City Ry. $4,000,000. The numbers of passengers carried in 1887 were, by the first named road 32,878,853; by the second 26,400,000; and by the latter over 51,000,000.

CORRESPONDENCE.

Success of a New Electric Railway.

WASHINGTON, D. C., Nov. 6, 1888.
EDITOR OF THE STREET RAILWAY GAZETTE.

Dear Sir:—Replying to your favor of the 3rd inst. in which you request me to let you know how the new electric railway is progressing, I beg to state that the results, so far, have been very encouraging.

We commenced business on the 17th of October with two motor cars, and on the first inst. we added the third motor car, and we shall soon put on the fourth, to be followed by others in the early spring. Our cars have averaged more than their full seating capacity from the start, and on Sundays each motor car has had in tow a large summer car, and the six cars have been inadequate to meet the demands upon them. The first Sunday we carried, with two motor cars towing two summer cars, over 5,000 passengers. On the second Sunday it rained all day, until four o'clock, and yet our passengers numbered 2,250. Last Sunday the weather was pleasant the entire day, and with our three motor cars and the three summer cars we carried over 6,000 people. We use two ten horse-power Thomson-Houston motors to each car, and they have climbed a five per cent. grade with over 200 passengers to each car, including the tow, starting and stopping on this grade with apparent ease. We use in our power house a Ball engine of a hundred horse power capacity, which drives an eighty horse power Thomson-Houston generator. As you are aware, we use the center pole, overhead system on New York avenue, and beyond the city limits we use the cross suspension method. I would recommend the center pole system in all cases where the width of the street will admit of it. With neat iron poles such as we use on New York avenue, the street not only looks better, but the result is more satisfactory in every way. In fact, the iron poles are a great ornament to the street, and prove not to be objectionable to street traffic.

We run from ten to fifteen miles per hour, the limit of our charter, which enables us to do with one car the work of two ordinary horse cars. As to the economy of operating under the system which we employ, as compared with horse-power, we cannot yet give accurate figures, but I have no doubt that even with our limited number of cars it is cheaper and certainly more profitable than a horse road would be. Our road has paid handsomely thus far, and we have every reason to feel hopeful for the future. The public seem pleased, and property along New York avenue has doubled in value, in many instances, since our road was commenced.

Yours truly, GEO. TRUESDELL,
President Eckington & Soldier's Home Ry. Co.

"U. S. Mail" Lines.

TROY, N. Y., Nov. 13th, 1888.
EDITOR STREET RAILWAY GAZETTE.

Dear Sir:—In reply to yours of 3d, we have a contract with the post-office department as follows: We furnish a stipulated number of tickets for the P. O. carriers at a reduced rate in consideration of the making our lines "U. S. mail" lines—each car carrying a conspicuous sign "U. S. Mail" on each end; there are no letter boxes on the cars. The effect has been far beyond our expectation in preventing unnecessary delays to our cars by teamsters and others, and especially by contractors digging up the streets in constructing sewers, etc. We have had a test case in United States Court, the offending party being held for trial.

Very Respectfully, CHAS. CLEMINSHAW,
Prest. Troy & Lansingburgh R.R. Co.

Kansas City Cableography.

ST. PAUL, MINN., Nov. 20, 1888.
EDITOR STREET RAILWAY GAZETTE.

Dear Sir:—I notice in the November GAZETTE a tabular statement of the cable railways of Kansas City, by Mr. Wm. B. Knight, which he claims is the only correct statement ever published. I will mention a correction which you would oblige me by publishing in your next issue. The Kansas City Cable Railway Co.'s main line is 1.9 miles long, running from Union avenue to Woodland avenue over 9th and 8th streets, and not 2.74 miles. The Kansas City Cable Ry. Co.'s Independence avenue line .84 mile. Engineer Clift Wise is in addition to the ones mentioned; commenced operating June, 1885.

Yours truly, CLIFT WISE.

Sprague's and Thomson-Houston's Electric Railway Systems.

General Wm. H. Sinclair, President of the Galveston (Texas) City RR. Co., paid especial attention to the discussion at the Washington Convention anent electric railways. Subsequently he visited Richmond, Va., and inspected the electric road there. A few days afterwards we met the general at the Grand Pacific Hotel, Chicago, when he made a statement which we thought would be interesting to our readers; and, therefore, we wrote to ask if he would favor us with a statement in writing. Here it is:—

OFFICE OF THE
GALVESTON CITY RAILROAD COMPANY,
GALVESTON, Texas, Nov. 28, 1888.

EDITOR STREET RAILWAY GAZETTE:

Dear Sir—Replying to your request that I give you my impression as to the electrical road at Richmond, Va., would state that at the close of the Street Railway Convention at Washington, in company with several other gentlemen, I went to inspect the Richmond road, and my trip was most interesting and profitable. When Mr. Sprague addressed the Street Railway Convention at Washington in regard to his system, and answered the questions propounded to him by members of the association in regard to the way the road was working, he created the impression in my mind that there were serious defects which had not yet been overcome; but, after visiting Richmond and seeing the road in operation, I feel convinced that the operation of street cars by electricity is no longer an experiment, and I also became convinced that Mr. Sprague's apparent indifference to unfriendly criticism in regard to his Richmond road did not grow out of the feeling that I first attributed as the cause, but, rather, out of a perfect confidence he felt that he had a good system and that it was a success, notwithstanding local surroundings at Richmond which gave it a black eye.

A subsequent visit to Lynn, Mass., where the manufactory of the Thomson-Houston Company is located, and the work in process of construction for various roads, and the construction of lines in various parts of the country by that company, further convinced me that the propulsion of street cars by electricity is no longer in its experimental stage, but an established fact; of course susceptible of further development and greater efficiency as time passes, and the emergencies that arise will be overcome by the inventive genius of the electrical fraternity.

Yours truly, WM. H. SINCLAIR.

MR. WM J. RICHARDSON, secretary of the American Street Railway Association, passed through Chicago recently; but only stayed in this rapidly growing city, which is now ahead of Brooklyn, long enough to dine with Mr. C. B. Holmes, and to make a friendly call on Mr. J. B. Parsons, etc. He had been to Minneapolis, no doubt looking how the land lays in reference to the next annual meeting of the national association. This is beginning in good time, certainly. And this, with other indications, tend to show that Mr. Secretary Richardson will do all he can to make the Minneapolis Convention a grand success.

MR. J. C. ROBINSON, of whom Mr. Wm. J. Richardson, of Brooklyn, has spoken very highly, and whose splendid testimonials from across the water were mentioned in our columns some time since, has been appointed Superintendent of the Los Angeles Cable Railway Co. Mr. C. B. Holmes and his friends are to be congratulated on the securing of Mr. Robinson's services, and he cannot but feel glad of such an appointment as he has at last obtained. Mr. Robinson's family were recently sent back to England on account of the ill-health they suffered in the South. Now he will have the pleasure of sending for them to enjoy the best California climate. May he and they long enjoy it.

(*Continued from page* 175.)

mercial value—system of electrical operation with the exception of the overhead system. Many of you, of course, are familiar with that system as developed in Richmond and elsewhere. Of course the underground system, and perhaps the storage battery system—though I have not examined into that thoroughly—may be successful in Southern cities, but I take it that the State of Ohio is mainly a Northern State, and a system to be a success—a system of motor power to be a success absolutely—must be built for our cars to be operated by through all kinds of weather. For instance, a system which would operate our cars in the summer time only, would not be a success, because we have such snow and ice, and in such great quantities, to contend against in the operation of roads in the winter time, and therefore a system that is successful for eight or nine months in the year, and has to be abandoned the other months, would be a failure. Therefore I have felt that the storage battery, or any other independent motive power that is applied to a car that must depend upon the friction between the surface of the tread of the wheel and the head of the rail for its starting control, would be apt to be a failure in Northern cities, for the reason that we have storms at times, such for instance as the blizzard back in the springtime of 1888, familiar to all of us, more or less at any rate, in which it would be impossible to operate an individual motor. Steam, even, which has been longest with us,—and on which the best mechanical talent of the country has been expended in perfecting it—has not been a success for the reason, that at times there would come storms when it would be impossible to get sufficient friction between the wheel and the rail to start the car. Now with the cable power there is no such difficulty. In speaking of the cable, I refer to trunk roads, like those in New York and Brooklyn where there is very heavy travel.

Concerning electricity, what I have to say in regard to Brooklyn, where I live, is, that very little has been done in reference to the development of electricity. There are two motors—the Main and Weiss, with which simply trial trips have been made. Both are storage batteries. The secretary of the Brooklyn City R. R. Co., a man of considerable influence in controlling the policy of the Company, Mr. H. M. Thompson, formerly Secretary of the Board of Railroad Commissioners of New York State, has expressed unbounded faith in electricity; yet notwithstanding that, and the attention he has given to it in many forms, I recently saw a letter from him to Mr. C. C. Woodworth, known to many of you, whose company is a member of the American Street Railway Association, and who is now president of the New York State Street Railway Association, in which letter Mr. Thompson says that little is being done in electricity now, and mentions a naphtha motor which seemed to be coming into notice and in which he had great faith. It may be the Connelly motor of which he wrote. But it showed the trend of thought of the Secretary of the Brooklyn City R. R. Co., who was so decidedly in favor of electricity in some form or other, and whose faith has, perhaps by reason of his experience with electricity, been somewhat modified as to its efficiency. Therefore, so far as Brooklyn is concerned, there is but little doing in electricity. I would not, however, have you look much to Brooklyn for progress in electricity, cable or other motive power. Though it is the third city in the Union, I think it is about the thirtieth in the matter of general progress. Here, in Cincinnati—I came here three years ago—and found you had just started a cable road. Now I see you have three of them. We started with a cable road three years ago, and now have none [Laughter]! I don't know that I have anything further to say upon the subject of motive power. Of course you know what is being done on the Fourth Avenue Road with the Julien motor. That company has faith in it. They started with one car. They have ordered ten, and I believe they have three or four in operation; but I do not believe that, when winter time comes, these storage batteries will be able to run the trips regularly any more than the horse cars would at certain times, and I do not believe they will, by reason of the failure of rail friction from ice and snow. I think the horse car would be more likely to run because the horses can dig in their toe and heel calks and pull independently of rail friction. I think the only thing to be done by those great trunk lines in New York City that have to run in competition with the elevated roads is to have a formidable cable—something that will run through all weathers. The cable power would do their business to perfection, in my judgment.

Mr. Clark: Going a little further into this question of electricity as a power, the great trouble with the underground system, as I understand it, is, not that it can not be done, but before you get into the field where you can operate it, you must in the first place build a cable road in order to get perfect construction in order to avoid danger from shocks in the street and for the sake of economy; the conduit being damp and wet, there would be large loss from leakage, the wire would have to be perfectly insulated and the conduit well made, and to do this it would cost as much as to put down the cable itself. Of course the saving in power after you get it down would be large. As near as I can arrive at it, I should say that with a hundred horse power steam plant, delivered over the road, you would probably have 70-horse power delivered. That is perhaps an advantage over the amount of power used in operation as against the cable, in which, as I understand it, a large percentage is to be exhausted before you begin to move the car. There is another thing I have discovered in our road at Dayton. I don't know that it has come to you, but it is a thing that pleases a great many people on our road, and that is the ability to back up and take passengers.

This is done with greater ease than on a horse road and is a thing impossible with a cable road. If they have passed a place about ten feet the drivers will back up to it and take the passengers and frequently this is a great advantage to the ladies and an advantage to the company in taking up passengers. The storage battery system I have taken a great deal of interest in. The amount of loss, first from the steam plant and then to the dynamo power, and then to storage battery power, cuts it down pretty low and I think there must be a great deal of expense connected with any storage battery that may be adopted. As far as I can judge of the subject now, I think that all batteries put on the cars are so heavy that it would seem to me that there would have to be an overhauling of all their construction to make them lighter, or it would require great power to move the car itself. Of course this discussion divides itself into two parts: What will be applicable to large cities forms one part. Then there are the requirements of a small city. In my opinion it requires a very large city to support a cable road. There has to be a great many passengers carried before you come down to the question of economy in a cable. And this question of electrical operation, I think, is of particular interest to what I may call medium towns; for the cable would hardly pay in anything but the large cities.

Mr. Clegg: I want personally to thank Mr. Clark for his able paper this morning and for his interesting remarks upon it, and also Mr. Rodgers. Mr. Clark recommends—I am getting serious about this matter and it is a very serious and interesting question with me—Mr. Clark recommends permanent and substantial construction. I would like to ask him if there has been anything done in Dayton in the way of construction that might have been omitted or anything not done that should have been done?

Mr. Clark: In regard to our roadbed, there are questions that can only be answered by experience. I am rather of the impression, although it is not gotten by experience at all, but merely as I put that whole plant up there, that to be more than safe, I am inclined to say that if I was to build the road again, I would use a heavier rail, although there is nothing in our experience that leads me to say it. The road is giving way in no place except over one dirt fill, and there the superintendent reinforced it by putting the ties closer together; and in wet weather we churn the track in mud. With that exception I do not know of anything. We have a plant that is duplicated in every part. There are two new engines, and when we made our contract we made our electrician read over the engine builder's specifications and guarantee in his contract with us. He said that he had read over those specifications, and such engines as were there described were what he agreed to put in under his electrical contract. I have had a very unpleasant experience with Baltimore, probably not through any fault of our own, but while I learned a great deal by it, it cost the company $21,000. The contractors were experimenting. They built two engines there, either one of which will run the entire plant. We have been running 125 days without any delay except on account of one of these engines getting out of order, and that was through carelessness. It took fifteen hours to fix up the engine. We have excellent water by going a short distance for it, and a well 50 feet deep. We have two pumps there, one of which will get water enough. There are three boilers, any two of which will run the road. As I said in my paper, we find that having everything duplicated in that way it is more economical in operation, both in resting machinery and in economy of fuel. We are operating nine cars constantly, from morning till night. We have ten cars and two tow-cars, making a total of twelve cars. The superintendent has constantly one of these cars before him, not necessarily because it is out of order, but they take it in and take it apart and are constantly cleaning them and driving them in rotation in that way, and the result has been that we have run very satisfactorily. We have had, since the electrical experts left there, no trouble whatever. We had one difficulty which was very annoying at first. We were compelled to cross over two railroads with their sidetracks, making 26 single rails at one point. It was very hard to keep the wire above at first on account of the jarring. This was remedied by using a steel wire arm which was rigid at the base, but at the end has a little flexibility, and the result is that it follows the wire much better, not taking it at angles, and in crossing the railroad is not displaced by the jogging motion as it formerly had. Since this has been put on we have had no trouble at all. We started in there with a new conductor and my idea was to run the road as cheaply as possible, and to-day we are running without any conductor; and I think I state it correctly when I say that all agree that we have been doing remarkably well with men who were green in running the road.

Mr. Rodgers: I would like to ask Mr. Clark, with his large experience with horse and electric motors, whether he has any impressions as to the results so far obtained--the comparative economy of electricity over horses, and whether to use under trolley or over trolley?

Mr. Clark: Under trolley. The reasons for that I have stated in my paper. There is no question that frozen sleet is a non conductor and it would be necessary where it forms on the top of the wire to jar it in order to get a contact. There has been a suggestion made to have a little tapper run on the trolley wire where it runs overhead, to break the ice and have a contact. And in running the trolley, if you watch the ice, if there is enough water to flow on the under side, it will form an icicle which the end coming in contact with it will knock off, and in addition to that, the copper wire will stretch of itself very decidedly if there is enough on it, and if you carry a trolley on it, it tends to stretch it more than if you push up on it from underneath.

As to the question of economy, I would say that before building our road in Dayton, we visited numerous places and examined numerous books of various companies operating, and our experience was the most practicable construction that we had ever seen anywhere, that the power was there and if properly handled, was the most economical. I have in the city of Dayton tried to make a study of construction, and you will see that it is imperfect, but far in advance of anything that I have seen anywhere.

The question of economy reduces itself right to this, and for that reason I have stated that it is so essential you should have cleanliness and care in running an electric road. An electric road, in my opinion, that is allowed to take care of itself, or has not close attention, would be the most expensive system you could possibly put in. The production of the power and the amount taken to operate it is very economical—

extremely so. The main question is as to the care you take of the motor machinery and the wearing out of it. The battery being burnt out, and other things used up, would be very expensive, but the proper conducting of the railroad is very economical, much more so than cable or horse power.

The PRESIDENT: You spoke of rails. What size do you use, or what do you recommend?

Mr. CLARK: The 38-pound Johnson rail. We get contact by the rail except where it is carried over the end of the bridge to the other by copper wire. We cannot get it there because we have to put down an old-fashioned flat rail.

Mr. BROWNELL: A few weeks ago I rode on an electric road at St. Joseph, Mo., which had been changed from a horse road. The manager of the road seems to be very well satisfied with the road, and the change, and said that he was entirely satisfied, and it may, perhaps, be of some interest to you to correspond with him. He would be only too glad to answer any questions about the road. He told me that they had run their cars as high as twenty-five miles an hour. It is the Sprague system of overhead wire. He used an old equipment entirely, and there are some difficulties and objections, perhaps, but the operation of the cars has been entirely successful, and he says there has not been a delay from the time they started up.

And then, at Butte City, Montana, they are constructing a cable road. The engineer was formerly connected with the Northern Pacific Road, and, I believe, was connected with the Apollo St. R.R. of San Francisco, and is now building the Butte St. R.R., in Montana. That is the same conduit system, and the cost is little reduced from the other. He says the level parts of the road have a grade of about six per cent., and from that up as high as it is possible to go. The changes in the temperature are all most remarkable, falling from 10° above to 15° or 20° below in 24 hours; this can be verified very easily. The road is not in operation, but will be probably in the next thirty days, and it would be well for anybody who contemplates putting in a cable to correspond with him. They use the Bogle system of grip.

A "perfect" electric motor.

Mr. STEWART: While the direct remarks upon the subject of electricity have pretty thoroughly covered the subject, and while I am not here in the advocacy of any electric or cable system, or any other system, I desire to bring before this meeting the labors of an electrician in our neighborhood. I think it has been the common experience of everybody that has had anything to do with electricity in one way or another, that the country is full of electrical cranks. I think it is something over fifteen years ago that I had a little experience of my own. While I never made any great pretenses at being an electrician, I made my bread and butter in that line for some time. At Ashtabula there is a young man who has invented a system of electrical motor for the operation of street railroads, printing presses, sewing machines, etc. The electrical power is generated by the old system of Grove's battery—that is, the blue vitriol battery. These batteries to the number of seven I have seen in operation propelling a sewing machine. It is a make and break circuit. This man, who is pursuing the vocation of telegraph operator on the Lake Shore Road, has spent all the money that he has been able to get hold of, and all that he has been able to get from friends, whom he has been able to make believe that he has a good invention. He has submitted it to the electrical experts of the Patent Office through an attorney, Mr. Dubbs, and they say he has a pretty good thing; and they wanted to know whether he was rational or off his base and how he was esteemed in the community in which he lived. I told them that, so far as I was able to judge, the neighbors thought well of him, and had seen his machine work on a number of occasions. With a battery weighing about 1500 pounds (15 or 18 jars) he generates electrical force giving a propelling capacity of about five horses. He has covered the ground pretty thoroughly, and he proposes to put this on a car at a cost of $1200. He is a genius, as well as an expert, and he proposes to overcome the difficulty that has been suggested here, and it is a very practical one in the locomotion of cars over icy ridges and the slipping of the wheels. He proposes to overcome that by a wheel with points on it which can be placed in contact with the track when necessary, and, being in sight of the driver, can be taken up when not necessary. Whether this machine will work as well for ten horse power as well as five, has not been demonstrated. The experts of the Patent Office have not been able to believe that a battery so old-fashioned and simple could produce such results, but the young man is raising all he can to go before them, and his invention may be used for railroad purposes, yet, as well as other purposes.

Mr. DOHERTY: There are some of us who believe that electricity has past its experimental stage. There are a good many of us to believe that in some of its forms it is reduced to a practical result where prudent railroad managers can adopt it without risk of danger to themselves; that even if one had adopted the earlier forms and the storage battery were afterwards adopted, you have lost only your poles and wires, but your power—your dynamos, your motors—all remain the same. So far as my reading goes, there have been very unimportant improvements in dynamos for several years. You have from 70 to 75 per cent motor power, a result almost equal to the steam engine. There is another matter connected with electric roads, and that is the prejudice of the public, and the fear that the use of so much electricity will be dangerous to life. The latest device in electric cars is a truck separated entirely from the body of the car and susceptible of entire insulation from it.

Mr. CLEGG. We have with us this morning Mr. Paul Frommlitz of San Francisco, who has a motor—an individual motor, which he would like to present to the meeting, and has a paper here upon the subject. I move that he be permitted to read it. The motion being seconded and carried, Mr. Trommlitz read as follows:—

THE AUTO-PNEUMATIC CAR MOTOR.

To the members of the Ohio State Tramway Association—Gentlemen: In presenting this memorandum to your kind consideration, I beg to call your attention to our new Street Car Motor, which is destined to revolutionize the methods now in use for propelling these indispensable vehicles. It is called the Auto-Pneumatic Car Motor, and is a San Francisco invention, for which a patent has only been issued as late as May 29, 1888. San Francisco has had the honor of leading the world in the invention and introduction of the system of cable cars, and now that city comes again to the front with an invention which must supersede electricity and horse or cable cars, except where the latter are carried over very steep gradients, exceeding 30 degrees.

Compressed air has already been universally acknowledged to be preferable to steam as a means of supplying power to a piston, by a reason of its cleantiness, its freedom from smoke, heat and the other inconveniences which attach to steam propulsion. But the great drawback hitherto, to its use upon cars has been the difficulty of storing it in sufficient quantities, and sufficient pressure to maintain a uniform rate of speed, without having a recourse to inconvenient delays at stopping places in order to take in a fresh supply.

All this is now obviated by the Auto-Pneumatic Motor, the power of which is renewed automatically while the car is in motion, by a simple, beautiful and ingenious device, which solves the problem of air propulsion effectually and forever.

The modus operandi is simply this: A pipe is laid beneath the track and kept supplied with compressed air, at a mean pressure of sixty or seventy pounds, said air being supplied to the pipe in the usual way by a stationary steam engine and compressor at some fixed point upon the line, in the same manner as it is supplied to a rock drill. All along this pipe, at distances of five hundred feet apart, are orifices, or openings, provided with valves, which effectually prevent the exit of the compressed air in the pipe, until actuated by some outside agency. This agency is carried in the car or motor itself, and consists simply in a hollow movable arm, the upper end of which connects with the air reservoir in the car, while the lower end passes directly over the length of the pipe while the car is in motion. A joint at the upper end of this arm where it connects with the reservoir, permits it to move longitudinally a distance of about twelve feet, along a slot in the bottom of the car. When one of the valve openings in pipe is reached, the lower end of this hollow arm, by a very simple mechanism, engages with the valve, and as the normal position of the arm is such that its lower end always remains at the front end of the slot, it follows that when it engages with the valve, which is set in a short elbow projecting from the pipe, it will be carried backward to the other end of the slot, allowance being made for a direct travel by means of a secondary joint in the arm. Thus a connection is made between the pipe in the roadbed and the reservoir in the car, during the one second requisite for the latter to pass over the locality of one of the valves. This period has been found ample to maintain the pressure of the charge in the air reservoir, the connection being established, as we have said, at intervals of five hundred feet.

Thus the problem of supplying an economic power for moving street and other cars, whether on surface, elevated, or underground railways, has at last been solved, for it must be remembered that this mode of supplying power is highly economical as compared with cable cars, both in first cost of plant, cost of maintenance, and the amount of power derived from a given quantity of fuel. As a matter of fact, cable railroads lose from 85 to 90 per cent of the power evolved in working them only from 10 to 15 per cent of that power being actually utilized.

Full particulars as to cost of construction, maintenance, etc., will be cheerfully given by the undersigned.

Respectfully submitted, PAUL TROMMLITZ,

The paper was received and filed.

Mr. CLARK: There has been a reference here to five-horse power. In testing our road in Dayton, we found that the average amount of horse power was, in running a car on a level from three to four horse power, electrical. If we were running around a curve on the level, we would exhaust 12 to 13 horse power, and in going up a grade which we found on the engineer's plat to be 3.75 the horse power required was ten to eleven, being less than going around a curve.

The Secretary than read a paper by Mr. John Kilgour, as follows:—

CABLE AND HORSE POWER.

Mr. President, and Gentlemen of the Ohio Tramway Association:—To me has been assigned the task of presenting to you an article on Horse and Cable Railways. I presume this was done in all seriousness, although I do not see why any mention need be made of horse railways, excepting in the way of an obituary,—their day of usefulness is about over. The venerable John Stephenson of New York, who witnessed the trial of the first tramway horse car, fifty-six years ago, will, if his life is spared for a short time, see the last horse car taken from the road, giving place to the cable car or electric motor. Assuming the Darwinian theory of evolution to be correct, the horse car is the missing link between the old-fashioned stage-coach and the improved motors of this day. The members of this association are aware of the valuable service performed by the horse railway during its existence. The growth of our large cities has been aided very materially by the system of horse railway introduced into them. They have made it possible for all classes of citizens to enjoy suburban homes, remote from the wear and bustle of the business portions of a crowded city. This subject has been trundled before street-railway associations so frequently that it has become threadbare, therefore I have endeavored to be as brief as a bob-tailed car, and will only add that when the last horse-car shall have fallen into decay, I will reverently place a monument over the remains, bearing the same epitaph which was inscribed by the cannibals on the tomb of the missionary whom they had killed, cooked and eaten, "Well done, thou good and faithful servant."

Cable roads were first constructed and operated in San Francisco in the years 1872 and 1873. The growth of the system has been quite rapid since that time, but is retarded somewhat by the expense of construction. It would be folly to think of building a cable road in a city with a population of less than seventy-five or eighty thousand inhabitants; it would not earn operating expenses. Everything pertaining to the construction of a properly built cable road is costly. The one item, alone, of providing proper and sufficient drainage for the cable tunnel, will equal the cost of an ordinary surface railway. All of the machinery and mechanical appliances must be of the best—therefore expensive—description; as a cable railway can only be built and maintained on the greatest thoroughfare in large cities, it is presumed as a matter of course, that the cable has been substituted for the surface railway, none of the material of which can be used in the construction of the cable railway, therefore the value of the abandoned surface road must be added to the cost of the new, and the equipment of the old disposed of at a sacrifice. I will venture to say that no well built cable railway, of average length, in this country, has cost much less than one hundred thousand dollars per mile. A strong argument in favor of cable roads has been made, that a large number of extra or additional cars can be put in operation at any-time on short notice, without much additional expense. This is not so. The principal operating expense is pulling the dead

weight of the cable. There is a limit to the capacity of the cable in an emergency; just so many cars and no more, can be hauled. If the cable is overtaxed the evil effects develop immediately; strands occur; the whole line of cars is stopped; and when the cable begins to exhibit evidences of wear the managers of the road are in a constant state of uneasiness for fear there will be an expensive interruption to travel, and a consequent annoyance to the public.

Cable roads are better adapted to heavy grades than any other system. In fact, there is no other system that will accomplish the same work as satisfactorily and safely.

Much has been written, and well, on the subject of cable roads by Mr. Holmes, Mr. Lawless and others, but each different road will have its own experience, and the managers can only be instructed by the operation of their own roads, and cannot profit by the advice of others, except in the matter of minor details.

Cable railways may be considered a blessing in disguise—a blessing to the traveling public, a disguise to the stockholders who expect large dividends from their investment.

Quires of paper and gallons of ink might be expended in descanting upon the merits of the cable system, but as I am a firm believer in electricity as the motive power in the near future, I forbear to weary you. JOHN KILGOUR.

On motion the paper was received and filed, with thanks to Mr. Kilgour.

The PRESIDENT: Is there anyone here who knows anything about the Rassmussen cable system, in Newark, N. J.?

Mr. KERPER: It was not running at the time I was there. The cars were all blocked up. They had a step of eight inches to get into the car. They have run only experimentally and never succeeded in running it commercially. It was Sunday when I was there, and I could not get into the shops at all. They have been saying for the last six months that they would be ready "next week," but they are not ready yet. The supposition is that it is a failure.

President Bailey appointed Messrs. Kerper, Hathaway and Doherty a committee to nominate names of officers of the Association to serve for the ensuing year, and select place of next meeting.

On motion a recess was taken till 2 o'clock.

AFTERNOON SESSION. After calling the meeting to order the President announced that the next paper on the programme was "Best present construction of roadbed and building," by Chas. Hathaway, whereupon Mr. Hathaway stated that he did not expect, until within a very short time before coming to the meeting, that he would be able to attend, and hence had prepared no paper. No one responding to the call of the President for remarks upon this subject, the next paper, "Legal Decisions," was read by the Secretary in the absence of Mr. Lang, the author of it, as follows:—

LEGAL DECISIONS AFFECTING STREET RAILWAYS, FAVORABLE OR ADVERSE; AND OHIO STATE LAWS AT PRESENT IN FORCE.

Among the decisions of the Courts affecting Street Railways, favorable or adverse, I note the following as of special interest:

1. The Supreme Court of the State of Michigan in the case of Wood vs. The Detroit City R. R. Co.:

The plaintiff's story is, that he was driving a one-horse vehicle along the street on one side of the defendant's track, when he encountered obstructions and turned toward the track so that his right hand wheels were over the rail. He did not look behind him to see if the car was coming, until he felt something strike the rear wheel. He then looked around and saw it was the street car, and the driver, as he says, "motioned me with one hand to go on, or he would knock the wheel off me. I laughed at him and said "you had better not knock off more than one or two of them as somebody will have to pay for them." He kept on motioning to get out of the way. I told him I could not get over those wagons and I was not going to try. But I would get out of his way just as soon as ever I could. "I kept on." There was a number of wagons standing on the other side of the street loaded with brick, and three or four or five of them with the rear end of the wagon out on the street further than the fore end which brought the rear end of these wagons very near the car track, so that I had to get with the wheels on the right hand side of my wagon partially on to the track, and some places it got off the track, and some places I had to get right out pretty well over the track.

Up to this point the plaintiff was not only in fault, but he was the only party in fault. He had driven upon the track in front of an approaching car, without looking around until the car had come in collision with his vehicle. This was gross carelessness on his part, but further on his evidence shows that the other side of the track was entirely unobstructed and that there was nothing to prevent his crossing at once and allowing the street car to proceed on its way. The car had come to a stand still on the first collision and plaintiff's conduct in maintaining his ground and responding to the driver's request, that he should get out of the way, by a laugh and a threat was not only wrong to defendant, but also to any persons who might then be riding in the car, or waiting its coming But the plaintiff further testified that as he was leaving the track the driver called out "G—d—D—n I can smash you anyhow," and that he let go the brake, and the car almost instantly struck the plaintiff's wagon and threw it over, inflicting the injury complained of. The inference from this might be that the driver purposely, in the anger excited by their altercation, ran his car against the wagon.

The ground on which it is sought to charge the defendant is that its servant negligently drove the car against the plaintiff's vehicle. The Court say, we are then to see whether if negligence on the part of the driver is made out, or there is any evidence tending to prove it, if the plaintiff himself, on his own evidence does not appear to have been, at least equally negligent, and we think he does. He knew very well he was in the driver's way, and he had had ample time and opportunity to get out of danger if so disposed. That he was not disposed to allow the car to go on until it suited his pleasure to do so, was quite apparent. And there was abundant reason in his evidence for believing that he was purposely annoying the driver and delaying the car. The driver's testimony is quite different from the plaintiff's. He testified that when he first signalled the plaintiff to get off the track, the plaintiff made no effort to do so. The driver told him to get off or would be run into, and he replied "run and be d—d." He had as much right to the track as the driver had, and would get off when he pleased. He drove right along on the track, looking back and scolding the driver. Finally he turned off and the car moved on, but be almost immediately turned again toward the track sufficiently to be struck by the car. It was a case of contributory negligence. The lower Court rendered judgment for the defendent, which was sustained by this Court.

2. The Court of Appeals of the State of New York in the case of Kelley vs. New York and Sea Beach R. R. Co.

A broken spring hook used to fasten a curtain on an open railway car is not of such a dangerous character as to require the very highest degree of diligence to discover and remove it, and when the company was in the habit of inspecting such hooks at the end of each trip, and re-placing those found defective, and no similar accident had been caused by one before, and there was no proof showing how, or when the spring was broken, it was held: In an action against the company by a passenger injured by her clothing catching in such a broken hook, that the accident was not one which a prudent man would have anticipated: That the evidence failed to establish culpable negligence in the defendants, and that the trial judge should have held as a matter of law that the plaintiff had failed to establish a case entitling her to a recovery.

3. The Supreme Court of the State of Pennsylvania in the case of McCurdy vs. Pittsburgh, Alleghany and Manchester Passenger R. R. Co., and C. P. Sorg.

A conductor on a Passenger R. R. was discharged and subsequently complaints were made that he continued to ride on employees tickets.

The company thereupon posted up the following notice: "H. B. McCurdy has been discharged for failing to ring up all fares collected." "Discharged employees are not allowed to ride on employees ticket." Signed C. P. Sorg, Ass't Supt.

In an action by McCurdy against the company for libel, held: That the words relied on did not in their ordinary sense imply that the plaintiff had been discharged for embezzling fares, but only for failing to "ring them up," and that there being no evidence that the true meaning of the words in this particular case, were other than their ordinary meaning, the defendants were entitled to judgment.

4. The Supreme Court of the District of Columbia in the case of Harmon vs. The Washington and Georgetown R. R. Co.:

The plaintiff boarded one of the defendant's cars on Penn. avenue to ride to 19th street. As to what happened at his stopping place there was of course a conflict of evidence. Plaintiff claimed that when he approached 19th street that he signalled the conductor of the car to stop, and that the conductor thereupon rang the bell and the motion of the car began to slack, and that he arose to go out of the car and that the platform was crowded with passengers. That there were at least eight or ten persons on the platform and two (a man and a boy) were standing on the step of the car against the railing, the boy standing next to the body of the car and the man standing on the other end of the step, next the dash or railing of the rear end of said car. That he crowded his way through the crowd on the platform, and stepped down the step while the car was still in motion, but moving very slowly, that he was unable to get hold of either of the railings, because the man and boy were so standing on the step, and that after he had been waiting for the car to stop, the conductor rang the bell, and the car suddenly started forward and there was a sudden jerk of the car that threw him off on the street. That at the time plaintiff signalled the conductor to stop, the latter was engaged in figuring up his accounts, and was standing with his back to the rear door leaning against the jam, and after ringing the bell to stop remained standing inside the car and did not go out to assist plaintiff off the platform or step, and that while plaintiff was standing on the lower step of the car the conductor rang the bell from the inside and the car started forward with a jerk and threw him off. That it was about 9 o'clock at night, that he was in the habit of riding home on this line of cars and sometimes with this same conductor; that plaintiff was not in the habit of getting off the car while it was in motion and did not do so on this occasion, but was jerked off by the sudden jerking forward of the car while he was waiting for it to come to a full stop. And finally that there were more than a dozen passengers inside the car.

On the part of the defendant there was evidence tending to show that only thirty-five passengers rode on that car at any time between the Navy Yard and Georgetown. That these got on and off from time to time, and that a majority of them got off at the corner of 15th street and New York avenue. That only five or six were inside the car at the time of the accident. That the plaintiff was in the habit of riding on defendant's car and landing at 19th street, and in the habit of getting off while the car was in motion. That at the time in question the plaintiff signalled the conductor to stop that the conductor rang the bell and the car began to slow down. That the conductor was standing on the rear platform, and when the bell was rung no other person was standing there, except a small boy; that the plaintiff after signalling and without waiting for the car to stop, immediately went to the platform and stepped down on the step and whilst the car was yet in motion, but almost at a stand stepped off on to the street and there fell. That the conductor whilst the plaintiff passed out on the platform had hold of the bell-rope and was watching the plaintiff and as soon as the plaintiff alighted on the street and was free from the car the conductor pulled the strap of the bell for the driver to start, but seeing the plaintiff fall, the conductor immediately rung the bell and the car stopped before proceeding half its length. There was evidence to show that there were seats inside for twenty-two persons.

The action is to recover damages for injuries. Exceptions were taken to the ruling in the lower Court.

The Supreme Court held that in an action to recover damages from a St. R. R. Co. the defendant must prevail if it appear that when the plaintiff signalled the conductor to stop the car, the conductor rang the bell for that purpose and the car immediately began to slow down, and that plaintiff without waiting for the car to stop undertook to, and did step from the car whilst it was still in motion.

It is therefore error to refuse an instruction involving this proposition if based upon evidence in the case.

5. In Solomon vs. The Central Park, etc., Railroad Company, 1 Sweeney, 298, the plaintiff got on the rear platform of defendant's car to ride from 59th street to 45th. Soon after he passed through the car and seated himself on the steps of the front platform, and while thus seated, an accident occurred which threw him off the car, and caused the injury for which the action was brought? There was no evidence that the car was crowded, or that there was not plenty of room for plaintiff to sit inside. On the trial the plaintiff was non-suited on the ground that his own negligence in riding upon the front platform, seated on the step contributed to the injury he received. On appeal to the General Term the decision of the Trial Term was affirmed, and the court, after saying that the question of negligence, the facts being uncontroverted, was one for the court, added: "General experience has demonstrated that the front platform of a car is a place of hazard and danger, especially when a person occupies a place thereon such as the present plaintiff did. The plaintiff, then, was negligent in occupying the position he did, and that his negligence contributed to the accident admits of no question."

6. In Willis vs. The Long Island Railroad Co., 34 N. Y., 670, the plaintiff was injured by an accident to the cars while the train was moving, and while he was standing on the front platform of the car, there being no vacant seat in the car; and the court held that passengers are not to be deemed guilty of negligence for standing on the front platform of the cars, when there are no vacant seats for them within the cars.

7. In Ginna vs. The Second Av. R.R. Cor., 67 N. Y., 596, the court held that when a street railroad car is so crowded that one taking passage cannot enter it without great and unreasonable discomfort to himself and to the prior occupants of the car, and the conductor consents to and does accept from him the usual fare, without insisting upon his finding a place within the car, and while riding upon the platform he his thrown off and injured by the negligence of the company, the fact that he was standing on the platform does not of itself constitute contributory negligence, but it is a question for the jury.

8. In Nolan vs. The Brooklyn City & N. R.R. Co., 87 N. Y., 63, the plaintiff took passage on one of defendant's street cars. There were vacant seats inside, but as he was smoking, he rode upon the front platform. The evidence being that it was the custom of the line to permit no smoking elsewhere, but to permit it by passengers riding on the front platform. While thus riding, he was thrown off and injured by the negligence of the driver. The court in affirming the judgment of the court below in favor of the plaintiff, held that the evidence in the case was sufficient to justify the submission to the jury of the question of contributory negligence by the plaintiff; and that under the proof in that case, it was not per se negligence upon the part of the plaintiff to ride upon the platform.

9. In Sheridan vs. The Brookline & N. R.R., 36 N. Y., 39, the plaintiff's intestate, a boy, was seated with a companion of his own age riding in the defendant's car. As the car filled with passengers the conductor compelled the boys to get up and give their seats to adult passengers. They went forward and took other seats in the car, which the conductor soon after compelled them to give up and leave. The car was by this time crowded very full, and the boys were crowded and pushed by the throng of passengers out on the front platform, which, as well as the inside of the car, was full of people. While there the deceased was by the negligence of defendant's servants pushed off the car, fell under the wheel, and received injuries which caused his death. The court held that the trial judge properly denied a motion to non-suit the plaintiff on the ground that the deceased in occupying the position on the platform was chargeable with contributory negligence, and that that question was, under the circumstances of the case, one for the jury.

10. In Ward vs. The Central Park, etc., R.R. Co., 33 N. Y. Sup. Ct., 392, the proof showed that the plaintiff

took passage on one of defendant's cars, and stood on the rear platform, the seats in the car being all occupied, and some persons inside were standing up, though there was room for defendant to go inside and stand there. Two other persons, after the plaintiff, took passage, and plaintiff moved from were he stood to give them room, and took a position on the extreme edge of the platform, without holding on by the handrail on the rear of the car, or otherwise securing his standing. The track was rough and in bad condition, and by a sudden jolt of the car the plaintiff was thrown off the platform and was injured; but he regained the car, went inside, and there completed his journey. The court at General Term affirmed the judgment of non suit granted on the trial, and, after referring to several cases, said: "In each of these cases a recovery by plaintiff was upheld, but at the same time the principle fully recognized that it is the duty of a passenger upon getting on board of a car, not only to use ordinary care and attention to protect himself while there, but also to place himself in as safe a position therein as he is able to obtain; and that it is no excuse on his part for placing himself in an unsafe one, that the persons in charge know that he is unsafe, and do not drive him therefrom, when the danger is well known to such passenger. To stand under such circumstances upon the very edge of the platform without holding on to anything, and to maintain such position, after an opportunity had been had to exchange it for a place of comparative safety, was therefore negligence on the part of the plaintiff, which contributed to the injury, and debars him from a recovery, no matter how negligent the defendant may have been."

11. In the Supreme Court of Missouri, in the case of Werner vs. The Citizen's R'y Co. of St. Louis, plaintiff sued for damages under the stature for the alleged negligent killing of her husband by one of defendant's street cars. The defenses pleaded were a denial of the facts alleged, and contributory negligence on the part of deceased. There was evidence tending to prove that deceased in a state of intoxication lay or fell down on defendant's track, and remained there until run over by the car, which occurred about 8:20 p. m. It was a dark night and the only passengers on the car were Clifton and his wife, who testified that it was difficult to see any object at a distance, and that one would be liable to mistake as to what an object on the track was; that immediately after the accident the car was stopped, and deceased was lying by the foot of the rear platform. The driver testified that he saw an object lying ahead of the horses about 15 feet, and supposed it was a bundle of hay or sack of oats; that he could have stopped the car in two feet, but made no effort to stop it or ascertain what the object was, until after the car passed over it; that after he discovered the object on the track he proceeded right along, looking straight over his horse's head. The jury found a verdict in favor of plaintiff for $5,000. A motion for a new trial, based upon the usual grounds, was overruled by the court, the case appealed to the Court of Appeals, there affirmed, and thence taken by defendant to this court. The first point made by appellant's counsel is, that there was a variance between the negligence averred in the petition and that proven. The negligence alleged was that the death of plaintiff's husband was occasioned by the negligence of defendant through its servants in this: That although knowing that he was on the track, and unable to remove himself therefrom, they recklessly, etc., failed to check or stop said car, but with great force, etc., ran the same over him. Whereas, the proof was that the driver, the only one of defendant's servants then on the car, did not know it was Werner, but supposed the object to be a bail of hay or a sack of oats. The substance of the averment in the petition is that deceased was run over through the negligence and carelessness of the driver, and while he testified that he did not know that the object he saw on the track was Werner, by the exercise of reasonable care he could have ascertained that fact, or at least that it was a human being, before he ran the car over him. The argument would be just as forcible if the driver had testified that he knew the object he saw on the track was a human being, but did not know it was the individual Werner, etc. In this connection the appellant's counse contends that no negligence on the part of defendant was established, and argued thus: If the driver in the dusk and darkness had seen nothing at all on the track, but driven on and over deceased, it is clear that no negligence could have been imputed to him. It would have been an injury resulting solely from plaintiff placing himself across the track of the railway in front of the moving car. But if a total obscuration of his sight would have relieved him from the charge of negligence can a partial obscuration, to the extent it went and the effect it produced, have a contrary effect? Further on the court say: "There would have been nothing to call into activity more care and prudence on the part of the driver than was necessary to guide the horses when no danger was apparent or reasonably apprehended; but when he could see an object on the track as large as a sack of oats, he had reason to apprehend danger, not only to his passengers and the property in his care, but to strangers or their property, and to hold that he might drive on with the same indifference as if he had seen nothing on the track, because he could not discern what it was, would be to sanction recklessness, and ignore the duty of carriers to avoid injuring persons and property, when aware of the danger to which they are exposed, or when they have reasonable grounds for an apprehension that by proceeding as usual with their vehicles injury will be inflicted upon persons or property." The judgment of the lower court, which was for $5000, was affirmed

(12.) In the Court of Queen's Bench, Province of Quebec: John Parker and the Montreal Brewing Company vs. The Montreal City Passenger Railway Company:

The rails of the street railway track were the same pattern as those used in Philadelphia. The road was constructed in conformity to the requirements of the council, and, when completed, was accepted by the council as properly laid. The plaintiff alleged that at 2 o'clock in the afternoon, while on the Montreal Brewing Company's express wagon, which was being driven at a moderate rate, it struck against the rails at the curve of the Notre Dame street track; that the rails were several inches above the level of the street—contrary to law; that the shock broke one of the wheels and the axle of the wagon, which thereupon broke down with all it contained, and the plaintiff was thrown to the ground, a distance of twenty feet, along with the driver, and was injured, etc., laying his damages at ten thousand dollars.

The company averred that the driver of the wagon was guilty of gross negligence, recklessness and carelessness in approaching the curve in an acute angle instead of in a proper way—as nearly as possible squarely—that the wagon being very heavily loaded, required to be driven with care; that the plaintiff's driver must have been driving too fast, inasmuch as by the wrench given to the wagon an axletree one and three-fourths inches square, was broken clean off, and the plaintiff precipitated twenty feet from the wagon; that the rail was *not* several inches above the street, but was flush or level with the road and in the condition required by the law, and that the roadway within and outside each rail was paved and in good repair at the point in question at the time of the accident, and that they were guilty of no negligence in connection therewith, but had always complied with and strictly carried out all the provisions of the law in respect of their tracks, and had exercised all reasonable care and diligence in keeping the same in good repair.

On the first trial the plaintiff was awarded the sum of twenty-five hundred dollars, and the Brewing Company one hundred and ninety dollars. One judge of the Upper Court said the cases were precisely similar; they were actions for damages. In one case Parker was thrown to the ground and injured; in the other, the owner of the wagon claimed damages for breaking of the vehicle. There was no difficulty whatever about the injury sustained by Parker. It was admitted on the part of the company that the sum of twenty-five hundred dollars, allowed by the court below, was not an over-estimate, if the company was liable. The case had been argued twice. At first it appeared to His Honor that there was negligence upon the part of the company, but he was in the minority. He had since re-examined the evidence and had been able to come to a different conclusion. He was alone in this opinion, and the judgment in both cases would be reversed and the actions against the company dismissed.

Another judge of the same court says: "It cannot be questioned that a tramway in the street used for other business, must be a source of danger, but it does not follow by that that every accident caused by this increased peril must be put to the company's charge. They have certain powers conferred by law, and if they only exercise those powers in a lawful way, those who come in contact with them do so at their peril. We have, therefore, to inquire whether the construction of the railway was in conformity to law, and whether it was in good order. It seems to me that both of these questions must be answered in favor of the companies. There was some attempt to prove that the road beside the track was not in good order; but it is quite clear that the accident took place on the rail, and not between the road and the rail. It seems to me clear that the hind wheel of the wagon struck the raised part of the rail, and, instead of passing over, slipped into the wheel track, and being caught, as in a vise, was twisted off. Some testimony tended to show that the road was in bad condition; that the company, sensible of its wrong doing, had hurriedly repaired its line. The little evidence in support of this breaks down from want of precision. The inspector of the road says it was not true, but that the road was repaired a few days before and a few days after, as usual, and he tells us that the road was repaired constantly in this way. The majority of the court is to reverse, with costs."

Another judge of the same court, remarked that his first impression was that the cases did not admit of much difficulty, and after a careful reading of the evidence, he came to the conclusion that the actions were completely unfounded. The track might be an obstruction and an inconvenience, but it was permitted by law. There was no pretension that the mode of laying the rails was different from that prescribed by the law; that it was proved that the road was in perfectly good order; people had been crossing it at that place for twenty years. The wagon on which the plaintiff was sitting must have been going too fast. It was impossible to suppose that he could have been precipitated twenty feet if the horse was going at a walk. He added that the carters who drove him passed very cautiously over these places.

Judgment reversed in both cases.

(13.) The Supreme Court of Massachusetts, in the case of Banks vs. The Highland Street Railway:

The action was for personal injuries alleged to have been caused by the driver of the defendant, negligently causing his car to run against a telegraph wire that was at that time suspended across Columbus avenue. A fellow-workman was on a telegraph pole on one side of the street, while the plaintiff, with the end of the wire looped around his body, was climbing a pole on the opposite side of the street at the same time that another lineman stood on the sidewalk for the purpose of keeping the wire taut and out of the way of passing vehicles. An upward bound car had just passed under the wire when an inward bound car caught the wire under the end of a sign on the top of the car, pulling the wire away from the man on the sidewalk and pulling the plaintiff from the pole he was climbing before the car could be stopped.

The Revised Statutes of the United States provides that incorporated telegraph companies may, under the provisions of the following section, construct lines of electric telegraph upon and along the highways and public roads; and the third section provides that the mayor and aldermen shall give the company a writing specifying, among other things, the height at which and the places where the wires may be run; this writing to be recorded in the records of the city. In this statute the word "upon" includes crossing a highway by the wires. The telegraph company had no such writing; it had no right to run its wires across Columbus avenue as the plaintiff was doing at the time of his injury. Plaintiff was carrying the wire looped across the street attached to his person and with his back to the street so that, if the wire was struck, he would be pulled from the pole he was climbing; he was not only doing an unlawful act, but doing it in a manner that was dangerous to himself; it was a directly contributing cause of his injury. The car was lawfully passing upon the street and could not continue its course without striking the wire. The driver when he saw the wire, had no right to drive on without care or concern for the consequences, but the defendant was not liable to the plaintiff for mere error of judgment upon the part of the driver of the company; that he was not entitled to recover unless he satisfied them that the owner of the car recklessly and wantonly drove against the wire.

(14.) The Superior Court of Buffalo, in the case of Heckrott vs. The Buffalo Street Railroad Company:

This was an action for injuries received by the plaintiff, who, while riding upon the front platform of a close car, leaning his back against a window and his left foot in the iron hand-loop of the dash-rail, had his leg broken in consequence of the car coming in contact with a horse and wagon driven in an opposite direction.

The evidence showed that the plaintiff, about 8 o'clock in the evening, took passage on the car and paid his fare. The car was not full, there being not more than fifteen seats occupied by passengers, though twenty-two could be comfortably seated in it. The plaintiff, without any known or apparent reason, chose to get upon the front platform of the car, and to ride there without entering or attempting to enter the car Though the plaintiff was a witness, he gave no information, nor did the evidence furnish any, why he rode upon the platform when there was abundant room for him to sit inside of the car. There was no other person upon the platform but the driver, by whose side and on whose left hand the plaintiff stood, leaning against the front window of the car. While thus riding he put his left foot up into the iron loop placed upon the end and upper side of the dash-board of the car to be used as a handle for assisting persons mounting the platform. He was in this position when the car came in contact with the horse and wagon driven in a direction opposite to that of the car. The wheel of the wagon, or the weight of one of the horses, was borne against the dash-board of the car with such force as to bend it over upon the plaintiff's foot and to break his leg.

It is a settled principle of law—the court say—that the question of contributory negligence, in an action like this, where the facts are undisputed, is a question of law for the court. The court say: "The plaintiff, when he got on board defendant's car, not only did not place himself in a safe position therein—though he might and ought to have done so—he, knowingly, and without excuse, chose an unsafe position upon the platform. He might have taken a seat inside of the car where there were several vacant seats, and, had he done so, there is no doubt that he would have escaped injury from the accident which occurred while he was on the platform. More than this: there is no reason to believe that he would have been injured had he occupied a safe or proper position on the platform. Instead of doing so, he placed his foot in the iron loop of the dash-board, which, when the collision between the car and the wagon occurred, was bent over upon and broke his leg. It was a natural and direct result of his carelessness in placing his foot in that iron loop, where he had no right to place it, and which was never made for any such use or purpose. He alone, of all the persons on the car was injured. He gave no explanation, reason nor excuse for standing on the platform, much less for the careless act of placing his foot in the loop, and his own testimony shows that there was no reason nor excuse either for his standing on the platform or for his careless position while there and when the accident occurred, etc. That in the absence of any explanation, there can be no hesitation in saying that the plaintiff's dangerous position upon the platform at the time of his injury proved that he was negligent, and that it was the duty of the court to non-suit. The plaintiff has neither excused nor explained his riding on the platform, nor his dangerous position volntarily assumed while there. The verdict rendered by the jury cannot be sustained, but it must be set aside and a new trial granted.

(15.) In Hadencamp vs. The Second Avenue Railroad Company, 1st Sweeney, 490, it was shown that the plaintiff got upon the front platform of one of the defendant's horse cars for the purpose of riding to his residence on Thirty-fifth street; that the car was full of persons inside, so that he could not enter it; that the rear platform was crowded, and there were four or five persons on the front platform. He stood with his back to the front of the car holding on to a hand-rail on the front of the car, and while thus riding there, paid his fare. The car ran over some obstruction on the rail and produced a shock which threw the plaintiff off of the platform and one of his feet was caught under the car wheel and was severely crushed so that amputation was necessary.

The court held that it was not negligence, under the circumstances of that case, for the plaintiff to ride upon the platform, and laid down the principle that a carrier of passengers is bound to furnish safe and convenient vehicles and a safe place therein for the passengers, and that if a passenger received as such took and occupied as secure a seat or position as is open to him in the vehicle in which he is permitted to take passage, and is injured by the carrier's negligence, the passenger is not chargable for negligence for being in a more exposed position than other passengers, provided he conduct himself with care in the place where he is.

(16.) In the Court of Common Pleas of Pennsylvania, in the case of Fry vs. The Peoples' Passenger Railway Co. of Philadelphia, the plaintiff was a passenger on defendant's railway, being by occupation a conductor upon the road, but being off duty at the time of this accident he was riding on the front platform. The car stopped at a transfer stand, and was facing west. The east-bound track was on the south,

nd so close that the space between the cars was about six inches. The car being crowded, the plaintiff climbed over the dasher on the south side of the car, backward, in order to secure footing, so that he could not see what was passing upon the south track, and upon reaching the ground he was struck and injured by an east-bound car approaching at a good trot. Held: That a non-suit was properly granted, because the evidence did not show negligent or too rapid driving; and held, that in descending from the front platform in a place known by the plaintiff to be dangerous, he was guilty of contributory negligence.

(17.) In the Court of Appeals, State of New York: Stewart vs. The Brooklyn Crosstown R. R. Co. Plaintiff, while a passenger on one of the defendant's street cars, was unjustifiably attacked and beaten by the driver, who also acted as conductor. In an action to recover damages, held that the defendant was liable. The rule relieving a master from liability for a malicious injury inflicted by his servant, when not acting within the scope of his employment, does not apply as between a common carrier of passengers and a passenger. Such a carrier undertakes to protect the passenger against any injury arising from the negligence or willful misconduct of its servants while engaged in performing a duty which the carrier owes to the passenger.

(18.) In the same court, in the case of Dixon vs. the same company, was an action where plaintiff claimed to have sustained personal injuries alleged to have been caused by the negligence of defendant under the following circumstances: Plaintiff sought to enter a car by way of the rear platform, but finding it full, passed along by the side of the car in order to reach the front platform, and slipped on the snow, and was thrown under the wheels of the car. The car was moving slowly at the time, and at the place where he slipped there was a ridge of snow which the evidence tended to show had been thrown by the defendant's snow plow and sweepers about three feet high, three feet wide at the base, and one foot and a half at the top, sloping toward the car, and so near it as to leave merely room for the car to pass. The surface of the ridge was covered with a thin coating of recently fallen snow, which made it difficult to perceive that underneath it was hard and slippery, the snow having lain there for some weeks, much longer than was reasonably sufficient for its removal. The court say: While the railroad company would have the right to remove the snow from its track, it could not lawfully cause an obstruction which would interfere with the safe passing and repassing of persons traveling upon the road. The duty imposed upon a railroad company is the same as that which is incurred by every owner of property adjoining a street in a populous city, etc. If the ridge of snow where the accident occurred was an obstruction in the street, whoever placed it there and allowed it to remain an unreasonable length of time, should be liable for any injury sustained. The judgment should be affirmed.

(19.) In the Supreme Court of Michigan, the case of Laughlin vs. The Street Railway Co. of Grand Rapids, plaintiff sued for personal injuries caused by the upsetting of a cutter while crossing defendant's track, the cause of accident alleged being the continued existence of a hard and slippery ridge left by defendant by the side of the track, and making the crossing dangerous. The court below directed a verdict for the defendant on account of contributory negligence. Defendant now insists that whether or not this defense is clearly made out, there is enough in the record to support the ruling because no negligence appears of defendant, and because the injury suffered by plaintiff if any is not the same alleged in the declaration. The claim of the plaintiff is that at 9 o'clock in the morning on the 29th of February she (with her husband) was going in a sleigh down Fulton street toward the railway station, and at the junction of Park and Monroe streets had to cross the track, which turned upon Monroe street with a switch at the curve. The horse was a steady one, going previously at a walk. Finding it necessary to cross the track, her husband turned the horse to cross as nearly as he could at right angles, but the sleigh on making the descent tipped over to the left and threw her out, her husband being thrown upon her, and her left arm was dislocated. Defendant claimed that there was no negligent disposition of the snow; that the accident came from careless driving over the track; and that the alleged injuries were fictitious, and the proof varient. The court below did not allow any testimony of the condition of the road away from the immediate vicinity of the accident, as the testimony if believed indicated a condition of things of some duration, and not a fall of snow too near the time of the accident to relieve the defendant from fault for not removing it sooner, we do not see that any harm was done by confining the inquiry if the same rule had been applied to both parties, but it was not, etc. We think it was error to refuse to allow persons familiar with driving to give their opinion as eye-witnesses concerning the safety of the crossing. No amount of description can enable the jury to see the place as the witnesses saw it, and while witnesses must describe the place as well as they can, it is always competent for those who are familiar with highways and their use to give their impressions received at the time concerning safety or convenience of passage and other conditions of analogous nature, etc. We do not think there was any such proof of contributory negligence as to authorize the court to take the case from the jury, etc. The judgment is reversed.

(20.) In the Court of Appeals of the State of Missouri, the case of Dunn vs. The Cass Avenue and Fair Grounds R. R. Co:

This was an action for damages for injuries to the plaintiff's son in consequence of being run over by one of defendant's cars.

Plaintiff obtained judgment for $1,000.00 and the defendant appealed The petition was in substance as follows: after alleging that the company was a corporation, it sets forth the following ordinance: "That by section 1 of article 4 of chapter 21 of said ordinance it was provided that no car shall be drawn at a greater rate of speed than six miles per hour. That the driver and conductor of each car shall keep a vigilant watch for all persons on foot, especially children, etc, and that conductors shall not allow ladies or children to leave or enter a car while the same is in motion. Plaintiff avers that the car was moving southward on its track along Glassboro avenue and at a certain point the conductor of said car permitted the son of the plaintiff of the age of nine years to enter the car, and at a certain other point the conductor allowed said child to leave the car while it was in motion, that the violation of said ordinance directly contributed to cause the injury. He says that when the car reached a certain crossing the child left the car while in motion, and proceeded eastwardly to cross said Glassboro avenue" when another of defendant's cars, proceeded northward, ran over him and crushed his leg, which was afterwards amputated. Plaintiff charges negligence and failure to keep the provisions of said ordinance. The claim was for $250.00 medical attention and for $5,000.00 damages.

The defendant filed a general denial, and then averred that the child was a trespasser on the southbound car, and that the company had no notice of its being on the car, that he paid no fare, negligently remained on the outside and rear platform, hanging on to the lower step, and concealing himself. That after riding a short distance, he got off on the west side, safe and uninjured, and instead of passing to the west side-walk, voluntarily and negligently turned and ran east immediately behind the car on which he had been riding and ran out from behind the same into the horses of another car at the same instant going north on the east track; that the driver of this latter car could not have discovered plaintiff's son in time to avoid injuring him, and charged contributory negligence. The evidence tended to show among other things, that there was no conductor on the car, that there were about ten passengers upon it, one or two of whom besides the boy were upon the platform, that the boy did not pay his fare, though he testifies that he intended to do so, but did not do so, because there was no conductor on the car to receive it That desiring to get off, he requested one of the passengers to ring the bell, which he did, but the car nevertheless did not stop, that the boy got off while the car was in motion, landed safely on the west side of the track between the track and the pavement, that he immediately turned and started to run eastwardly across the road, to accomplish which he would have to run across both tracks, etc. One very willing witness of the plaintiff, who claims to have stood on the rear platform with the boy, does not remember to have heard the bell rung when the boy got off, etc.

At request of the plaintiff the court charged that under the law it was the duty of defendant to have had a conductor upon the south bound car and that a failure to have such conductor, or person acting as such, was negligence, etc.

The court say, we think this instruction was erroneous. The ordinance above recited does not require all Street Companies to have conductors upon all cars, etc. To that ruling we adhere. The judgment was thereupon reversed.

(21.) In the City Court of the State of New York in the case of Scheid vs. the Third Ave. R.R. Co. the plaintiff recovered a judgment against the Company for $1,000.00 damages for personal injuries received by being run over by the cars between half past one and two o'clock in the afternoon, etc. He got as far as the middle of the easterly track when he was struck by the horses, knocked down, trampled upon and severely injured. The testimony was conflicting upon the essential elements of the case, which were the negligence, if any, of the Company in the absence of contributory negligence of the plaintiff. The defendant's witnesses disagreed as to the rate of speed at which the car was going, but the conductor testified substantially as follows: "We jumped the track right there, we waited 15 or 20 minutes before we got clear. We went back on the track before we reached Pearl St., and were on the up track again, then we went at a pretty rapid gait as we always do, we had to go as fast as we could to make up time. It is the rule of the Company. I had 15 or 20 minutes to make up. I saw the plaintiff when I got off the car to see what had happened. The driver shouted and I heard the brake put on violently. The car was going at a pretty fast rate of speed, a little faster than the ordinary rate, as it ought to I was still trying to make up time, the driver put on the very heavy brake that shook the whole car, owing to the speed of the car at that moment."

The Court say, although it is quite certain that the driver shouted a warning, but as he admits not until the plaintiff was upon the east rail of the up track, yet that is not sufficient to relieve the appellant from all imputation of negligence. Upon the question of contributory negligence of the plaintiff, the evidence is also conflicting as to the position of the plaintiff at the moment of the accident, etc. Negligence is a question of fact. The actual result does not necessarily condemn the act of the plaintiff as rash or even negligent. It may only prove an error of judgment, and in such case it is for the jury to say whether a man of ordinary prudence and discretion might not under the same circumstances have formed and acted upon the same judgment. The judgment was affirmed.

(22.) In the District Court of the State of New Jersey in the case of the Jersey City and Bergen R.R. Co. vs. John Costigan and Thomas Egan, the case in brief is as follows: Costigan owned a building and employed Egan, to move it over certain streets. The Board of Alderman granted Costigan permission to move the house on condition that it should not obstruct the Street more than five days When Egan got the house as far as Newark Ave. and announced his intention of moving it down that avenue the R.R. Co, seeing that it would interfere very seriously with their cars, obtained an injunction from the Vice Chancellor restraining the owner and contractor from carrying out the plan. Then Egan changed the route and dragged it through Erie Street, blockading the track of the Company over 27 hours. The Company thereupon brought suit against Costigan and Egan for loss sustained through having their track blockaded. The Attorney for the Company put in evidence a certain ordinance to show it to be unlawful for the municipal authority to interfere with, hinder or obstruct the said Company in constructing or running their Railroad, etc.

The Attorney for the defendant put in evidence the resolution passed by the board of Alderman and claimed that said board had absolute right and power to grant permits to move buildings and to regulate the streets and obstructions thereon. The Superintendent of the Company testified as to the daily earnings of the cars, and gave the amount of receipts the day before the blockade, and the day afterwards, and also the day of the blockade which showed largely diminished receipts.

Several questions arose in the case and the whole case was thoroughly discussed, the result in brief was a judgment for the Company for substantially the difference between the daily earnings and the diminished earnings of the cars on the day of the blockade.

(23.) In the Court of CommonPleas of Penn the corporation of the Borough of Easton vs. The Easton and South Easton and West End Passenger R.R. Co.:

The bill filed by the Borough sets forth that the defendant, when the tracks of the Railroad are covered with snow, uses salt in large quantities for the purpose of removing the snow and that this use of salt renders the streets over which the Railroad passes burdensome, dangerous, and injurious to the traveling public, and prays for an injunction. Defendant confesses to using salt as charged, but denies that such use works injury to the traveling public, also claims the right to salt the track for the purpose mentioned in the bill as a necessary incident to its corporate franchise.

The Court say, Two questions were raised, one of fact and other of law. Both of which are vital to the plaintiff's case For if the salting of the track does no injury to the traveling public, then the plaintiff has no standing in Court. The same is true without respect to the question of injury if defendant has a right to salt its track as claimed. After discussing some principles of law, the Court say these familiar principles are doubly fatal to the present motion, for we are left in doubt, both as to the law and the facts. It is a close question whether defendant has not the right to salt its track when not done wantonly, even at the expense or the convenience of the general traveling public. It is true that this right is not expressly conferred by defendant's charter, but the affidavits submitted by the defendant show in the absence of countervailing proof that at certain times salting the track becomes necessary to the full enjoyment of defendant's franchises, and it may well be, therefore, that the right to salt the track is among the implied powers conferred by defendant's charter. But even if it be conceded that the defendant has no right to salt its track to the detriment of the general traveling public, the present motion would have to be denied because it does not clearly appear from the affidavits, and we are not permitted to look outside the affidavits, that the salting of the tracks does in fact work detriment to the public. Upon this subject plaintiff has produced the affidavits of thirty different persons who swear that the salting does work detriment to the traveling public. On the other hand defendant has produced the affidavit of forty-one different persons who swear that the salting does not work detriment to the traveling public. When it is added that in these affidavits some of our best citizens are arrayed against each other, it becomes apparent that the question whether the salting of the tracks is injurious is a doubtful one. Being doubtful the motion for a preliminary injunction would have to be denied for that reason alone. In denying the present motion we decide nothing except that the plaintiff is not entitled to a preliminary injuction. It does not follow that a perpetual injunction may not be awarded at the proper time. But the plaintiff must establish its claim that the salting of the defendant's track works detriment to the general traveling public, in other words, that it creates a public nuisance, by a trial at law.

(24.) In the Supreme Court of Ohio in the case of The City of Columbus vs. Street Railroad Co. decided in April, 1887:

The City of Columbus by ordinance granted the privilege to a Company to construct and operate a street railroad on one of its streets for a specified period. The ordinance provided that the Company should make, construct, and keep in order and repair all that part of the street included between the rails of its tracks and switches, in the same manner and with like material as the Street is constructed and repaired, so long as it shall use the same for its Railroad, and any failure to comply with the provisions of the ordinance or with any general ordinance of the City regulating the use of its streets or the police regulations thereof, should render such Railroad Company liable to the City in an action of damages for such failure, and the Council after giving the Company twenty days notice, should have the right to order any work to be done on the Railroad necessary to keep it in repair, and charge the cost and expense thereof upon the Railroad Company.

Held—First, that the ordinance did not divest the City of its control of the street or abridge its right to improve the same, and it might during the period named cause to be made new improvements thereon, including the part occupied by the Street Railroad and determine the kind of improvement to be made.

Second: By constructing and operating its Railroad the Company accepted the burdens with the privileges of the ordinance and thereby incurred the continuing obligation to make, construct, and keep in order and repair as long as it enjoyed those privileges, the portion of the street between the rails of its track, including such new improvements thereon as the City might determine and direct.

Third: When after notice the Company fails to do the work so required of it, and the City then causes it to be done, its reasonable cost may be recovered by action against the Company and it is not essential to the liability of the Company therefor that the notice to make such improvement precede the letting of the contract by the City for the same. It is sufficient if such notice be given before the work is done, and while the Company may still perform the same.

Fourth: Where the Company after receiving such notice without attempt to perform any part of the work required of it, permitted the City without objection or complaint to commence and complete it adjusted the track of its Railroad to conform thereto as it progressed, and with knowledge that the City expected it to pay for the same and of all the circumstances received all the benefits thereof as fully as if

it had been performed by the Company. The City may recover the reasonable cost of the work so done although the notice does not strictly conform to the requirements of the ordinance.

Ohio State Laws at present in force. At the meeting held at Toledo, Nov. 18, 1885, I had the honor of reading to the association a paper entitled, "Street Railway Legislation of Ohio," in which I gave in full the Statutory Laws of Ohio then in force governing street railways, and referred to several decisions of the Courts of the State theretofore rendered.

By referring to the published proceedings of our meeting for that year, and noting the sections following, it will show the laws at present in force.

March, 1887, the Legislature passed the following:—Section No. 2501. No corporation, individual or individuals, shall perform any work in the construction of a street railroad until application for leave is made to the council in writing, and the council by ordinance shall have granted permission and prescribed the terms and conditions upon, and the manner in which the road shall be constructed and operated, and the streets and alleys which shall be used and occupied therefor, and cities of the first and second grade of the first class and of the second grade of the second class may renew any such grant at its expiration upon such conditions as may be considered conducive to the public interest.

Section No. 6861. That it shall be unlawful for any person or persons, without proper authority, to place any obstruction upon any railroad, or any street railway, or any cable railway, in this state, or displace, injure or destroy anything appertaining thereto, or interfere with, remove, displace or disarrange any rail, cross-tie, switch, side-track, locomotive, car or train of cars, or other property, appertaining to any such railway, street railway or cable railway, or interfere with, displace or disarrange any flag, lamp or other signal attached to, or employed upon any railroad, street railway or cable railway car, locomotive, switch or other property appertaining to any such railroad, street railway or cable railway, or remove from, disarrange or destroy any lock, fastening, coupling or attachment on any track, car, switch, stand, tool-house, depot, or other property of any such railroad, street railway or cable railway.

Any person violating any provision of this section shall, upon conviction thereof, be fined not more than five hundred nor less than twenty-five dollars and imprisoned in the penitentiary not more than ten years or in the county jail not less than thirty days.

An Act, to authorize the county commissioners of certain counties to grant the right of way over certain roads for street railway purposes.

Section 1. Be it enacted by the General Assembly of the State of Ohio, that the county commissioners of any county within this state, having by the federal census of 1880 a population equal to, and not exceeding thirty-six thousand one hundred and seventy-eight, shall have the power to grant the right of way over and upon any of the turnpikes or county roads of said county for the purpose of constructing and maintaining a street railway thereon.

Section 2. Before granting the right provided for in the first section of this act, said county commissioners shall require a bond to be given in such reasonable amount as they may determine, conditioned that said street railway shall be kept in good repair, and that no unnecessary damage shall be done in the construction of said railway.

Respectfully submitted,

ALBION E. LANG.

Toledo, Ohio, November, 1888.

Mr. Doherty interposed when the Secretary was about half through the foregoing paper, and suggested that, as the members could not bear in mind all the points covered by the decisions in the paper, from the mere reading thereof, and as it would appear in the proceedings, where it could be studied fully, that it would be better, and he therefore moved that the paper be included in the proceedings, and the further reading of the paper be dispensed with. This motion being seconded, stated, and remarks called for, an animated discussion ensued, in which the interest and importance of the subject were urged, as also the desire of some members to discuss it. It was announced that this paper (and the others) would appear in extenso in the ensuing number of the STREET RAILWAY GAZETTE. Mr. Clegg preferred to hear the whole of it read, notwithstanding. Ultimately Mr. Doherty withdrew his motion, and the Secretary proceeded to read the long paper to the end.

It was resolved, on the motion of Mr. Doherty, seconded by Mr. Clegg, that a vote of thanks be tendered Mr. Lang for his very exhaustive and concise report upon this subject, and that the paper be printed in the proceedings of the Association.

Mr. CLEGG: I said a while ago, I am in the street railway business, and would be satisfied to make a modest living out of it, but I do not see how I can do it with the present jury sentiment against our business. I want to present this case, and I want to ask what we can do as street railroad men, to correct it. I think this is a very important subject. It is just as important as the motive power. I have in Dayton a $10,000 suit against me where a woman fell off of a street car and brings suit for that amount. We proved by seven witnesses on the car, against two witnesses inside a drug store (mark that), that she got off the car while it was moving. She not only got off the car while it was moving, but with a basket on one arm and bucket on the other, without taking hold of the rail or supporting herself in any way, and got her dress muddy and brought suit for $10,000. The case was tried last winter and the jury disagreed. There were four for the railroad and eight against us, and the jury, in the face of the slight evidence against us, wanted to give the woman $6,500 damages. I want to know if there is anything we can do to correct such a state of things? I have no doubt there are other railroad men here who have had just the same experience, but if this is to be continued, I cannot see that their profits can be very large.

Mr. KILGOUR: I see there is present a Mr. McLaughlin, to whose presence I object; he addressed a very improper letter to the Board of Directors of my company, to be used on the morning of the meeting when it was supposed we were to vote on the adoption of an electric system of street railway. I was not aware of it until afterwards, when one of the directors showed it to me. The letter will be here in a few minutes and the gentlemen can judge for themselves. This was after I had done everything in my power for McLaughlin, introducing him to the city authorities, and showing him everything that he wanted to know, and this letter was written and sent surreptitiously. I ask that the Association request him to withdraw.

It was moved and seconded that he should withdraw.

Thereupon Mr. McLaughlin stated that he was told that the meeting was not exclusively for street railroad men and had entered, but if they wanted it entirely for themselves he would withdraw, being able to take care of himself in any controversy he may have with Mr. Kilgour, and the Association would hear his version in another way. He then withdrew.

Mr. KERPER: I had a case last week of malicious prosecution. I had in May, 1887, arrested five of our men for taking advantage of our company, and in that case, before I had done anything, I consulted my counsel and my counsel advised me to consult the prosecutor, and both told me that I had a good case. The action came up, and in the first place the jury had to answer four questions. One was, whether there was probable cause for bringing the action—not whether the men were guilty or not—and the jury answered "no." The question was asked whether there was malice in the prosecution. I had none, there was none, and they proved none; yet they said "yes." The next question was, did the prosecutor ask counsel. I had asked counsel of my own and had asked the prosecuting attorney, and yet they said "no." The next question was "Did the railroad company follow the advice of counsel?" The answer was "no." The verdict was for a thousand dollars.

I certainly had probable cause, whether I had just cause or not. I certainly had no malice. I had asked counsel and had followed the advice of counsel. They first made up their minds to convict, and then they had to vote on these questions in such way as to do so. I do not fear the case at all. I do not think such a case will stand in the higher court.

The PRESIDENT: Is the committee appointed to select place of meeting and officers for next year ready to report?

Mr. KERPER, as chairman of the committee, then read his report, as follows:

"Gentlemen of the Ohio State Tramway Association:

"Your Committee respectfully nominate the following officers to serve for the ensuing year: For President, Hon. M. A. Hanna, Cleveland; Vice-President, A. G. Clark, of Dayton White Line; Secretary, H. A. Everett, of Cleveland; Treasurer, J. B. Hanna, of Cleveland; Executive Committee, James M. Doherty, of Cincinnati. Place of meeting, Cleveland, Ohio, third Wednesday in November, 1889.

"Respectfully,

CHARLES HATHAWAY,
J. M. DOHERTY,
G. B. KERPER."

The Secretary was instructed to cast the ballot of the Association for the officers named, and they were duly elected. And Cleveland was chosen for next meeting.

Mr. KILGOUR: Here is the letter addressed to our board. It was addressed to each member.

The Secretary then read the obnoxious letter.

Mr. KILGOUR: When it came to the final vote on the adoption of an electric system, this gentleman thought I was going to vote against his company, and hence wrote this letter to the members of the board, and I did not know anything about it until one of them told me. I had a perfect right to oppose that system, as I was not, and am not, committed to any system of electrical construction. This was seeking to undermine me in a surreptitious manner in my own board. If these supply companies can invade our Association in this way, I can not remain in it.

Mr. KERPER moved, "as a matter of record, that the letter be received and filed, and that Mr. McLaughlin's presence be dispensed with at this or any future meeting of this Association."

The motion was promptly seconded and carried, with only one dissentient.

Mr. HATHAWAY was appointed a committee to escort Vice-President Clark, in the absence of President Hanna, to the Chair.

Mr. CLARK took his seat amid hearty applause, saying: "I am gratified by the applause. Now what is the next business."

He then read the names of officers for the coming year.

In conclusion it was "Resolved that 25c per car be collected from the members for the coming year."

On motion the Association adjourned until November 20, 1889.

"The Lunch."

The street railway men of Cincinnati, and at their invitation the O. S. T. A., have given a good example that others may do well to follow, in regard to refreshing the natural man after exercising the mind in their regular sessions. The general rule hitherto has been to hold the banquet late at night, but on this occasion they met at six o'clock, and called it a lunch. The scene of the hospitality was at the Queen City Club.

Menu.

Oysters, Deep Shell.
Radishes, Olives, Celery, Consommé Brunoise.
Paupiettes of Flounders, White Wine Sauce,
Potatoes persillade.
Filet of Beef, larded, a la Godard.
French Peas, Roman Punch, Roast Quails.
Chicory and Lettuce Salad, Nesselrodt Pudding.
Camembert and Roquefort Cheese, Cafe.

In due course the feasters became talkative, some more, some less. Mr. A. G. CLARK occupied the chair. COL. G. B. KERPER was the first called upon to let off his flow of soul, and he gave a revised edition of the peculiarities of the Ohio State Tramway men. How the discursive colonel knows so much about so many of them is a wonder. He has the facts written down, and although he read his manuscript, he kept the company in a flood of continuous laughter for 12 or 15 minutes. His eloquence made such an impression that it was difficult for any one else to speak after him; and not until he spoke later on did the "house" revive to such a state of hilarity.

Mr. A. D. RODGERS, of Columbus, expressed the thanks of the guests to the generous courtesy of the Cincinnati companies. These annual meetings, he said, were the means of cultivating friendship and sociability; and the temporary freedom from routine duties of those who attended the meetings, did them a world of good, to say nothing of the knowledge gained.

Mr JAMES M. DOHERTY, Cincinnati, expressed his longing for the day when electricity will propel all cars, and let horses have a chance of falling into better hands than those of street railway managers. But he was not sure that they would—"anyway, when we shall have lightning to do our service we shall at least have clearer consciences." In conclusion he made humorous reference to "economical persons" whose health required walking exercise, and who, therefore, used "motive power other than cable or electric, to the detriment of our dividends."

MR. WM. J. RICHARDSON, Brooklyn, still held that the city he came from is the "third city in the Union," although a certain preacher, in dis-

cussing about "the world, the flesh and the devil," had asserted that the latter made Brooklyn his headquarters. Mr. Richardson expressed great pleasure in being present, and said that it was very gratifying to find that the Ohio State Association entertained such kindly feelings as had been manifested toward the National Association.

Mr. Clark said he was obliged to leave, on account of important business, and he summoned Col. Kerper, who had been so highly honored by the National Association as to be elected its president, to occupy the chair for the rest of the evening.

Col. Kerper did accordingly, and the entertaining proceedings that followed may be better imagined than described. Among those whom he punned, humored and called upon for speeches were Messrs. C. B. Clegg, of Dayton, James M. Doherty, of Cincinnati, Chas. Hathaway, of Cleveland, Mr. Simms, same city, Mr. Hughes, of Chicago, Mr. Stewart, of Ashtabula, Mr. Harris, of Cincinnati, etc.

Mr. B. F. Houghton, Cincinnati, read a metrical composition after the manner of the "Lament from Walnut Hills," published in our last number, and coupled therewith a hit at General Superintendent John Harris, referring to a mistake in the report of the proceedings at the Washington Convention, in which Mr. Harris is made to say (in answer to Mr. Holmes), that "We have pulled up two cars and had two passengers on the cars at the time," whereas it should have been reported 150 passengers in each car. Poet Haughton said:

They say that Mr. Harris,
Was not himself at all,
When at the Great Convention
He made a speech this Fall.
He spoke in glowing terms, mother,
Of Kilgour's line, and said
They coupled two cars together,
(And I think he's lost his head.)

For he did further state, mother,
That they pulled them up the hill
With speed to the very top, mother,
With the greatest ease and skill;
And that at the time, dear mother,
They carried *two* passengers!
As if *that* was a regular load, mother,
For Kilgour's cable cars.

The company separated in good time, and in good humor, all feeling they had been entertained like princes by the street railway men of Cincinnati, Ohio.

Personal Notes.

Mr. C. B. Holmes, of Chicago, is one of the men who let no grass grow on the path when they are pushing any enterprise.—*Los Angeles Herald.*

Mr. John Stephenson, the veteran street car builder, called at his office November 20, for the first time after four weeks of severe sickness. Hs has since gone to South Carolina to convalesce.

Mr. Frank J. Sprague delivered a very able and interesting lecture on the electrical transmission of power, before the Franklin Institute, Philadelphia, on November 12.

Mr. Augustine W. Wright has been in Chicago for some time superintending the construction of several new lines on the West and North Sides.

Mr. R. Dudley Frayzer, of Memphis, Tenn., was recently in Chicago, conferring with Mr. C. B. Holmes in reference to the sale of his road to Chicago capitalists.

Mr. W. H. Cole has resigned his position as superintendent of the Virginia Electric Light and Power Co. and the Richmond Union Passenger Railway Co., and has located in New York city as a contracting electrical engineer.

Mr. Elias E. Ries has an article in the *Electrical World* (New York), of November 10, on "Heating by Electricity," wherein he shows the advantages of supplying heat as well as light and power, from the same dynamo, the current transmitted to the various points of consumption over the same circuit.

Mr. Edward J. Lawless deserves special congratulations on the safe arrival of a son and heir Thursday morning, Nov. 15th. "His hands are evidently made to handle a grip, and his lungs would do credit to any superintendent." In this case, certainly, marriage is not a failure. We regret, however, that Mr. Lawless resigned the superintendency of the Metropolitan Street Railway Co. November 1st, and has not yet decided what move to make next—whether to abandon railroading altogether, or seek his fortune in pastures new. We trust he will stick to street railway work—in some new field. He has been tired of Kansas City for a considerable time, and has been talking of resigning for six months or more. He likes the work heartily, and is an expert, especially in the management of cable railways, and would be glad of an engagement — anywhere out of Kansas City, Missouri.

Henry L. Gude, late Superintendent of the City Railroad, in San Francisco, who died in that city on the 30th of September last, was born in Queens county, N. Y., and was about 28 years of age at the time of his death. He arrived in that city early in the year 1880, and at once found employment with the City Railroad Company, in whose service he remained up to the time of his death. He commenced as a driver, and rose rapidly in favor, being in due course advanced to the positions of timer, assistant superintendent and superintendent. He had been the superintendent of the road about a year and a half when taken away by quick consumption. In business he was prompt and energetic, and had a watchful care of the property in his charge, and thoughtful consideration for the men under him. In social life he was courteous and genial, and warm in his friendship. He was a member of the Masonic Order and also of the Odd Fellows, and left a large circle of acquaintances to mourn his death.

Mr. N. J. Bailey, who has been recently appointed Superintendent of the City Railroad, San Francisco (to succeed H. L. Gude, deceased), is a native of Pennsylvania, though many of his earlier years were spent in Iowa, where he was engaged farming. He went to California in 1878, and was first employed as a driver on a street line in the city of Sacramento. In 1879 he removed to San Francisco and secured a position as driver on the Central railroad, then one of the most extensive street car lines in that city. The following year he left that road and entered the service of the City Railroad Company as driver, and has since remained with that company continuously in the various positions of timer, receiving clerk and assistant superintendent. He had charge of the road during Mr. Gude's sickness, and his experience and qualifications led to his appointment as superintendent upon the death of Mr. Gude.

Mr. F. B. Rae, who has been engaged on special gold and stock work for the Western Union Company in Chicago since his trip to and return from China with the celebrated Mitkiewicz telephone expedition, has associated himself with the Detroit Electrical Works in connection with their electric railway department. Mr. Rae is an electric railway pioneer, and his many friends will wish him abundant success in his new position.

Mr. H. A. Stoltenberg, of Chicago, is again settled down to the studying of electric propulsion, now that the election is over. For a time he devoted his energy to handling the tariff question.

Mr. Leonidas Le Cenci Hamilton, M. A., author of the book entitled "Origin of Energy," delivered a lecture at Horticultural Hall, Boston, November 30. Subject: Electricity and Magnetism; what they are, and where they come from.

Mr. J. F. Meech, the European manager of the Thomson-Houston International Electric Company, has arrived home after three years' absence. Mr. Meech was accompanied on his homeward trip by Mr. F. J. Down, of the firm of Messrs. Laing, Wharton & Down, the London, England, representatives of the Thomson-Houston International Electric Company. Mr. Down will soon return.

Street Railway News.

Arkansas.

Fort Smith.—The *Courier Journal*, November 23, is authority for the statement that the railway's collections are not counted, but weighed, by the cashier. Fifty dollars in nickels will weigh 10¾ pounds.

California.

Los Angeles.—"The cable road is sold" is the refrain of several charming articles in the local papers the beginning of November, and they rejoice for the fact that Mr. C. B. Holmes, with others, of Chicago, had made the city richer by a cheque for a million dollars. The road will soon be eighteen miles long, and further extensions will follow until there will be thirty miles of cable road. Mr. Holmes and other Chicago capitalists hold three-fourths of the stock.

San Diego.—Mr. Henry's road is running in San Diego, and has been doing so, with hardly the loss of a week's time, for a year. The few days that were lost were caused by a fuel famine. Adjustable leverage is used in the gearing, which gives satisfaction, with the exception that when the gearing is new it is too noisy; but it soon wears down and runs smoothly. As yet the gearing has never been found wanting, and on Sundays a single motor weighing 1,400 pounds has frequently carried a train of two cars up a nine per cent. grade, each car holding about sixty-five people. According to its franchise, the company is allowed to run its cars at a speed of eight miles per hour in the city limits, but the company contemplate in the near future putting a car on its University Heights extension that will attain a speed of fifteen miles an hour.

Sacramento.—An electric car (storage battery), with Reckenzaun motor, was running on the Central street railway the last week in November, with "perfect success" we are told.

San Francisco.—The branch of the Howard street cable system on Twenty-fourth street, is in operation since November 21. The Potrero avenue Improvement Club celebrated the occasion with a banquet in Maennerfund Hall. Cars on the new branch line are running for the present from Potrero avenue to Howard street, where passengers are transferred to the main line. Cars will run direct to the ferry as soon as the Howard street cable is laid, and will connect with the Park branch. A horse car line is contemplated in connection with the cable system running along Potrero avenue to Tenth and thence to Howard.

The California Traction Co., San Francisco, has been incorporated; capital, $500,000; S. D. Ingram and others, incorporators.

Colorado.

Denver.—The Park Railway company is pushing work very rapidly on their new motor line through the city park. The ties are all distributed, the rails are there and the rolling stock will be there by the middle of December. Lots are selling very rapidly, and the price will be advanced as soon as the cars are running, it is believed.

The Centropolis Car Co. have secured the contract for castings (about 4,000 tons), for the Denver cable railway, as Col. Randolph informs us, and the contract for the excavation has been let to John D. McGilvray.

Connecticut.

Ansonia.—A new motor car, ordered by the electric road of Ansonia, Ct., some time ago, arrived recently from the J. G. Brill works, Philadelphia.

Dakota.

Huron.—The street cars are fitted up with stoves and are very convenient for traveling. They make regular trips on all the lines. New trucks will soon be set under all the cars, says the *Times*.

District of Columbia.

Washington. — The following advertisement appeared in the *Post* Nov. 25: Eckington & Soldiers' Home Railway Co.—Treasurer's Office, No. 1202 F St. N. W. Washington, D. C., Nov. 10, 1888.—The Board of Directors of the Eckington & Soldiers' Home Railway Company, at their meeting on the 1st instant, ordered that books of subscription be opened for $25,000 of the Capital Stock authorized by its charter, to be used for building the extension of its road to Soldiers'

Home and the new Catholic University. Persons desiring to subscribe for said stock can do so on application to the cashier of the Citizens' National Bank of this city. The stock will be of equal value in all respects to that originally taken, and subject only to similar assessments.

E. KURTZ JOHNSON, Treasurer.

GEORGIA.

Atlanta.—The Fulton Street Railroad Co. has been incorporated by Messrs. L. J. Hill, W. A. Moore, James Kingsberry, W. T. Ashford, J. R. Gramling, John A. Smith, W. J. Campbell, J. J. Spalding and W. S. Thompson. They have obtained an ordinance to construct their railway, provided the work be commenced within six months and finished within twelve months.

ILLINOIS.

Aurora.—The street railway track on Main street has been replaced with new rails; the old rails being placed on the Bluff street extension to the watch factory.

Bloomington.—The Decatur Electric Street Railway Company has incorporated, with a capital stock of $100,000, and give notice that they will petition the council for leave to operate. The horse car company oppose the scheme, and partisans of both companies are carrying on a red-hot controversy in the newspapers. The new company propose to have their lines in operation by July 1. T. Martin is one of the company.

Chicago.—The North Chicago Street Railroad company instuted an equity suit, Nov. 7, in Court of Common Pleas No. 2 against The Fidelity Trust Company, which is the trustee of a mortgage upon the property of the railway company to secure an issue of bonds to the amount of $1,500,000. These bonds had already been issued, but the company desired the trust company to certify the issue of an additional $750,000 of bonds, and it is this latter that brought the matter into Court. The mortgage in question, which secures the first issue of bonds, has a clause providing for the issue of an additional $1.500,000 bonds for the making of permanent improvements on the property of the company, but it is also provided that the question of the policy and necessity of making such improvements should be first submitted to the trust company for its approval. This approval the railway company neglected to secure, and it has expended over $1,000,000 in cabling a large part of the old track, the erection of a new station, the purchase of cable plant, the construction of additional horse railroad tracks, etc.

The West Chicago St. R. R. Tunnel Co. received certificate of incorporation November 14, showing that the capital stock of $750,000 has been fully subscribed, as follows: J. Charles Moore, $250,000; Warren F. Furbeck, $250.000; Charles T. Yerkes, $10,000; Frederick S. Winston, $10,000 and James F. Meagher,$230 000. These subscribers met at the office of the North Chicago St. Railroad Co., 444 North Clark street, and elected themselves directors of the company for the term of one year. The purpose of the corporation is stated to be to construct, purchase or otherwise acquire a tunnel or tunnels, with necessary and convenient approaches and appurtenances under the Chicago river or its branches, and to maintain, use, operate, lease or otherwise dispose of the same, and to hold and use such realty as it may be necessary to acquire for the construction, maintenance or operation of such tunnel or tunnels and approaches.

The "L" roads are urgently pressed forward by interested parties. The mayor has settled the doom of the State street project by a casting vote. The West Chicago Rapid Transit Association are in a fair way of earning the title of loud-talking party; they have held a public meeting on the South side—Central Music Hall—and nearly set Lake Michigan on fire. The only scheme in favor is the "alley way" project.

Danville.—The street cars are to be heated, in the expectation that cold weather may arrive ere long.

Joliet.—An electric road is projected.

Moline.—The People's Street Ry. Co. has been incorporated with a capital stock of $12,000, by Messrs. Edward H. Guyer, John H. Porter, John B. Cornwall and Charles F. Hemenway. These gentlemen are directors in the Central street railway, and it is understood that the proposed new line is to connect with the Central on the bluff and extend westward to Daebelliehn's addition.

Sterling.—The Union Street Railway company, of Sterling and Rock Falls has been incorporated capital stock $35,000; incorporators, Roswell Champion, William J. Watson, and Henry C. Ward.

INDIANA.

Fort Wayne.—The street cars now run over the new tracks at the corner of Main and Calhoun streets.

The new street car barn at the corner of Glasgow avenue and East Washington street is under roof.

Indianapolis.—The Indianapolis *Journal* of Nov. 22, gives a long account of the origin and progress of street railways, and recites an interview with the "Originator of the development of this important American invention."

IOWA.

Des Moines.—The Electric Street Railway company have been offered $4,000 by the citizens of North Des Moines on Jefferson street as an inducement to extend their line from Sixth avenue on that street as far as Thirteenth.

The work on the West Motor line was discontinued for the season Nov. 26th. Mr. M. H. King who has had charge of the work says that the grading is finished and that the motors will be put in operation early in the spring.

Sioux City.—Three miles of the cable road are now completed.

KANSAS.

Atchison.—The Street Railway company is encouraged to proceed with the work of constructing their road by *The Champion*, saying that a good road with good service will be a positive benefit to the city.

Topeka.—The material for the East side street railway has arrived and work was resumed Nov. 19th. The road will be completed at once.

Wichita.—The Riverside & Suburban electric railway "works like a charm, and President Oak Davidson is happy;" and the Thomson-Houston Electric Railway System is greatly admired. Engineer Verstraete says they are making an extension of three miles.

LOUISIANA.

New Orleans. The mayor of this city (Mr. Shakespeare) sends us "true copies" of two ordinances granting rights to operate street cars with electricity. The first was adopted Nov. 1st, granting T. Prudhomme, Maurice J. Hart, W. J. Behan and Edgar H. Farrar, their associates and their assigns, the right for fifty years to use cars propelled by electric motors on the various street railroads of this city.

The second, dated Nov. 19, is like unto it; and grants to Joseph A. Walker, Alden McLellan, Joseph Hernandez, E. J. Hart, Henry Larquie, Wm. J. Behan and Thomas Pickles, their associates and assigns, the right for fifty years to use cars propelled by electric motors on the various street railroads of this city.

As such conflicting statements have got abroad, we thought it worth while to trouble the mayor for the "bottom facts," and following is a true copy of both ordinances—they are identical with the exception of dates and names of grantees, which are given above.

"Be it ordained by the Common Council of the City of New Orleans that the privilege is hereby granted to [So and So], their transferees, associates and assigns, and to any corporation to which they may hereafter transfer this privilege, the right for fifty years to use cars propelled by electricity, on any and all of the street railroads of this city, with their consent, provided that all said cars so propelled by electricity on said street railroads, shall be used only for the transportation of passengers; and shall, in all respects, conform to the rules and regulations now prescribed by the respective charters and franchises of said railroads, provided, however, that no system shall be used requiring poles and wires to be placed on the public thoroughfares, but only such system as will in itself be contained in each car, and be of such low voltage, as to be absolutely safe, and subject to the approval of the City Council, it being distinctly understood, that nothing herein contained shall be construed as granting exclusive privilege, and it being further understood that no street railroad company shall be permitted to use such improved system, unless such company shall have complied with all of its charter obligations and contracts."

MAINE.

Biddeford.—Efforts are being made to convert the horse roads of Biddeford and Saco into electric railways. Thomson-Houston System.

MASSACHUSSETTS.

Boston.—The West End electric railway is fast approaching a state of completion, says the *Daily Globe* of Nov. 23; it would be more correct to say, we believe, that the electric railway portion is only commenced. But one part is about being completed, and the rest is to be proceeded with without delay.

Hyde Park.—The Norfolk Street Railway company received its charter of incorporation from the railroad commissioners November 21, with $100,000 capital. The officers are: W. E. L. Dillaway, president; H. M. Bunton, treasurer; Thos. E. Faunce, secretary; the same and M. M. Cunniff, George Miles, H. C. Stark and George H. Miller, comprise the board of directors. The company is to locate and lay tracks, with all curves, frogs and other appliances necessary to operate its road in the streets of Hyde Park. The location is to be confined to that town, and the route to begin at the Boston & Providence railroad station, at Readville, and to extend and run through Readville, thence through West River street to its junction with Central Park avenue. Also beginning on Central Park avenue near the Readville station, thence through by-streets to Hyde Park avenue, and continuing along the avenue to the Boston line. There are several conditions under which the charter is granted, the principal one being that the company shall lay and maintain tracks only in such places and manner as shall be designated by the board of selectmen of Hyde Park.

Leominster.—The electric railway project has recently received fresh impetus. The original company is re-organized, and there are signs of practical activity. It is proposed to have a line five miles in length, to extend from Leominster Center through North Leominster to Fitchburg, connecting there with the street railway of that city. It is understood that sixteen persons, representing Leominster, Boston and Lynn, have subscribed for two hundred shares in the contemplated railway, with a capital stock of $200,000; par value of shares $100. Of these 200 shares, 191 are held, it is stated, by members of the Thomson-Houston Electric company and those directly or indirectly interested in that company.

Springfield.—The Citizens' Street Railway company is erecting a spacious brick car-barn on Ninth, between Jefferson and Madison streets.

MICHIGAN.

Ann Arbor.—"Ann Arbor's street car project is not dead or sleeping, but will be heard from before long."

Detroit.—The special committee on street car routes has decided upon two new routes; and it is their intention to award the franchise to the company offering the lowest rates of fare. Tickets must be sold at the rate of eight for twenty-five cents in the morning and evening, the hours to be specified by the bidders for the franchise. Three sets of bids must be offered, the first on a basis of a thirty-year franchise, with overhead electric apparatus allowed outside of the mile limit. The second bid must be for a twenty-one year franchise, with all the electrical apparatus underground. The third bid is for a twenty-one year franchise, with the same conditions as to overhead wires as in the first. It is distinctly understood, however, that all wires and apparatus outside of the mile limit must be put under ground when the council so order.

Grand Rapids.—The Valley City Street and Cable company submitted a petition and application to the council November 19. It stated that the company's petitions for franchise to points in the sixth and seventh wards had always been met with the objection that its routes were not direct enough for the public use. It had lately constructed the Canal and Ottawa street lines, and with fair weather would operate them in three or four weeks. To give direct and rapid transit to the above wards, they asked permission for additional franchises.

Saginaw.—The Union Street Railway company are making considerable extensions. The *Courier* declares that "President Seligman is a hustler

from way back," and remarks that "with a double street track, Pullman coaches and other facilities, the Saginaw Union street railway will get there at a great rate and fully answer the expectations of the wide-awake, pushing and progressive spirit of the people of this commercial metropolis and railroad center of Northern Michigan."

MINNESOTA.

Duluth.—The West Duluth Street Railway company, composed of Messrs. Shannon, Elder, Stowell, Tanner, Hurlbut and R. H. Harris, is being formed, with authorized capital of $100,000, to build surface and elevated roads in West Duluth.

St. Paul.—Engineer Clift. Wise, of the St. Paul City Railway Co., has done a piece of rapid cable railway construction. He finished one mile of double track cable road November 23, which is undoubtedly the best and cheapest road ever built. The cold weather approaching they were obliged to stop work, but managed to lay all the iron work and complete the concreting in just twelve days for the one mile of double track. The greatest force of men employed at any one time did not exceed 500. The yokes are cast-iron. The common yokes weigh 450 pounds and the pulley yokes 475 pounds, and were able to withstand a pressure of 90,000 pounds before breaking. This test was made under hydraulic pressure, at the St. Louis Car Wheel Co.'s works, St. Louis, Mo. It is the strongest yoke yet made. The slot rail weighs 58 pounds per yard, is of an improved kind, invented by Col. P. F. Barr. Instead of using the objectionable bolt to fasten it to the yoke it is keyed, thus simplifying the work and lessening the cost considerably of laying the work.

The tram rail is what is known as the Providence Girder, weighing 54 pounds per yard ; it is fastened on each side with a wedge, thereby obtaining the correct gauge. Concrete is used only around the bottom of the yokes for foundation and half-way up the sides of the conduit The balance of the conduit is sheeted with dry white oak saturated with coal tar. The conduit is egg-shaped at bottom and forty-two inches deep. The paving is granite. The whole construction is by far the best and cheapest and the fastest laid of any yet built. The foundations for the power house and for the machinery and engines are finished, also the smoke-stack, which is 162 feet high. The building will be 250x166': The machinery is being built by the well-known firm of Poole & Hunt, Baltimore, Md., whose work on cable machinery is unexcelled. There will be two 28x60' engines, made by E. P. Allis & Co., Milwaukee; there will be three Babcock & Wilcox boilers 624 horse power. All of this work will be put in in the spring, and the road, which will be 2.67 miles, running by June 1st.

Besides this, a new plant has been put in for the old road, which will be a duplicate of the plant for the new road. They are getting it under cover now and expect to have it running by February 1st.

MONTANA.

Helena.—The committee on ordinance reported an ordinance Nov. 13, granting the Helena Motor Railway company the right of way for the continuation of their line on several streets.

MISSOURI.

Kansas City.—The Boston directors of the Kansas City Cable company are likely to buy Mr. Winner's Independence & Park Ave. "dummy line." The Boston syndicate consists among others of Phillip Chace, Lord Day and Frasier, all of whom were in Kansas City the middle of November, and sanctioned considerable extensions.

Mr. H. J. Latshaw and Dr. Morrison Munford appeared before the county court at Independence Nov. 19, in behalf of the Blue Valley Rapid Transit company and were granted a franchise for an electric or motor line on Fifteenth street from the Blue to the end of the Fifteenth street cable. It is the intention of the company to build an electric road and to commence work early next March.

St. Louis.— The Councilmen have individually expressed themselves in favor of "L" road; and the eastern capitalists interested will soon appear before the Council.

Mr. C. B. Holmes, President of the Chicago City Railway company, together with Mr. John V. Farwell, representing Chicago capitalists, are negotiating for the purchase of four of the principal street railways in St. Louis. The *Republic* says that, "the knowledge of their negotiations has occasioned much talk in business circles in Chicago and has induced Mr. Yerkes, the owner of the West Side horse system of that city, to attempt a similar deal in Kansas City after trying to head off the syndicate in its St. Louis deal."

The Union Electric Railway, the Wyatt Park Electric road, the Frederick Ave. line, and the citizens' may be bought (all four) for $70,000, says the Leavenworth *Times;* and gentlemen interested in the Sprague Electric Railway & Motor company have "obtained options" thereon.
a few nights ago in the South Side indorsing the Lindell company's "Blue Line" project. Vice-President Lightner of the Railway company was present, and assured the assembly that the line would be built to the Park in a very short time, if the franchise were only obtained. The Missouri Railroad (Cable Division) intends to put a bill before the house to have their cable line extended from its present terminus at Sarah street all the way to Forest Park, to take the place of its horse car line now running to the Park. The Union Depot Railway company intends to put an extension on one of its South Side lines. Nothing has yet come out of the project of this last named line's crossing the Fayon Av. bridge, but it is supposed the bill will materialize at the next sitting of the Council. The St. Louis Cable & Western's new curve at Grand av. is said to work like a charm, but still the pulleys are quite noisy in keeping with one of the characteristics of the rest of the road. Mr. Julius Walsh is said to have promised a party of gentlemen, who intend to improve the property greatly in and around Rinkelville, that he would either run a steam or a cable road on the Rinkelville extension. Several Kansas City and eastern capitalists have a bill before the house to run an elevated railway from Washington avenue and Third street to the North End, South End, and West End. The South End and North End roads will be surface roads when they are out in the suburbs a considerable distance.

NEW YORK.

New York.—The annual meeting of the stockholders of the Manhattan Elevated Road was held November 14. The following were elected directors: Jay Gould, R. M. Galloway, Russell Sage, Samuel Sloan, Sidney Dillon, George J. Gould, J. Pierpont Morgan, John H. Hall, Cyrus W. Field, Edwin Gould, Chester W. Chapin, Simon Wormser and S. V. White. The new board immediately organized by the election of Jay Gould as president, R. M. Galloway, vice-president and D. W. McWilliams secretary and treasurer. The annual report for the year ending September 30, 1888, as submitted to the stockholders, shows gross earnings for the year of $8,673,891.70; operating expenses, $5,201,050.01; net income, $3,472,841.69.

The Third Avenue Railway company, at its annual meeting November 13, determined to substitute the cable for the horse as a means of moving its surface cars, and if the decision from the Court of Appeals be favorable, as expected, the work of changing the new motive power will be begun at once. The horses used by the company, says the *World*, got away last year with 99,734 bushels of corn, 153,321 bushels of oats, 2,823 tons of hay, 433 tons of straw, 15 tons of bran and 144 bags of fine salt. The consent of owners of more than half of the real estate along the line of the road has been secured for the change to cable motor.

In the case of the People, appellant, against John O'Brien, Receiver, et al., the Court of Appeals, November 27, reversed the judgments of the Supreme Court and dismissed the complaint, with costs to the defendants, other than the Receiver—thereby giving a valuable victory to the Broadway and Seventh avenue railroad people.

Watertown.—This cold city is to have an electric railway, Thomson-Houston system, for which the Watertown Street R. R. Co. have undertaken to lay out $30,000 immediately.

OHIO.

Cleveland.— The East Cleveland R. R. Co. have eight miles of Sprague electric road pretty well equipped. They have purchased sixteen motor cars of the Lewis & Fowler Manufacturing Co., and they are very fine indeed. They have built this year in their shops thirty-three new cars, and bought, including the motor cars, thirty-four additional. They have in contemplation the construction of fourteen miles of additional track (two new routes), next season, and they expect to keep things "humming."

PENNSYLVANIA.

Pittsburgh—The Pittsburgh Traction company are now running thirty-one cars over their cable line, twenty-five cars and six "swings," and business is increasing every day. The cars run smoothly and with enough frequency—every three and a half minutes—to accommodate the heavy traffic. On Sundays, however, it is found difficult to find room for all the people who want to get out and in the city. Large parties visit the suburbs on pleasant Sundays, and make a sort of excursion business for the Traction company. At a meeting of the directors, November 20, it was decided to order ten new cable cars to meet the increase in travel. As soon as longer coupling-pins can be secured the old horse cars can be used to advantage as tenders. The only obstacle at present is that the short couplings prevent their going round the loop at the foot of Fifth avenue. (The old horse cars are for sale, as stated elsewhere in this number.)

Attention in street railway circles is again attracted to the Central line, and George I. Whitney, who is the practical head of the company, says that the preliminary papers for the incorporation of the Central Traction line were signed November 22, with a capital stock of $1,500,000, and that the work of building the new line will commence with early spring.

Reading.—The electric railway running from this city to Black Bear Inn, was opened November 27. The trial trip was made with a car upon which were the directors of the road and a number of invited guests. Everything worked satisfactorily and the car made about fifteen miles an hour. The road is two miles long and connects the city with an important suburb.

TENNESSEE.

Chattanooga.—The directors of the Electric Street Railway held a meeting November 14, and the condition of the road was thoroughly discussed and found to be satisfactory. The motor to be used was thoroughly discussed, and it was decided that electricity should be used. It was, however, ordered that no contract for rolling stock or motive power be made until after the track had been laid the entire length. This, it is estimated, would require about thirty days. Then the stock and machinery will be ordered and put in as soon as possible. The operation of the road will necessitate the building of an immense electric plant to furnish motive power. It is the design of the company to thoroughly illuminate the entire line with electric light, and to make the necessary accompaniments to the system very ornamental to the streets.

Memphis.—A special despatch, dated December 8, says: There is scarcely a doubt but what the consolidated street-car lines of Memphis have been sold to a syndicate of Chicago and Eastern capitalists. The trade was effected through Messrs. F. H. White and John L. Norton, of Memphis, and Messrs. Holmes, Honoré and Hickley, of Chicago, who represented the syndicate of purchasers. The street-car lines stock represents $1,000,000, and the price paid is said to be par. The deal has been pending for three months, and was, so it is alleged, consummated yesterday in Chicago by Messrs. R. Dudley Frayser, Sam. Tate Jr., and F. H. White, on behalf of the street car companies, and the Chicago gentlemen named above. The terms of sale are said to be $200,000 cash and the balance on a limited time.

TEXAS.

Fort Worth.—Final negotiations were completed November 19, by which a syndicate of Boston and Chicago men became owners of the Rosedale and Queen City car lines, and 717 acres of suburban property, paying therefor $513,000. The railway lines will be extended fifteen miles, and made an electric railroad. This is the largest single deal ever made in Fort Worth. The syndicate is headed by Irving Evans, Walter Potter of Boston, and J. V. Farwell, of Chicago. The syndicate has donated the land on which to build a $12,500 college.

Mexico.

Says a Mexico dispatch: The Street Railway company, which is making a study of electric and steam motors for its suburban service, has about decided that electricity is impracticable here, mainly on account of the high cost of fuel, and it is now proposed to introduce the same type of locomotives as are employed on the New York elevated roads. The introduction of steam will tend to build up various charming suburban towns. American locomotives and cars will be employed.

EXPIRING PATENTS

Relating to Street Railways becoming public property in December, 1888, furnished by F. B. Brock, Patent Attorney, Washington, D. C.

[All the features of the following list of patents are about to become public property by expiration, and may be appropriated by any one. Manufacturers may determine to what extent they may act independently of patent rights, and inventors may, through them, gain an insight into the prior knowledge of street railway development. Drawings and specifications of any patent may be had at cost by applying to Mr. Brock.]

Expire week ending Dec. 5.

- Car Starter, J. North.
- Car Axle Box, W. S. Auchinclass.
- Car Starter, C. P. Leavitt.
- Car Seat Frame, G. Buntin.
- Car Journal Lubricator, S. Uslick.
- Car Axle Lubricator, J. Barber.
- Draft-Pole for Horse Cars, S. A. Otis.

Met on the Road.

Philadelphia: Dan. Coolidge, Esq., late Supt. of the South Boston road, but for the past nine months the Philadelphia representative of the Johnson Steel Street Rail Co.—located in his new office in the beautiful Bullitt Building. Dan. is happy, and a charming office it is, too; exquisitely furnished, large, airy and roomy. A permanent exposition of J. S. S. R. Co's specialities occupies a prominent place on one side of the room; several handsomely framed photographs adorn the walls, and Dan. will be thankful for any more that may be sent to him. My experience inclines me to the belief that he chose the Bullitt Building because about the finest restaurant in Philadelphia is on the top floor, and Dan. being a prince of entertainers, takes good care to inveigle his friends up there on every possible occasion.

New York: Rambling about through the Mutual Life Building, on Nassau St., I see another latch string hanging out; a pull opens the door and I find myself in the presence of another jolly good fellow—Major Evans. When the Johnson Steel Street Co. first hung out its shingle, it began to cast around for a good man to represent it. The "best" always was good enough for that Co., so it hit on the major, and his record testifies as to the wisdom of its choice. Not a railroad man in the country but who knows him, not one but who has a good word for him; not a supply man but who speaks well of him; open hearted, genial and thorough, with friends by the score, in business and out of it; an earnest worker, a level headed business man, the major goes through the world, treating it as it treats him.

Boston: John F. Courtney, who for fourteen years past has been associated with the Ry. Register Mfg. Co. of Buffalo; John is known to everyone in the Street Ry. business in the U. S., Canada, Mexico and about everywhere else. He recently sold out his interest in his old company, and now makes his debût as dealer in street railway supplies of every description. Unless the past holds for naught, and friendships and business popularity don't weigh in the balance, John F. Courtney will make his new venture go.

John A. Brill, who "booted and spurred" was en route to the pier to take the steamer for Europe. Everyone knows John A. Brill; he has travelled from Dan to Beersheba, and from the Aurora Borealis to the Precession of the Equinox. He is held to be one of the best salesmen in the Car business to-day, and is credited with having once talked the Rajah of Terra del Fuego into giving him an order for 200,000 cars or something of that kind.

Beadle, E., looked natural enough in his cosy quarters near the Gilsey House, in New York, but he had about lost his voice from a severe cold. He gave a good report of Col. Watson's condition (the latter, by the way, his many friends will rejoice to hear he left Boston for Buffalo on Nov. 9th,) Mr. Beadle is, as most of us know, the general manager of the Railway Register Manufacturing Company, and few men have more friends than he.

D. W. Pugh, in Cincinnati, amiable, jolly, good natured and as full of business as ever. Few men are better liked in the supply business than the genial representative of the John Stephenson Co., and no one can justly begrudge him in his popularity.

Col. Hy. M. Watson, en route from Boston to Buffalo, convalescing, after a siege of sickness that almost cost him his life.

Frank J. Sprague and H. McL. Harding in Ohio's "Queen City," arranging for increased equipment of Mr. Littell's recent purchase there—"Uncle Jim. Doherty's" Zoo road.

Elmer Evans, a cousin of the "Major's" and for two years associated with him with the Johnson Steel Street Rail Co. Easton, Reading and Scranton, Pa. each received a visit from this gentleman lately.

D. Frank Longstreet in Denver, where his road there is to be cabled at once; Mr. Robert Gillham being engineer of construction. The Providence Girder Rail is to be used. Contract for slot rails placed with Wm. Wharton Jr. & Co. of Philadelphia.

Gardiner C. Sims, President Providence Girder Rail Co. at Victoria Hotel, N. J., full of business, as usual.

"In Dixie," William F. Swift, secretary Brush Electric Co., combining business with pleasure. Mr. Swift is an old newspaper man, and well known amongst that fraternity in Chicago.

In Richmond, Va.—Chas. Hathaway Jr., and M. S. Robison, visiting the Exposition (or Fair) and inspecting the Union Pass. R'y (Sprague system) there.

In the smoking room of the Inman line S. S. "City of Berlin," in mid-ocean, while the good ship was being lashed by high seas on all sides, Mr. Rufus Martin homeward-bound, who sailed from New York for Southhampton on the North German Lloyd SS., "Zahn," Oct. 31.

TRAMP.

The Julien Storage Battery Motors.

The Julien Electric Traction Company are now running three cars on Fourth and Madison Avenue, New York. Until recently, the batteries were changed after each round trip of twelve miles. Now they are only changed after the second round trip or twenty-four miles. Even then, the battery requires but about three hours' charge, before it is put on the car again. The company hopes very soon to make three round trips or thirty-six miles with one charge. If they can accomplish this there will be required but one charge of battery a day, thus making a great saving of time and labor. In other words, horses will be changed but once a day. All this is due to the scientific progress the Julien Company is making, more especially in the storage battery.

The company has done a great deal of experimental work on the three cars now in use, and has put them to such practical tests as to be able to settle on a standard. Hereafter the standard car of the Julien Electric Traction Company will be an eighteen foot body, mounted on an independent rigid truck, with a six foot wheel base and (on the Fourth avenue line) a fifteen-horse power motor, geared to each axle. The car will carry 144 cells in six groups of twenty-four each. This novel grouping is for economy; for, by this means, the motors will be run most of the time in series, instead of altogether in parallel, as at present.

It is a remarkable fact that none of the Julien cars have yet broken down, or become disabled, since they were put in service; but have always got back to the station without any external aid.

Business Notes.

THE JOHN STEPHENSON COMPANY have received many large orders for cars—horse, cable and electric—we understand, since they received the gold and silver medals at the Cincinnati Exposition, etc.

THE PITTSBURGH TRACTION CO. have a lot of street cars they wish to sell, since they are running their cable road.

Now that Mr. Nitsch advertises his peat moss in the STREET RAILWAY GAZETTE he may expect his business to be more than trebled during 1889.

THE CINCINNATI CORRUGATING CO.'S material is found, upon examination, to be very well adapted to many uses in connection with the buildings of street and other railway companies, such as for roofing and siding, as well as for making dust-proof floors for the lofts of stables; by using their corrugated steel arches placed upon wooden or iron I beams, or using their beaded or corrugated ceiling, which can be easily placed on the under side of ordinary floor timbers. This would avoid the trouble which exists in ordinary board floors, where the lumber almost invariably shrinks, so as to leave open cracks for the dust to work down through, which is, of course, very injurious to horses. We were especially reminded of this by hearing allusions to it at the meeting of the American Street Railway Association, at Washington.

MR. EDWARD BEADLE, manager Railway Register Manf'g Co., 1193 Broadway, New York, informs us officially that "Mr. John F. Courtney is no longer connected with this company, having sold out his interest in the same." As stated elswhere in our present number, Mr. Courtney is located at 407 Locust street, Philadelphia, doing business on his own account, in street railway supplies.

TO STREET RAILWAY MANAGERS, ETC., Gentlemen:—The undersigned, for the past 14 years connected with the Railway Register Manufacturing Co., of Buffalo, N. Y., having disposed of by sale, his interest in the business, has opened an office at 407 Locust street, Philadelphia, for the sale of *Street Railway Supplies at manufacturers' prices*. Estimates for printing tickets, transfer checks, trip slips, etc., a specialty. Thanking you for past favors and soliciting your trade, I am, yours respectfully, JOHN F. COURTNEY.

NOTICE TO MANUFACTURERS.—Gentlemen: The undersigned, for the past 14 years connected with the Railway Register Manufacturing Co., of Buffalo, N. Y., having disposed of his interest in the Register business, has opened a temporary office for the sale and exhibit of Street Railway Supplies, at 407 Locust street, Philadelphia, P With his extended acquaintance among Str Railway managers throughout the United St Canada and Mexico, and being also a resi of this city for the past twelve years, is compet to furnish the best of references, and would r spectfully solicit the agency for your goods for this city and vicinity. Have accommodations such as will warrant the placing of supplies of all kinds in the Street Railway line on exhibition, and for the inspection of Street Railway men of this vicinity. A representative canvass of this city once each week, Chester, Wilmington, Baltimore and Washington, together with Trenton and neighboring cities at least once each month—will be made. You can readily see the advantages open for the sale of your goods. Will be pleased to hear from you.

Yours respectfully, JOHN F. COURTNEY.

THE PALMYRA MANUFACTURING COMPANY, works at Palmyra, Wis., organized to manufacture under Prosser's patent for "Utilizing Heat Products," is making progress with the new noiseless motor for street cars. Some gentlemen from Boston, Gloucester and Salem, who hav had an expert at Palmyra for two weeks or mo on his favorable report came on and exami the motor and other improvements in stea machinery, and made a purchase of the entire rights of Prossor's Inventions in Steam, for the six New England States. The consideration, we learn, was $100,000 in cash payments, and one-fifth of the capital stock of company to be formed in Boston, to manufacture, etc.