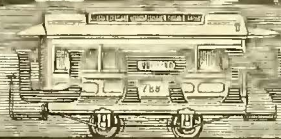


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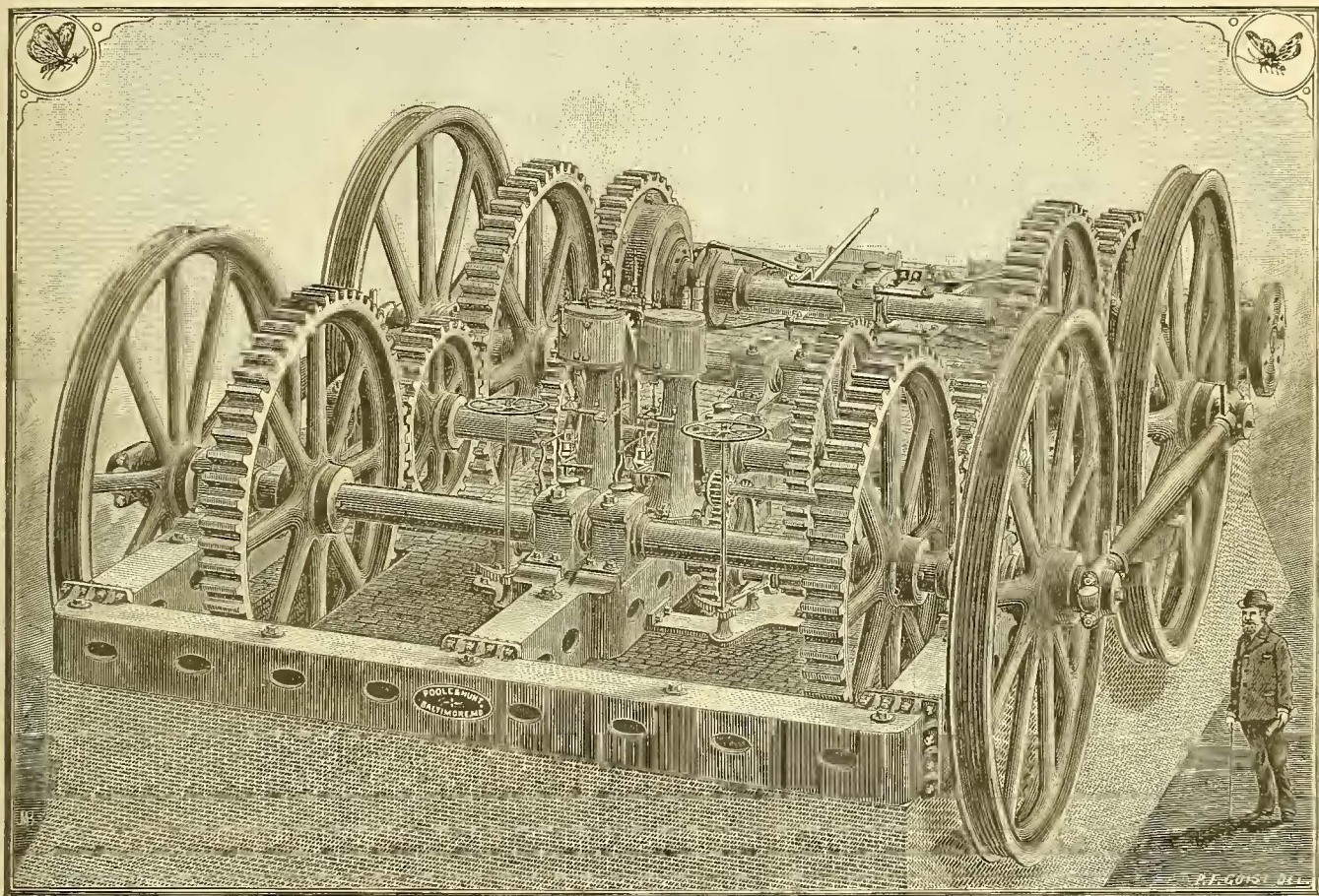
THE STREET RAILWAY JOURNAL



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MOTIVE POWER OF THE TENTH AVENUE CABLE ROAD.

Motive Power of the Tenth Avenue Cable Road.

The Tenth avenue cable road of this city has now been in operation five months. The first cars were started over the line at 5 P. M., August 29, 1885, and the road was open to the public at 6 A. M., on the 31st, thirty-six hours after making the experimental trip. At first the road was operated from 6 A. M. to 9 P. M., and the number of hours gradually increased. Inside of three weeks from its inauguration it was running 22 hours of the 24, continuing at that rate to date.

No trial of the road or appurtenances was made prior to the formal opening, and at that time it was discovered that the attachments of grip to cars were not heavy enough for the work, but, as the company had provided only ten (10) cars, under the impression that traffic would be

very light (which soon proved to be a mistaken idea), the carrying capacity was altogether too limited to allow the removal of a number of cars at any time for repairs to grip attachment without greatly inconveniencing the public. The motive power has not caused a single detention—in fact, the only trouble experienced was as above stated, with the original attachments of grips to the car, and even this difficulty could have been obviated if less haste had been made in starting and sufficient time allowed for testing the different parts.

There are sixteen large sheaves of from four to twelve feet in diameter, and nineteen hundred (1,900) carrying pulleys. As the entire system is in duplicate, but one-half the wheels are in constant use. Only two (2) men are employed to lubricate and examine these wheels, making cost for labor \$3.50 per day.

The building containing the motive power is located on Tenth avenue, at 128th and 129th streets, and the interior is finished in a style resembling a banking institution rather than a railway depot. On entering and passing through the vestibule, then descending a stairway at the right, the first or tension floor (which is ten feet below the main floor of building) is reached, and from this point a complete view of the massive machinery and engines is obtained. As the floor of the machinery room is six feet below the tension floor above mentioned, or sixteen feet below the main floor, the whole presents a magnificent appearance from this entrance. The room containing the engines and machinery is about 50x115 ft., and a space about 40x100 ft. is required for the machinery and engines, the weight of which exceeds 300 tons. The company are well pleased with the quality of the work, and do not fail to give the machinery build-

ers, Messrs. Poole & Hunt, of Baltimore, well-deserved credit.

The accompanying cut illustrates one section of the driving machinery. This is duplicated on the opposite side of engines. The main shaft is 100 ft. long, divided into five (5) sections, each coupling being about three (3) ft. in diameter and joined with cross-keys.

The principal improvements in the machinery are—

- (1.) Driving drums are independent.
- (2.) Auxiliary power.
- (3.) Varying diameter of grooves on the periphery of the drums.

The friction clutches (four in number, one for each train of gears) have sixteen wrought iron and steel discs three-eighths of an inch thick by about four feet in diameter. Every alternate disc being secured to the gear wheel, and the others fastened to the shaft, causes the lateral power applied through the clutch to be multiplied by sixteen in affecting the gear.

Owing to the multiplicity of square inches in friction surfaces in this clutch, the power required to operate the six miles of cable with cars is not sufficient to force the oil from between the surfaces.

It is necessary to frequently inspect the cables, more especially if considerably worn. The ends of strands tucked in at splices occasionally work loose, and, if discovered before they are entirely out of the rope, can be quickly repaired. During this inspection the cable must be moved very slowly—about two miles per hour—and this machinery is provided with auxiliary engines for the purpose. They can also be used for removing old ropes and replacing with new, and in case of serious accident to the main gears, the auxiliary power can be utilized to operate the entire road, which can be done up to a speed of four miles per hour, and the service of this power is almost inestimable where necessary to keep a road running uninterruptedly.

The driving drums are overhanging—placed outside of the girder frames. They are arranged in this manner to allow the cables, if needing repairs, to be entirely detached from the machinery; and in this the principle is the same as in Chicago, where the feature was first introduced, and has proved of great assistance when handling the ropes.

The rope used on cable railways has a hempen center, around which the wire strands are wound, and a section under strain of five or six tons is longer than when subjected to a strain of but one ton. As the incoming rope has all the stress of operating the road, and the outgoing cable has only that produced by the tension weights, varying from 1,000 to 1,500 lbs, the grooves in the periphery of the drums are made to meet the contraction which takes place in the rope as it is relieved of the stress.

In this system of driving, the first grooves in the drums are largest in diameter; the second smaller than the first, and so on, each groove gradually diminishing in regular order to allow the rope to return to its normal structure as the successive wraps are made.

The Whipple Metal Railway Tie.

That metallic ties must eventually take the place of wood is an opinion which is gradually gaining ground among railway men. The rapid destruction of ties by their natural decay, as well as by fire and wearing out, makes them expensive in spite of their comparatively low first cost.

The experiments made with various forms of metallic ties and stringers have not been altogether promising. Rigidity, first cost, and, in many instances, a complete alteration of the method of track support, have

Fig. 3 is a cross-section. The tie, it will be seen, is formed of two flat strips of metal *A B*, connected by two concave side pieces *c c* in Fig. 3. The lips on the top and bottom pieces are turned over and clasp the edges of the two concave sides *a a*, *b b*. To increase the strength, a line of rivets is put through the side-pieces at their centers *c²*. This construction forms a box which is composed practically of two triangular beams united at the apex. Elasticity, however, is secured by making the side plates concave instead of straight. The weight of

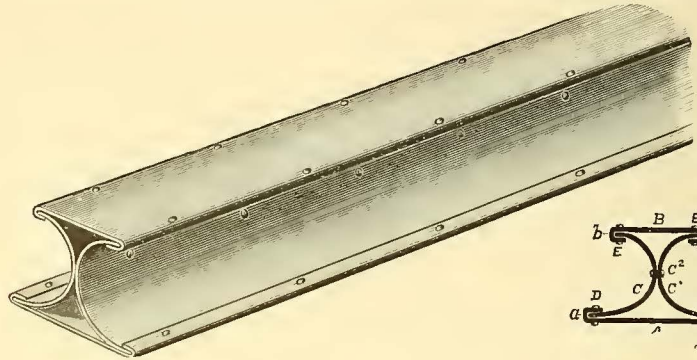


FIG. 1.

FIG. 6.

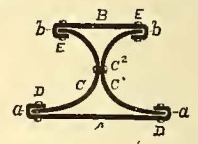


FIG. 3.

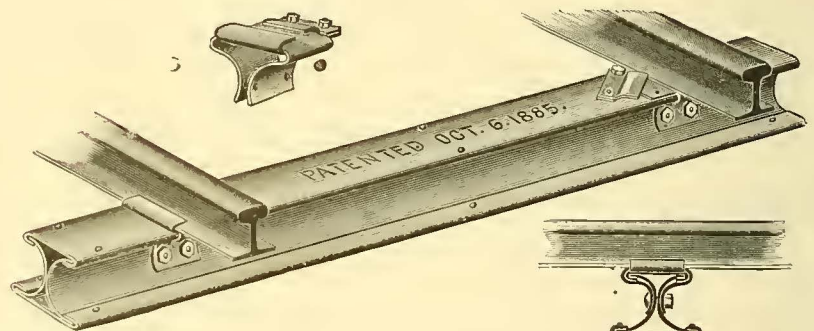


FIG. 2.

FIG. 8.

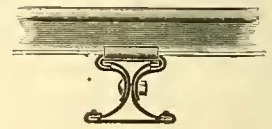


FIG. 5.

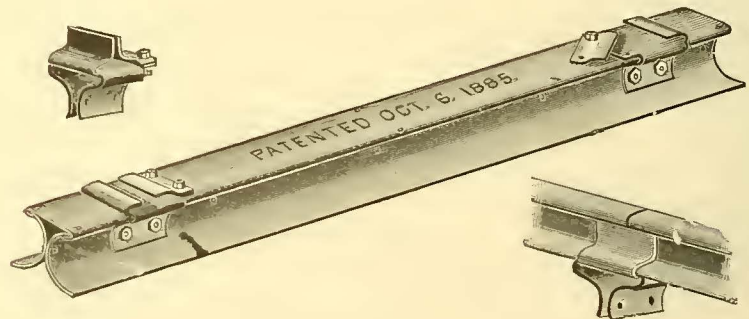


FIG. 4.

FIG. 7.

THE WHIPPLE METALLIC RAILWAY TIE.

been among the objections which have been presented. Abroad experiments have been tried on an extensive scale. A variety of systems have been used, but the experimental stage can hardly be considered passed with the most complete systems.

The Whipple metallic tie,* of which we present illustrations, is an attempt to combine in metal all the good features of wood, while retaining the useful qualities of metal.

Fig. 1 shows the method of constructing the tie itself.

Fig. 2 shows the tie under a pair of rails with the fastenings in place.

*The Whipple Elastic Tie and Patented Rail Fastening. L. E. Whipple, United States Hotel, Hartford, Conn.

the plates, degree of compression with which the lips are turned upon the sides, number of rivets, etc., are determined by the strength and size of tie required. Where the greatest elasticity, lightest possible weight, and a cheaper method of fastening are required, the form shown in Fig. 4 is adopted. In this the base plate, it will be seen, is omitted, which, of course, considerably increases the elasticity of the tie. The method of fastening the rails upon the tie is shown in Figs. 2, 4, 5 and 6. Fig. 5 is an end view of the fastening as attached to the tie, and Fig. 6 a perspective view of the same. The metallic chair has one removable side, allowing the rail to be slipped in place and fastened by spring of two

bolts on the inner side. Figs. 7 and 8 show another form of chair which also forms a fish plate.

This form of track support, it is claimed, can receive any degree of elasticity, gives an exceedingly firm anchorage, as the bottom of the tie can be spread to an unlimited extent, affords great facilities in laying track, and determines the gauge with absolute accuracy, the bolt holes being punched beforehand in such a way that no variation in the distance between the rails is possible except where it is determined in advance.

The support given by the two ends of the tie, if the clamping is well done, evidently must be the same. It is intended in sending these out that in track laying or putting in a tie, it would be necessary to handle only one bolt at each end. This form of tie is equally applicable to street or steam roads, and can be adapted to the lightest or heaviest rails in use.

Where it is desired to make the tie show in Fig. 4, this is effected by placing a strap on the bottom of the tie directly under the point where the rail bears. This strap or foot is similar in section to the base plate shown in Fig. 2, but does not extend the full length of the tie. This construction adds very little to the weight but immensely to the strength of the tie, concentrating the metal at the point where it is most needed. These ties, made of 3-16 Bessemer steel, all complete, fastenings, bolts, nuts and rivets, ready to lay, weigh in the form shown in Fig. 1, 120 pounds, and in Fig. 4, 90 pounds, the ties being 6' long. Tie for street rail ways, 5½' long, top 3" wide, bottom 4½" wide, with two rail fastenings all ready to lay, made of 3-16 metal throughout, 52 lbs.; with resupporting plates, 4" wide under each rail, 55 lbs. Same tie with base plate the entire length of it, 75 lbs.; additional length, 9½ lbs. per foot. Fig. 4, with the reinforcing base-plate, weighs 65 lbs. The heavier ties can be made of any length, and weigh 17½ lbs. for each additional foot of length required.

When wanting Street Railway Supplies, consult our Directory.

Electric and Pneumatic Subway and Railway.

The annexed engraving represents very clearly an arrangement which allows a combination of an electric and pneumatic subway and railway. Reference being made to the cut it will be seen that the plan is a simple one and consists principally of a continuous row of iron boxes on the top of which are the rails for a car track. The first operation in construction is the laying of wooden cross ties or foundations for holding the conduits in place. Upon these are placed two or four rows of hollow cast iron boxes with longitudinal openings at the top; the boxes are joined and held together by bolts, and are coated with asphaltum. Covers are placed over these longitudinal openings. On the left box or conduit (see

engraving) the cover is in its place and the rail is bolted to the sleeper. On the right hand side is seen a section of the cover taken off, showing how easily repairs can be made, and here is also seen a packing between the cover and boxes making it waterproof. Spaces are allowed for water to run into the sewer.

Inside the conduits are pulleys for an endless cable to draw and lay the wires through the conduits at stated distances.

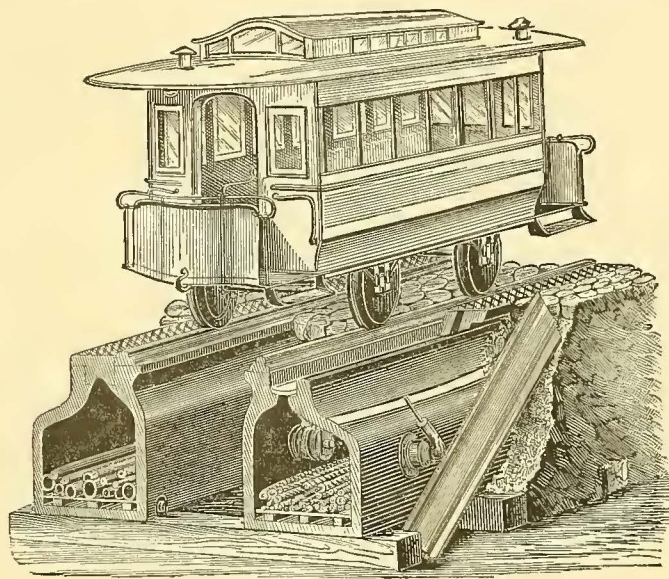
An outlet is provided by which connections can be made between stations and houses. In the left conduit are pneumatic tubes and electric light wires; and in the right conduit are shown telephone, telegraph wires and cable. This description of conduit forms a solid and noiseless sleeper as it occupies that part of the street now occupied by the cars. The conduit also makes

President. We quote entire the circular issued by the management regarding the duties of the division masters:

"It shall be their duty to devote their whole time to the interests of the Company, under the direction of the President; to conform to all the rules and regulations now in force, and such as may from time to time be made by the President, and see that all employees under their charge faithfully execute and obey all orders given them.

They shall have charge of all the stables, cars, horses, harness, tools, and all other property belonging to or controlled by the Company in their division, and see that every thing is kept in good condition, and ready, at all times, for use.

It shall be their special duty to visit each stable in their division at least once a day,



JAGEL'S ELECTRIC AND PNEUMATIC SUBWAY.

a good drive way on the street where no cars run.

The inventor* claims to have a new improved system for railways in cities, to form conduits for electric light wire and pneumatic tubes in one, and telephone and telegraph wires and cables in the other, with opening on top to admit laying and connecting the same with houses and stations on a plan similar to that of water or gas.

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Metropolitan Street Railway of Boston.

Through the courtesy of Mr. C. A. Richards, President of the Company, we are enabled to present to our readers a synopsis of the methods employed in the management of the road.

The President is the controlling center of the whole, and by him all orders for changes or special arrangements are issued. The company operate lines of cars in Boston, Dorchester, and in East Boston and Chelsea. The former are divided into four divisions, and all of the latter are embraced in one. These divisions are under the immediate superintendence of division masters who are personally responsible to the

and as much oftener as occasion may require, to know from personal observation that it is kept in a neat and healthy condition; that the horses are properly fed, cleaned, shod, and otherwise properly cared for; that the cars are cleaned and kept neat and tidy, harness cleaned and in good order; that each employee under their charge is faithfully performing the duty assigned him; visit the shoeing shops, and see that everything therein is properly conducted, and be prepared, at all times, to give the President such information, relating to their divisions, as he may require.

They shall approve the account of all labor performed in their divisions, and render a true and just account of the same at the close of each week.

All articles needed in the various departments of their divisions shall be reported to them by the foremen, and it shall be their duty to ascertain if they are actually needed; should such be the case, they shall make a requisition for the same, (all requisitions for articles in the store-house shall be made in duplicate), which, being approved by the President, an order will be drawn for the same, and the articles sent to the station for which they were ordered. Upon receipt of such articles, they shall see

* Julius M. Jagel, 55 Gold Street, New York.

that the proper voucher, or receipt, for the same is promptly sent to the office, endorsed by them in writing, and stating the quality of the articles received. They shall cause all articles received for their divisions to be delivered to the persons requiring them, and see that they are used with strict economy, and allow nothing to be wasted in any of the departments of their divisions.

The Foremen of Stations, Horse Shoers, Wood Workers, Harness Cleaners, Car Cleaners, Starters, Shifters, Feeders, Watchmen, Helpers, Tow Boys, Hostlers, and all other employees in their division are under their charge, and they will be held responsible for their efficiency and good conduct, and to that end they shall have the power to appoint and discharge, with the approval of the President. In making appointments, the person applying for the situation shall fill out the blank provided for that purpose; if it is satisfactory

and faithful in the performance of their several duties in every respect.

They are to see that the track, curves, switches, and all pertaining thereto, are in good condition; should they find any repairs needed, they will at once send notice of the same to the Roadmaster's office, and not lose sight of all repairs needed, till such repairs are made.

They are to be on the streets through which their several lines run, all the time that can possibly be spared from their other duties; see that passengers are properly accommodated, where trips are needed, where they can be dispensed with, and notify the President of any changes which they may deem to be advantageous to the company or its patrons; they are to see that the requisite number of cars are furnished at the different places of amusement; that the cars are ready and properly started for the accommodation of those who

Tow Boys to be under the charge of the Division Master in whose division they are employed.

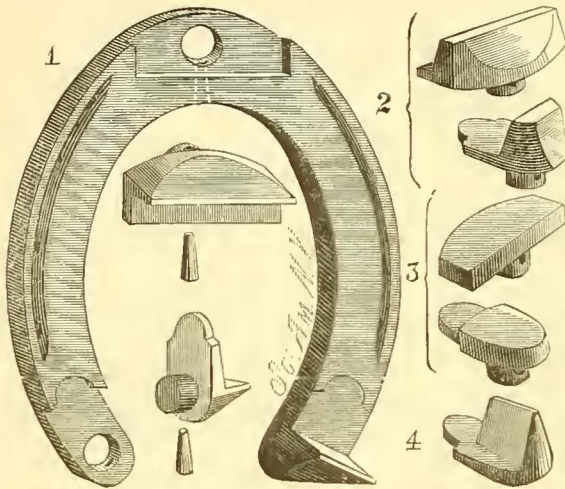
Division Masters will see that no more help is employed in any department of their division, than is actually needed.

The President only has authority to regulate the pay of employees.

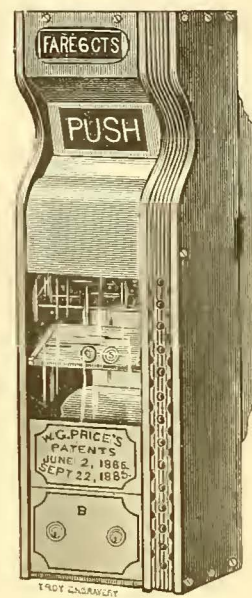
No foreman or any other employee is allowed to borrow any articles or supplies from any other division, except in case of emergency, and then they must report to their Division Master at his first visit the articles borrowed, and the circumstances which required it, and he shall see that such articles are promptly returned to the station from which they were borrowed.

Division Masters are not allowed to sell or otherwise dispose of any property of the Company, except with the consent or order of the President.

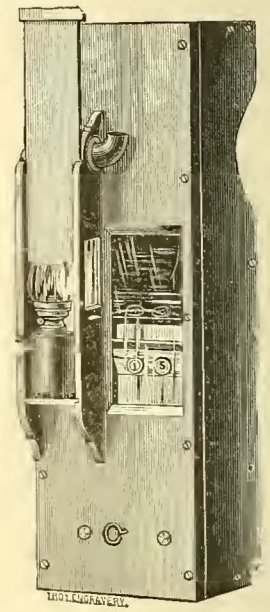
In case of accident upon their division,



THE STEVENS HORSE SHOE.



PRICE'S IMPROVED FARE BOX.



to the Division Master, he shall approve it and present it the President for his approval; if granted, they may be appointed at once. In making discharges, the Division Master shall furnish the President with a written copy of the charges preferred; if approved by him they shall be discharged at once.

They shall report in person to the President at his office whenever required, and make written reports at such times as he may direct.

They shall be at their headquarters daily at such hours as the President may direct.

They may, with the consent and approval of the President, make such rules and regulations for the employees under their charge as may be deemed requisite, for promoting the best interests of the company.

It shall be their duty to superintend the running of the cars on all the lines of their divisions; make all time tables required, submitting them to the President for his approval, which being obtained, they shall see that the cars are punctually started by the table so approved, and that the trips are regularly performed; that the conductors and drivers are prompt, careful

may wish to take them at the close of such places.

Should any Division Master become cognizant of any violation of the rules, negligence, or improper conduct on the part of any employee, of any other division than its own, it shall be his duty to promptly report the same to the Division Master having charge of such employee.

Employees are not to be changed from one division to another, without the consent of both Division Masters, except by order of the President.

All orders for special cars are to be sent to the Division Master of the route over which they are to be run; they are to receive the pay for the same, (unless it is otherwise provided for) and pay the same into the Receiver's office.

They shall have authority to let special cars (when it can consistently be done) but not for less than five (5) dollars each, without orders from the President.

Should vacancies among employees occur in any department of the divisions, they are to be filled as far as possible by promotion; competency, faithfulness and good conduct, to be the standard for such promotion.

they will see that a written report of the same, with all attendant circumstances, names and residences of witnesses, is sent to the Secretary with all possible dispatch."

The stable foremen have charge of the stables and make their reports regarding supplies and other incidentals to the Division Masters. They have the superintendence of the hostlers, harness cleaners, and other employees whose duties require them to be at the stables, but have no authority to employ or discharge.

Stationed at various points along the lines there are men known as "Aids." Their duty is to see that the cars are run in their proper places and at the proper time and speed. To look out for and prevent blockades as far as possible, and to have a general oversight and see that the conductors and drivers are acting in accordance with their instructions. They are not in charge of any men, but have authority to issue street orders for the movement of cars.

This embraces the entire system of the car manipulation with the exception of the duties of the conductor and driver. It will be seen that it is exceedingly simplified,

and to any one who is familiar with the intricacies of the street railway tracks in Boston, and the smoothness and harmony with which the cars are handled and the courtesy and accommodation of passengers, the efficacy of the system is at once apparent.

The Stevens Horse Shoe.

The shoe that is illustrated in this issue is one for which it is claimed that a great saving of time and expense is gained over the use of the ordinary solid shoe. It is of course apparent to any one who has to deal with horses that are used upon stone pavements or in slippery places where it is an absolute necessity that the calks shall at all times be sharp, that a shoe that can be resharpened without being torn from the hoof will lessen expense and preserve the strength and vigor of the horse's foot.

This shoe seems to be exceedingly simple in construction. The calks are slipped into the recesses that are left for them at the heel and toe. A dowel pin fits into the hole that is shown at these points and through this in turn there is driven a hard taper steel pin. The pin holds the calk in place and is in turn prevented from slipping out by forming a slight burr over the beveled head by striking the softer metal of the shoe proper, a light blow with a hammer. This, however, does not prevent the easy removal of the pin by the use of a common round nail set at the other end, yet the calks are said to be so securely held in position that it is impossible for them to spring, but that they remain firm and rigid until they are worn down.

It is also claimed for this shoe that it can be fitted to the horse's hoof without injuring its construction; that it can be put into the fire and widened or narrowed, drawn in or out, and fitted the same as a hand made shoe, without affecting its strength or the perfect fitting of the calks.

The saving in time and trouble to those who are obliged to be upon the road most of the time, in enabling them to avoid the necessity of going to a blacksmith shop every time it is necessary to sharpen the calks, is at once apparent, and a further advantage is claimed in the fact that side and flat calks can be readily substituted for the sharp in the stable, thus preventing the horse from spiking himself in the stall.

Improved Fare Box.

We present the front and rear views of an improved fare box, for which it is claimed that it renders "knocking down" by either passenger or driver impossible, and that in consequence more than the average number of fares are collected, and that no fare register is required on a car where it is used.

The box has a light push block which covers the opening into which the fares are dropped, the weight of which causes a gong to strike whenever it falls back and meets with a fare as an obstruction. The weight of the fare has nothing to do with the ringing of the gong. It is accomplished in the following way:—

The push block consists of a bronze casting which is suspended from the top, and is of such shape that it extends down and under the plate through which the fares are dropped. The lower part of this push block is sawed into a comb, the teeth of which play back and forth through the teeth of another double V shaped comb which is directly under the opening for fares, and which is suspended on an axis so it can be tipped or turned over, and has a counter-balance which will cause it to return to its normal position. The glass exhibition plate turns on an axis and is attached to the V shaped comb by a link so it will turn over also. The hammer is keyed and soldered to the axis of the exhibition plate so it moves at the same time.

The action is as follows:—

The push block is pressed back and a fare or fares are dropped into the double V shaped comb. The push block then comes forward by its own weight, but the teeth of its comb can not pass through or between the teeth of the other comb, owing to the fare being an obstruction. The weight of the push block then turns the double V shaped comb over, the fare falls down and the double comb returns to its normal position. The glass exhibition plate and hammer move only when the double comb moves. When the exhibition plate tips over it dumps what is on it and returns to its normal position in time to catch the fare just put in; and as it returns to this position the hammer which is attached to it strikes the bell or gong. The works are very simple, being all made of solid bronze castings, which it would seem could never wear out.

The push block is not heavy, as it has only to raise the hammer which in falling strikes the gong. The gong rings as loud for a ticket or three cent piece as it will for a silver dollar. The push block is cushioned with rubber, so it makes no noise when moved.

The cut of back of box shows the lantern box open. This box* projects only 2½" as it is partly enclosed in the main box. The light from the lantern shines directly on the money or fares, and is also reflected on them by a mirror so that they can be seen by all the passengers and the driver. The glass slide which directs the fares to the exhibition plate consists of two mirrors, which are fastened together back to back, and they assist considerably in lighting up the box.

Thus everything that is put in the box is in full view of both passengers and driver, and the lamp gives an excellent light for the latter to see to make change by. The woodwork is cherry and the metal hard bronze nickel-plated, and there are no springs or other delicate parts to get out of order.

*W. G. Price, 514 Fulton street, Troy, N. Y.

A well-known firm renewing its contract for advertising another year in the STREET RAILWAY JOURNAL says: "We feel that your paper has been of great benefit to us, and many orders that we filled, and applications we are receiving daily, we can trace to our advertisement in your paper." "A word to the wise" etc.

The Transmission of Power by Electricity.

On this subject the Boston Journal of Commerce discourses as follows:

Few people are aware how successfully this has been accomplished by the Massachusetts Electric Power Company using the Daft electric motors. At 197 Congress street, Boston, it has in use two Daft dynamos of twenty-five horse power each that are run by being belted direct to a fifty horse power Armington & Sims engine. The steam is generated in a steel tubular boiler set with Jarvis Furnace, and coal screenings are used for fuel. This power is transmitted all over the city, and is used in running all kinds of machinery, including sewing machines, ventilator fans, printing presses, elevators and other work. The demand for power far exceeds the supply, as the company have let all the capacity of their engine, and have applications for 300 horse power more. It is the intention of this company to start a station to be run exclusively to let power. The present plant has been in operation over eighteen months, and the only interruption has been three hours, when other parties cut their wires by mistake. In many cases these motors have supplanted small steam engines and hired power. Customers claim that the power is more regular than they have ever used before even when coming from the adjoining buildings. The future of this system is filled with possibilities. It will eventually become the motive power of all the present horse railroads. In a very few years elevated electric railroads will be as plenty as steam railroads are now and in time it will supersede the present system of running locomotives on all railroads,—and why not? It is simply a question of cost of making power. It is acknowledged by every practical engineer that the present system of making steam in locomotive boilers is expensive as well as wasteful. The evaporation of pounds of water to each pound of coal consumed to make steam in locomotive boilers does not average over 3½ pounds of water, using the best grades of bituminous coal, while with stationary boilers set with the Jarvis Patent Boiler Setting, using coal screenings for fuel, an evaporation of nine pounds of water to one pound of fuel is made, and the reduction in cost of fuel is from one-third to one-half. It is only a question of time when all the different electric lighting stations in this country will use their engines in the day time to make power to be sold for manufacturing purposes, the same as they sell it in the form of electric lights now. They can also furnish power to run electric railways, elevated or surface. The economy of this system over the cost of running horses, as used now, will be over fifty per cent. Any parties interested in this system and who wish to see it in operation running machinery, can do so by visiting the places in Boston where it has been in use the past twelve months.

When wanting Street Railway Supplies, consult our Directory.

Street Railway Development.

The average fare per passenger in the United Kingdom over the six years ending in 1883, was 3.74c., the maximum having been 3.8c. in 1879, and the minimum 3.6c. in 1883. This comes very near to the average of the street railways in the Department of the Seine, which, for the latter year, appears to have been 3.3c. per passenger; but it is nearly 1½c. under the average of the New York street railways, which was 5.60c. for the same period. It is obvious that if the New York street railways carried an equal number of passengers per mile of line open, if the distances were of the same average length, and if their working expenses and all other factors of cost were much similar, the higher rates per passenger received in New York should represent something like a correspondingly higher rate of profit. There is not, however, a sufficient amount of uniformity in the system of keeping the accounts to allow of a strictly parallel comparison being made. Neither the French nor the United States street railway returns exhibit the average length of the journey made by each passenger, and in the absence of this showing, the average fares per passenger do not point to any data of real value.

One of the most essential features of economical street railway working is, of course, that of getting the highest possible duty out of the horses and vehicles employed. It is impossible to state comparatively the average number of miles run per horse and per vehicle over the course of a year, because that information is only given for the United Kingdom; but it is possible to express the result for both the United Kingdom and the United States, in reference to the number of passengers carried per horse and per vehicle employed. Before proceeding to deal with this latter phase of the subject, it may be noted that in 1883 the duty of the horses employed on our home street railways was as follows for each of the three kingdoms:

	Number of Horses.	Number of Miles Run.	Average Miles per Horse.
England.....	15,702	33,587,940	2139
Scotland.....	3,054	5,431,000	1778
Ireland.....	1,366	3,166,500	2318
United Kingdom	20,122	42,185,700	2096

If in street railway working, as in other corporeal affairs, it is true that "the merciful man is merciful to his beast," the foregoing figures would appear to indicate that Scotland has attained this merit in a considerably higher degree than either of the other two divisions of the country.

As between English and American street railways, there is a very remarkable difference in the results obtained in relation to both the horses and the vehicles employed. If we take the twelve leading lines of New York, we find that to carry 186½ millions of passengers, 2759 cars and 13,443 horses were operated, being an average of 67,000 passengers per car and 14,000 passengers per horse. In the United Kingdom, however, 2819 cars were employed in 1883 to carry 295,721,000 passengers, showing an average of 104,903 passengers per car, or

about fifth-seveu per cent. more than the average of the United States. When, again, the comparison is extended to the power employed to obtain a given result, it comes out that the two cases are very much on all fours, the average of the twelve selected New York lines being 14,000 passengers per horse, as compared with an average of 14,700 for the United Kingdom as a whole. It will be noted that in New York the number of cars employed relatively to the horses at work is much higher than in this country, the ratio of the selected lines already referred to being 2759 cars to 13,443 horses in the former case, as compared with 2819 cars to 20,122 horses in the latter. In considering this matter, the higher amount of mechanical traction employed in this country must not be overlooked. When this circumstance is taken into account, the difference of ratio to which attention has just been called, becomes all the more marked.

In the following tabular statement the number of cars employed, of passengers carried, and of passengers per car in the United Kingdom, are shown for each of the five years ending with 1883:

Year.	Number of Cars.	Number of Passengers.	Number of Passengers per car
1878	1124	146,001,000	129,894
1879	1382	150,881,000	109,176
1880	1610	173,067,000	107,495
1881	1945	205,623,000	105,719
1882	2352	257,760,000	109,592
1883	2819	295,721,000	104,903

It is not without interest to note that while in the United Kingdom there are seven horses for each car employed, the corresponding average for the New York street railways is only 4.9 horses. In the latter city the number of passengers annually carried per car, varies from a minimum of 25,761 on the Central Park line, to a maximum of 145,872 on the Broadway and Seventh Avenue line. There are, however, no such wide variations in the ratio of passengers to horses employed, the minimum being 10,713 and the maximum 16,764.

There is no better method of estimating the productivity of either railways or street railways than that of calculating the traffic and the receipts per mile of line open, assuming that the conditions of comparison are in other respects strictly relevant and parallel to each other. So far as street railways are concerned, however, this latter condition can hardly be said to be met. The calculation is liable to be disturbed and the results vitiated by the proportions of single and double or treble line, and by other matters that are liable to obvious variation as between one country and another and even as between different districts in the same country. Thus we find, for example, that there were 406 miles of street railways open in France at the end of 1884, but although we are told that of that aggregate, 351 miles were worked by horses, forty-seven miles by mechanical motors of different sorts, and about eight miles by the two systems of traction, there is no distinction made between single and double lines. How vital this distinction is, in its bearing on the gross revenue of a line, may be estimated by the fact that in the case of

many of the New York lines the length of track, calculated on the mileage of single line, is more than double the length of the line, as ordinarily expressed. Thus the Atlantic Avenue line, although only twenty four miles in actual length, has more than forty-eight miles of track, the Brooklyn City line is double throughout, and so with many others.

Subject to the limitations just stated, it appears that the average gross receipts derived from the street railway traffic of the United Kingdom over the six years ending 1883, was \$7,653,384, being at the rate of \$17,548 per mile. The highest average over this period was \$20,717 per mile in 1878; the lowest \$15,718 per mile in 1880. In the former year, therefore, the average was thirty-two per cent. higher than in the latter. In France, the average receipts per mile open have taken a much higher range, reaching as high as \$41,496, over the whole of the street railways in Paris and its neighborhood, in 1883. This latter average is made up of a great many extremes, the average receipts per kilometre falling as low as \$1217 on the Boulogne-Billancourt line, and as high as \$62,532 on the Montrouge-Gare de l'Est. The range between the two extremes is made up of all kinds of intermediate figures.

In New York the street railways appear to yield as remarkable variations in gross mileage receipts as those of Paris. The aggregate mileage of the thirteen principal street railways of the former city amounts to 364 miles, resolved into single track. This mileage yielded in 1884 over \$9,700,000 of gross receipts, being an average of \$26,645 per mile, or nearly fifty per cent. over the average of the street railways of the United Kingdom, but about thirty-seven per cent. under the average of the lines in the Department of the Seine. The following tabular statement shows the very singular variations as between one line and another, even in a city so full of life and traffic as that of New York. The table gives the mileage in single track of principal street railway lines in New York in 1884 with gross earnings of each in that year and average earnings per mile.

Name of Line.	Miles.	Gross Earnings.	Average per Mile.
Atlantic Avenue....	48	\$408,019	\$8,500
Broadway.....	21	365,300	17,380
Brooklyn City.....	88	2,011,000	22,850
Buffalo & East Side..	26	109,629	4,216
Bushwick.....	23	366,273	15,925
Central Park.....	26	759,300	29,227
Dry Dock.....	23	881,000	34,352
Eighth Avenue.....	21	712,900	33,947
New York & Harlem	13	702,000	54,000
Second Avenue.....	18	895,000	49,732
Sixth ".....	8	825,000	103,125
Third ".....	21	1,489,000	70,809
Rochester City.....	28	248,000	8,857
Totals and gen. av..	364	\$9,772,326	\$26,847

The higher range of receipts per mile of line in operation in Paris is borne out by the proportions of passenger traffic to mileage in the three cases just quoted. In Paris and its environs there were seventy-two miles of street railway open in 1883 and the total number of passengers carried 88,441,000, giving an average of over 1,200,000 passengers per mile of line. This is

a very much higher average than that of either this country or the United States. In the latter case, the principal New York lines above named had, in 1884, an average of 821,760 passengers per mile, the maximum being 2,064,500 in the case of the Sixth Avenue, and the minimum 352,381 in the case of the Broadway line. On the six principal street railway lines of Massachusetts—the Cambridge, Highland, Metropolitan, Middlesex, South Boston, and Worcester—embracing unitedly 161 miles of road, and carrying a total of 71,769,000 passengers, the average number of passengers carried per mile was 445,700, or not much over one-third the average carried on the Seine street railways. In the case of one line—the Cambridge—the average fell as low as 282,348 passengers; in the case of another—the South Boston—it rose to 775,446. When we come to analyze the returns for the United Kingdom, we find that the average ratio of passengers to mileage is approximately the same as that we have just found for the chief lines in Massachusetts. The figures showing number of passengers carried and rates of passengers to mileage open in the United Kingdom for the last six years are appended.

Year.	Miles of line open.	Total Passengers Carried.	Av. Passengers per Mile of Road.
1878	269	146,000,000	542,751
1879	321	150,881,000	470,000
1880	363	173,067,000	470,000
1881	488	205,623,000	421,359
1882	564	257,760,000	457,027
1883	671	293,721,000	440,717

It would appear alike from the above table, and from the returns of gross receipts per mile, that the street railway traffic of England is not increasingly remunerative, but rather the reverse. In 1878 the number of passengers carried per mile open was twenty-three per cent. higher than in 1883, while the gross receipts per mile were thirty per cent more in the former year than in the latter. In this respect street railways are only following the behests of a well known law of development. In all undertakings of the kind, the best and most remunerative lines are first laid down, and the results which they yield are seldom borne out by the experience of lines less favorably situated as regards population and other conditions of success. Notwithstanding these facts, however, there is apparently no cessation of activity in street railway enterprise either in our own or in other countries, and it is abundantly manifest that their importance as a means of passenger transport is increasing, and likely to increase.

In the majority of new applications, powers are sought to use mechanical power, including in some cases a system of working by means of wire ropes placed under ground and propelled by stationary engines. In only fourteen cases had locomotive engines been applied to street railway working in England up to 1884.

It is a moot point among engineers whether horse or locomotive traction is, under ordinary conditions of working, the most economical. In America horse traction

is the most generally employed, engines being indeed scarcely used at all. On the Nord street railways at Paris, engine traction, in 1881, amounted to as much as \$15.74 per engine per day. In consequence of this high cost engine traction was given up, and horses were again resorted to, when the expenses of traction fell to \$7.17 per mile, being about the rate of Glasgow and several of our large English towns. In other towns the cost of engine traction has been considerably under that just stated, without any very obvious reason. On the Rouen street railways for example, where engines have been employed since 1878, the average cost of steam traction over the three years 1881-3 amounted to 22c. per mile. On the Valenciennes-Anzin street railways again the cost of steam traction has been reduced to 19c. per mile. On the Lille street railways steam traction has been brought as low as 11c. per mile.—[Engineering.

Boston Conductors.

EDITOR STREET RAILWAY JOURNAL:— I wish it to be distinctly understood before I begin that I am not a Bostonian and am somewhat disposed to smile at the pretensions claims that are made by the worthy citizens of the Hub regarding their physical, moral and intellectual excellencies. Yet I try to be honest and when I do see a feature that has merit, I consider it worth copying. So while riding about in the street cars in the City of the East Wind I have found that in some ways the conductors make it far more agreeable for passengers than has been done elsewhere.

In the first place in the mere matter of stopping, they are far more accommodating, and the slightest indication from the street or the car is sufficient to bring the car to a standstill whether the signaler be old or young, decrepit or strong. And when a passenger enters a car, the conductor will see to it that a seat is provided if there is one vacant. Every one knows that the ordinary passenger is more intent upon his or her personal comfort than upon the cultivation of a gracious manner. So we have all seen the ladies spread out their gowns, and the gentlemen extend their elbows, until the car was filled from end to end, before the regulation eleven upon a side was complete.

But Boston does away with this, and when such things do occur, which is rare, the conductor is on hand with his "Move up a little, please," and the passenger has the seat that he has paid for.

Then comes the interest that the conductor seems to take in the welfare of his freight. You ask a question and you always get a civil answer, as has been known to be the case at rare intervals at home. But if you are a stranger it is no trouble to step to the street corner to point out the way, or help a lady with her parcels or her children. There is an air of interest that the men seem to take in what they have to do, that strongly marks the employees on the cars.

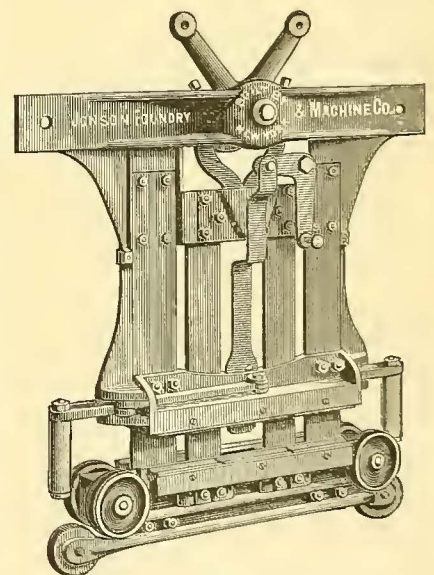
These things you say are matters that the disposition can effect, and in a place like

Boston where men may know their neighbors a social spirit is more apt to pervade the very air. But here in the hurry to and fro the courtesies are brushed aside and no one can keep the standard up by rule or order. The companies, however, can direct that the streets shall be announced as they are passed, and this alone will save many a twisting of the neck, and be a little aid to strangers that they, at least, are not apt to overlook. And this, kind sir, is also done in Boston. NEW YORKER.

The Jonson Grip.

This grip is especially designed for use in connection with the duplex system of cable, and has dies upon each side for gripping the cable. For use it is put in position at the end of the route by means of a well, and bolted to the car in the usual way. The cable is then lifted into position upon the two wheels at each end of the grip and can run freely until it is desired to start the car.

To do this the levers at the top are drawn together, and these by a simple arrangement raise the entire lower jaw and cable tightly against the upper jaw. Prompt release is provided by the fact that the weights of the lower jaw and the cable, together with the downward strain that is produced by the tension, all tend to throw it out of



THE JONSON CABLE GRIP.

gear the moment the strain upon the levers at the top is relieved.

If at any time it becomes necessary to throw the cable off the grip entirely, it may be accomplished by means of a rod that is attached to the bell crank shown upon the face. This through an arrangement of levers that may be seen by an inspection of the cut gives the vertical rollers that are at either end of the grip, a side movement and guides the cable off the wheels.

* Jonson Foundry & Machine Co., M'f'rs, 115th St. & Harlem River, New York.

When wanting Street Railway Supplies, consult our Directory.

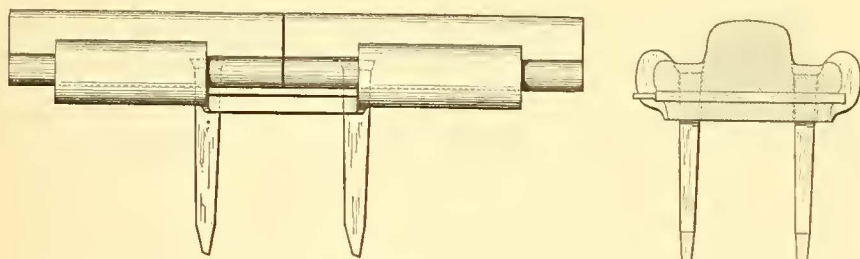
Street Rail Joint.

The joint* of which we give a perspective and sectional view is intended for use in connection with what is known as the centerbearing street rail. It binds the two ends of the rails firmly together and thus prevents their pounding from the passage of the car wheels, and the consequent sagging or depression at the ends.

The rail is spiked to the stringers in the usual manner, and the ends of the rail are clamped to a plate of wrought iron or steel by flanges that hook over the outside bead that is rolled upon the rail. These flanges are drawn tightly against them by an iron $\frac{3}{8}$ inches \times 5 inches driven under the bottom of the rail ends, where there is a depression left in the chair or plate for that purpose.

This wedge bears against the whole bottom of the rail giving a firm and solid support, not allowing it to sag unless the whole joint is pressed into the stringer. There are oblong slots in the chair to permit of expansion and contraction and the wedge is held in place by a spike driven through its edges. The flanges at the sides of the chair not only hold the rails down but also keep them in line, yet do not project over the rail flange far enough to interfere with the flanges of the wheels.

* A. J. Hutchinson, Patentee, 95 Liberty St., N. Y., & So. Norwalk, Conn.



HUTCHINSON'S STREET RAIL JOINT.

When Should a Car go to the Paint Shop?

The railway manager frequently has to decide this question independently of the advice of the car builder or car painter, and too frequently trusts to luck for a correct answer. Commonly the car is made to run the regulation number of months before it is allowed to go in for painting. No distinction is made between those cars painted by the company and those finished at contract shops. All must stand a like amount of wear. The only exception is when a car begins to look particularly dingy and disreputable.

When traffic is brisk and rolling-stock scarce, a good excuse is found for prolonged service, and ignorance in regard to a few fundamental facts concerning painting frequently causes much loss to the company. Long and severe usage may, in some cases, do a car little or no harm. In other cases a short exposure may do great damage to a car and shorten its lifetime.

One of the most important uses of paint or varnish is to prevent moisture from reaching the vital portions of the car. If the wood is properly filled as a foundation,

varnish alone will answer. Accepting as an axiom the proposition that wood when subjected to alternate wetting and drying decays with great rapidity, we reach the conclusion that the important function of varnish or paint is to exclude moisture from the frame, etc. It follows, therefore, that as long as dampness is kept out, the car is safe to run without danger of permanent injury. When this cannot be done and moisture begins to penetrate behind the panels, the car is liable to rapid decay.

In inspecting the painting and varnishing of a car for the purpose of deciding whether it must go to the shop, the general appearance may, in cases of emergency, almost always be neglected. The first points to be examined are the window-sills and their junctions with the panels and mouldings, and next the points where the battens touch the panels. If the varnish has cracked here and the paint has opened so that the continuity of the protecting surface is destroyed, order the car to the shop. If at those points paint and varnish are still continuous and keep out the water and beating of rain, the car may safely run, because the frame is protected.

In case of pressing need of rolling-stock it is by no means necessary to put a car into the the shop for entire repainting or even for revarnishing. The cracks can be stopped in a short time and the car made fit to stand a considerable length of service.

It is often a matter of economy not to paint a car even when the varnish is gone and the paint itself is getting in bad condition. A few days expended in making the cracks tight will frequently put a car in condition to run for months. The expense of this is small.

It sometimes happens that a car not six months from the shop shows these cracks while the varnish is still bright and the color unfaded. In such a case send it to the shop. Order it to be made tight. This can be done in a short time. New cars, from the shrinkage of the wood and a general settling down to their bearings, are especially liable to the cracking of the paint and varnish. When the car goes to the shop ample time will be given for "taking up slack," tightening of truss-rods, nuts, braces, etc. Neglect of these precautions is likely to result in a rapid deterioration of the frame. It will "work," and by its very motion grind itself out at certain vital points and, at the same time, from the entrance of moisture around the windows, will decay quickly.

A passenger-car frame when well made, if

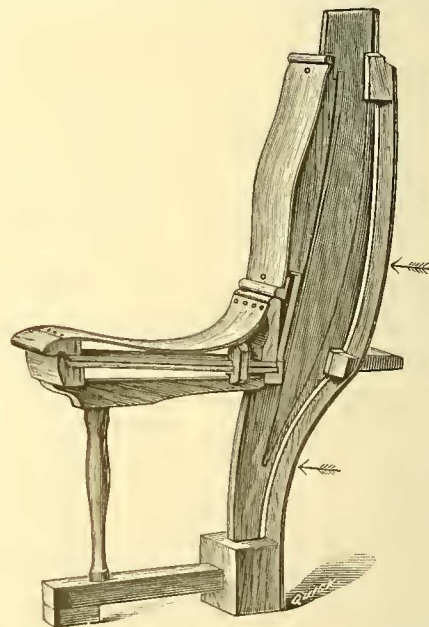
protected from the weather, and its bolts, nuts and truss-rods looked after, will last in first-class condition for twenty years or more. Yet the strength of the same frame may be destroyed in five years if moisture find access to it.

By a few inexpensive but very necessary repairs at the right time cars can be kept sound even when the panels appear to be laughing through paint whose original color cannot be distinguished. Such cars can usually be stripped inside and out, and at a small expense converted into neat and serviceable stock, good for many years' wear. Similarly cars, if neglected, will be found too badly rotten in the frame to be worth new panels when only ten or eleven years old.

Bearing these facts in mind, rolling-stock in time of need may be subjected to long and severe usage with repairs occupying but little time and of insignificant expense. —American Railroad Journal.

Street Car Seats.

We illustrate a section of a street car seat,* made of three-ply veneer that is well-known for its properties of retaining its form under all conditions of climate and temperature. Claims are made that these



veneers are stronger, less liable to split and will hold their shape better than any class of solid work. The veneers are cut about three sixty-fourths of an inch thick and laid cross grained three-ply, so that there is no possibility of checking.

*Gardner & Co., Mfr's, 183 Canal street, New York.

We learn from a foreign exchange that the recent trial of the Reckenzaun electric tram car system in Berlin was highly satisfactory. The public trial was the first, as no private trial was allowed, and the circumstances were very unfavorable to the company. The car was stopped, started and speed varied on grades and curves at the pleasure of the inspectors. The accumulators used in the cars are charged from the central electric light station by a "Victoria" dynamo, at a distance of one quarter of a mile from the starting station.

Corporations and Employees.

Modern journalism, or rather the daily newspaper, in its struggle for popularity, has developed a school of writers whose chief aim is to make the relations between corporations and their employees as strained and unpleasant as possible. Any difference as to wages, hours, duties, discipline or penalties, most of which might be arranged easily, quietly, and satisfactorily to all concerned, is enlarged upon and treated in such an exaggerated way that a public sentiment has actually been created that the corporation must, as a matter of course, be always in the wrong.

During the past three weeks the columns of the New York daily press have been loaded with an insufferable amount of gush, the burden of which has been the duty of the street railway companies to their drivers in the way of hours of labor and remuneration. In all the columns of matter printed upon the subject we have failed to see one line that indicated a particle of interest in the companies' side of the question. Decidedly, as far as the newspapers are concerned, the corporations are, in this matter, "the under dog in the fight." Now the facts in the matter are, that in every instance the roads, after a gentlemanly representation of the employees' grievances, without any strikes, force or pressure whatever except fair argument, have granted all that was asked for, and some roads voluntarily reduced time and increased wages, notably, the Fourth avenue (Vanderbilt) line.

This flurry of the newspapers and the easy and pleasant manner in which the interested parties have arranged their relations, leads us to ask, What are the factors to decide the question of remuneration of employees? Some three years ago a difference arose between President C. A. Richards of the Metropolitan Railroad of Boston, and the conductors and drivers of his company. It was more the work of a meddling (weekly) paper than of any dissatisfaction among the men, but by much journalistic fanning quite a flame was created and the statement of President Richards that he bought men's services as he bought hay and grain—according to quality and the state of the market—was treated as the most shocking doctrine. It seems to us that the only element that enters into the question, quality being equal, is supply and demand. A government official who pays more than the market price for labor is considered derelict in his duty to his stockholders—the people. Why not equally so the corporation superintendent? If he can get good and efficient conductors and drivers for say thirty-five cents a trip, why should he pay fifty cents? If he can buy good hay for eleven dollars why pay fifteen? If he can get good corn for sixty cents, why pay seventy-five? What is the difference in the three transactions? Why do we always say *get* labor and *buy* hay and grain?

The supply of labor can never be so large that it can be bought by the road for less money than it will command elsewhere. It

is the good fortune of the grain dealer or farmer if the demand for his commodity is greater than the supply. It is not the fault of the consumer if the opposite is the case. So too with the man who has labor to sell. If the demand is great he profits by it in high wages, (and he never fails to exact them), and if the demand is light he suffers in consequence. The company never blames a man for the high wages a short market obliges them to pay; why should it be blamed for the low wages an overstocked labor market enables it to obtain servants for?

It seems to us that it is time for the press to turn around and acknowledge that it is the duty of corporation officers to manage their affairs on the same economic business principles that all private enterprises are conducted upon, viz: to obtain its labor, its appliances, and its supplies in the most favorable market, and at the lowest prices commensurate with good value and utility. The law of supply and demand will always regulate remuneration, as it always has.

H. A. S.

Cost of Street Railways for Small Towns.

MESSRS. EDITORS:—In your December issue of STREET RAILWAY JOURNAL is an inquiry signed S. R. Ferguson on the above subject. I would say that I will build him a mile of street railway, composed of nothing but metal, viz., metal longitudinal stringers, wrought iron tie rods (which act as true track gauge) and wrought iron wedge key, with a 42 lb. steel girder rail, for the sum of \$7000, and will guarantee to keep it in thorough repair for 60% of what it cost to keep the timber system in first class repairs for the term of twenty-five years.

I do this knowing that in a few years the timber system requires great expense in repairs, and within twenty years a renewal, while in my system, when once laid little repairs are needed, and won't require renewal in his or my lifetime, if we live to be 100 years old. No one now living can tell the life of a metal.

THOS. H. GIBBON,
Eng. and Supt.

37 State street, Albany, N. Y.

Dead Weight.

EDITOR STREET RAILWAY JOURNAL:—

If a street car runs 100 miles in a day and 300 days in a year, then 10 lbs. of unnecessary weight is equal to carrying 1,000 lbs. one mile each day, and 300,000 lbs. one mile each year, with all the stops and starts incident to a mile of travel. Multiply this by 100 cars and look at the figures. It costs money to move this weight by horse-power, and yet probably there is not a street car in this country that could not readily have removed more than 10 lbs. of useless weight, and some of them might dispense with 100 lbs. Some attachments that may be good in themselves, are yet not of sufficient advantage to warrant the cost of carrying.

W. L. E.

New Haven, Conn.

R. G. MATTHEW
tive of the firm
will hereafter mak
Lakeside Building,

E. C. WHITE, Nev
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WE regret to learn t
of Andrews & Clooney, l
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It is understood he will rei
all winter.

JAMES K. LAKE, Esq., wei
street railway men as the Sup.
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DeWitt C. Cregier. Mr. Lake
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is the highest compliment that ca
paid to his ability and enterprise. I
sudden change in the management of a
road, when so many improvements and ne
enterprises of Mr. Lake's inception are un
der way or about to be begun, will cause
much surprise in street railway circles. He
will take a much needed rest and devote
some time to his private business interests.

Our Directory of Street Railways.

If your company is not fully and cor
rectly represented in our Directory, we
shall esteem it a great favor if you will give
us the necessary information to make it so.
We wish to give length of track, gauge,
weight of rail, number of cars, number of
horses, and names of officers.

We mentioned in our January issue, a
proposed trial of the Honigman motor, a
Prussian invention. A test of the motor
was made, January 18th. They are similar
in appearance to ordinary street cars, ex
cept that they have no platforms. They
are 11' long 7' wide, and motive power is
derived from a supply of caustic soda, which
is heated in boilers at the terminus of the
line, and forced into the boiler of the motor.
Power is thus obtained without any fire,
steam, or noise. The motor can be stopped
within its own length when running about
nineteen miles an hour. The present mo
tor cost \$2,000 to \$2,500, and will draw two
loaded street cars. The test was success
ful enough to satisfy the company.

A correspondent asks about what k
rail is used in the Kansas City Cab
also desires information about
The rail is a side-bearing, flat
on 5" x 7" stringers, what is c
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the same as that use^d
New York, a descrip^t
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When wanti
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MONTHLY, \$1.00 PER YEAR.

E. P. HARRIS, General Manager.

American Railway Publishing Co.,
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NEW YORK. CHICAGO.

S. L. K. MONROE, Sec'y and Treas.

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Employer and Employee.

We print elsewhere a communication entitled "Corporations and Employees," containing some thoughtful suggestions that will well repay reading. The writer asserts truly, that the wages and relations of employer and employee have been and will be governed by supply and demand. We see no reason why the sale of the commodity, labor, should be and can be governed by other law. But, while the employer buys labor of the employee as he buys cloth of the merchant, he also sustains the relation of fellowman to the laborer as well as to the merchant. This, however, is not a factor in the purchase but exists as one of the permanent relations of life. The mutual obligations of this relation are frequently ignored by employers and employees, resulting in a discord which has been confused with the labor question itself, of which properly it is not a part. That Mr Richards was wholly right in saying that he bought labor as he bought hay, as he could buy it to the best advantage, we have not the slightest doubt, but we venture to say that Mr. Richards would also assert that the same courtesy and consideration are due from his company to his employee as his patron, and we think it is on account of a lack of these that a great many disturbances between capital and labor exist. While the relation of employer and employee imposes no additional responsibility in this direction, the intimate contact renders the ignoring of this relation very conspicuous and, we think, very poor business policy.

The main point to be emphasized, however, is that the relation of employer and employee is two-fold, or rather we should say, two distinct relations, viz., that of buyer and seller and that of man and man, neither one of which hinges in the slightest degree upon the other, nor is dependent upon it. The employer has no more responsibility for the comfort of men of whom he buys services, than of him of whom he buys hay. The purchase of his labor is a purely business transaction, imposing no obligation other than that each fills his contract; but the universal obligation already exists on every man to treat every other man as if he were a fellow being, should not in justice and cannot with profit be ignored.

Street Railway Employees' Duties.

A recent issue of the Telegram of this city contained a column and a half interview with State Commissioner of Labor Peck, on the hardships of conductors and drivers on the street railways of New York and Brooklyn. As the systems of most roads in our large cities are similar, the same hardships are, presumably, endured all over our broad land. Among those enumerated were long hours, exposure to the weather, severe rules as to being on time and starting, punishments for misdemeanors, etc. Of the thousands of employees it is no doubt an easy matter to find a few hundred discontented ones, and some individual cases of real hardship. But we emphatically insist that the 75,000 or more street railway employees are as well paid, well cared for, and well satisfied, as a whole, as are the same class or grade of men in any other business.

In the matter of wages they rank among the highest grade of unskilled labor. No class of laborers outside the trades obtain as high wages.

The interview above mentioned was particularly severe on the hardship of long hours. Street railway men do have to get to work early in the morning and work till late at night. It is an emphatically *all-day-long* business. The very condition on which it receives its birthright from the government is that it shall accommodate the people in transportation. This necessitates early and late hours on the road, neither of which are run at a profit to the company. We have no doubt that every street railway in the country would gladly start its first car as late as 6 o'clock A. M., and run its last car into the stable as early as 10 P. M., with a half service after 8 P. M., if its profit and loss account only were consulted, for most roads that have a *profitable* business outside these hours run all-night cars.

Now, then, the fact being that street railways must run early and late, do their employees suffer special hardship thereby? On many roads the actual time occupied on the cars is less than nine and a-half hours, and, including "swings," the day's work is less than eleven and one-half hours. There are some roads, and some cars on many roads, where the hours are longer; perhaps, in extreme cases, fourteen and a-half or fifteen hours, but such exceptional long days are usually accompanied with an extra compensation. As a class, the average time of the whole street railway force in this country is probably not five minutes from eleven hours, one way or the other, and many men in the field of skilled labor serve longer; as druggists, 12 to 16 hours; barbers, 14 hours; cooks and restaurant help, 12 to 16 hours; bakers, hotel employees, and many others, who, in addition to their long hours, have the additional hardship of confinement indoors. The street railway employee gets—say four dollars a week more than his unskilled fellow-laborer in other fields, and does seven hours more work for it.

The question of discipline, of penalties

for violation of rules, etc., is a very broad one. The necessity of the most strict and perfect discipline on roads employing many servants is acknowledged, and the only means of obtaining it is by fair and wholesome rules enforced by penalties severe enough to be respected. The driver or conductor who is late for his trip, or careless in driving, so as to cause accident to life or property, or through impudent and ungentlemanly demeanor, causes prejudice against the company in its patrons' minds, or a hundred other things, must be made to understand in some way that he has to live up to the rules; and different roads have different systems. It seems hard to lay a man (who needs work) off for two days for being five minutes late, but on a road employing 700 to 1,500 men, the neglect to punish would be equally disastrous. There may be that man with the special genius necessary to keep a proper discipline among 600 or 800 men, who are out of his sight most of the time, without penalties. He is a jewel that his employers or associates want to take excellent care of, for such men are very rare.

The fact that no other employment is so persistently sought by men who know its hard side, and that men thrown out of employment by one company invariably seek work in another, rather than in any of the, presumably, more desirable fields, is a standing argument in favor of the fair treatment, satisfactory remuneration and desirability of street railroading as a poor man's livelihood.

Our Directory of Street Railway Appliances.

As the advertising pages of the STREET RAILWAY JOURNAL are very constantly consulted in buying supplies, in order to render them still more useful, we shall print hereafter a Directory of articles advertised in the paper. The completeness of this Directory, and the character of the houses advertising, is very gratifying, and, with the additions to be made to it, will be found very convenient to our subscribers. If parties requiring any article not mentioned in the Directory will address us, we will endeavor to place them in communication with satisfactory producers of or dealers in the goods wanted.

We desire to call attention to our department of "Special Notices." Companies or parties having cars, horses, or street railway property of any sort to dispose of, or those in want of any of these things, or parties in want of help, or in want of a situation, will do well to use this column. The prices, it will be noticed, are very low, and we are personally aware that excellent results have been realized by those who have thus far used the department. The STREET RAILWAY JOURNAL reaches street railroads in all parts of the world where English is spoken.

When wanting Street Railway Supplies, consult our Directory.

Repainting Cars.

We reprint on another page, an article entitled "When Should a Passenger Car go into the Shop?" The author, a gentleman of large experience, treats almost entirely of the car from the painters' standpoint. He brings out very forcibly the fact that by taking the minor repairs in hand before they have time to cause damage, a car can be run for a longer season without serious injury and without in any way impairing its durability, and he might have extended his observations and pointed out that many repairs of details, if attended to when their need is discovered, render expensive repairs unnecessary. It is well said that if a new car receives prompt and frequent attention during the time when the wood is taking its first set and the frame is getting down to its bearings, the life of the car will be prolonged almost indefinitely. For roads where the supply of rolling-stock is scanty, it is fortunate that this very essential repairing is of a character to take the cars out of service but a short time. While for the sake of appearances the varnishing should be frequently renewed and the whole of the passenger rolling-stock go into the shop much more frequently than is usually considered necessary, this frequent painting and varnishing is necessary but not absolutely essential, and the long delay caused by giving a car a thorough overhauling can be in many cases exchanged for a three or four days' trip into the paint and repair shop.

In the past year we have seen cars in several of the Chicago shops whose records showed a service far beyond that which is considered a long life. These cars had received treatment not unlike that described in the article we have mentioned. When first put in service they were subjected to close and constant inspection—nuts were never allowed to become slack, and brace-ropes and braces were carefully inspected; moisture was rigidly excluded from the interior of the woodwork by keeping the exterior free from cracks.

In the life of cars, choice of color for the exterior has a very important bearing. While the color does not in any way shorten or prolong the life of the timber directly, it makes a vast difference with the time which the varnish will endure in a perfect condition. Varnish upon dark colors cracks more quickly and lasts a shorter length of time than upon the light colors; hence, the frame has less protection, and the surface of the wood being heated to a higher degree in the sun's rays than with a light color, there is more shrinkage, and hence the car frame is more exposed to the entrance of moisture through cracks. This may seem a trifling matter, but it has sufficient influence upon the wearing qualities of the varnish alone to make a difference of several months in the time which a car can run without revarnishing.

When wanting Street Railway Supplies, consult our Directory.

Notes and Items.

[All our readers are particularly requested to send us, at the earliest possible moment, notes concerning actual or proposed improvements in street railways. It is by this means that the STREET RAILWAY JOURNAL will increase its usefulness to each one who receives it.]

Baltimore, Md.

THE CENTRAL PASSENGER RAILWAY is 5' 4½" gauge instead of 5' 6" as printed heretofore in our directory.

THE BALTIMORE & CATONSVILLE RAILWAY Co. will be found reported in our directory, this issue, thanks to the Superintendent and Purchasing Agent, Geo. W. Appleby, Esq.

Birmingham, Ala.

Now surveys are in progress for the old project of connecting Birmingham and Elyton by street railroad.

Bismarck, Dakota.

A street railway company has been incorporated in this city with \$100,000 capital stock.

Boston, Mass.

THE HIGHLAND STREET RAILWAY Co. petitioned the Legislature, January 26th, for leave to lease or purchase the franchise and property of any and all other street railway companies in Boston, making one consolidated company, with authority to make such underground or surface alteration of the streets as may be necessary, to establish and maintain a cable system of motive power, and also that it may increase its capital stock as may be necessary to carry out the above plans. The Highland Company claim that by this scheme they can run a less number of cars, give better service and prevent street blockades.

THE NEVERSLIP HORSE SHOE Co. say, "that their business has been so large this season that it has been almost impossible to fill their orders, which have exceeded the capacity of their works, and they have been obliged to have work done by outside parties. In the month of November, they found it impossible to handle their business from the Boston office alone, and were obliged to open a Western branch office and store at 73 Jackson Street, Chicago, Ill., and have been favored with a business there far exceeding their expectations. A great many street railways in the west, (at Decatur, Ill., Des Moines, Iowa, Hannibal, Mo., Quincy, Ill., &c.) are using their goods."

Report says, "The system of operating street railways by cable is soon to be applied in this city on a large scale if consent can be obtained of the Board of Aldermen. Several well known Boston men have become Directors in the Boston Cable Street Railway Company, and they have associated with them two or three Philadelphia gentlemen. Within a few weeks application will be made to the Aldermen to grant a location. The plan now in view is to run from the center of the city to the adjoining town of Brookline, whence hundreds of business men come every day to their warehouses, offices and stores in this city. From Brookline it is proposed to run the cable cars to

the city of Cambridge, which has 50,000 inhabitants or more. From Cambridge the proposed cable line will run back to Boston. The cable system to be employed is similar to that which has been in use on the Market street line in Philadelphia for the past two years." We cannot vouch for the truth of this, but will advise our readers later.

Brenham, Texas.

THE BRENHAM STREET R.R. Co. is a new road, two miles in length, of 4' gauge, laid with twenty pound steel rail, running three cars and twenty-two mules. President, T. J. Pampell; Secretary, John A. Bandle; Treasurer, D. C. Giddings.

Brockton, Mass.

PERRY'S IRON FOUNDRY, Brockton, is to be converted into a horse-car factory, a capital of \$50,000 being raised for the purpose of refitting and starting.

Brooklyn, N. Y.

BROOKLYN CITY RAILROAD. It is understood that this company will lay a trial section of Tom L. Johnson's cable road on Flatbush Avenue.

THE BROOKLYN CITY RAILROAD COMPANY held its annual election, Jan. 11th. The following gentlemen were elected directors: Seymour L. Husted, James How, George N. Curtis, Alexander Studwell, William H. Husted, Crowell Hadden, William M. Thomas, William H. Hazzard, George W. Bergen, John C. Barron, D. F. Lewis, Edwin Packard and Frank Lyman. A. B. Baylis, Jr., retires to make room for Mr. Lyman.

THE LEWIS & FOWLER MANUFACTURING COMPANY have decided to furnish, in addition to the articles which they manufacture, a general line of street railway supplies. This will be heard with satisfaction among those who appreciate dealing with so live and enterprising a house.

THE BROOKLYN CITY RAILROAD COMPANY, whose hotel, the Mansion House at Fort Hamilton, was destroyed by fire in January, will soon have plans perfected for a very much enlarged structure, and will erect a hotel that will be entirely suitable for the patronage of that line.

THE BROOKLYN CITY RAILROAD COMPANY has decided to pay its drivers and conductors two dollars for a day's work of twelve hours and additional pay at the rate of 16½ cents an hour for all time over twelve hours. About 800 men will be affected by the change.

Chicago, Ill.

Commissioner of Public Works De Witt C. Cregier was appointed Superintendent of the Chicago West Division Street Railway, the position held for many years by Mr. Jas. K. Lake, and will enter on his new duties Feb. 1. Mr. Cregier was trained in the Quintard Iron Works in New York, and came here in 1853 to set up some pumps for the city. He was offered the position of Superintendent of the city pumping works and held it for more than twenty-three consecutive years. A hostile administration crowded him out of the place, but he was restored a year or two later, and held the

position until he became Commissioner of Public Works in 1882. He has been a thoroughly efficient official, and has had the reputation of being the hardest working man in the City Hall.

THE CHICAGO WEST DIVISION COMPANY has planned work for the coming season to cost in the neighborhood of \$240,000. For the accommodation of the different lines and the new lines anticipated, six new stables and five car houses and storage rooms are to be built, each two stories in height. It also expects to construct twelve miles of single track. In the work planned there will be used 18,000 castings for sub-structure, 1,500 iron and 30,000 wood ties, 300 kegs of nails, 126,000 lineal feet of stringers, and about 1,000 tons of steel rails.

THE VAN DEPOELE ELECTRIC RAILWAY MOTOR COMPANY has been incorporated to construct an elevated railway in Chicago. It proposes to erect a structure, suspended between crossings by an iron lattice work structure supported at the crossings by towers surrounded by electric lights. The electricity by which the cars will be run will do away with smoke, noise and dirt, and give rapid transit. The capital stock is \$500,000 and the incorporators are:—Lucius Clark, Wm. A. Stiles and John Easau.

THE CHICAGO PASSENGER RAILWAY Co., having complied with all the conditions imposed upon it by Mayor Harrison with regard to the Harrison street extension and bridge, he has signed the ordinance granting the franchise. The conditions are that the company shall pay one half the cost and \$1,000 a year for the maintenance of the new bridge, at the pleasure of the city, after five years. The company pays a license fee of fifty dollars a car a year, and agrees to take up its track and leave the street in good condition at the end of twenty years.

THE CHICAGO WEST DIVISION RY. Co. have been granted permits to lay additional track on Van Buren, Division, Eighteenth and Leavitt streets, and Ogden avenue.

THE NORTH CHICAGO STREET RAILWAY COMPANY are getting out plans for a new car shop that will be 150' x 106', two stories high, and capable of storing forty cars, besides carrying on extensive repairs. Mr. Augustine W. Wright, the very able chief engineer, does not favor the practice of street car companies building their own cars, but he believes in providing the very best facilities for doing repairs. When these shops are completed, they will contain over a mile of heating pipes.

THE CHICAGO HORSE & DUMMY RAILWAY has been sold at auction to F. W. Betz for \$46,000. The road extends from the western limits of Chicago to the Desplaines river.

THE CONSOLIDATED RAPID TRANSIT AND ELEVATED RAILROAD Co. has been incorporated with a capital stock of \$12,000,000. The purpose is stated to be to construct an elevated railway from the City of Chicago

to Riverdale, South Chicago, Englewood, Washington Heights, Proviso and Norwood Park.

The patrons of the North Chicago City Railway Co. have called, through a committee, for warmer cars. The economic and comfortable car heater, that shall warm and ventilate street cars satisfactorily, is one of the necessities of the near future.

Charleston, S. C.

THE ENTERPRISE STREET RAILWAY COMPANY are extending their tracks through five streets.

Danbury, Conn.

A new street railway is projected for Danbury.

Duluth, Minn.

For some time negotiations have been pending with Minneapolis capitalists for the purchase of the Duluth street railway and all its franchises. Sam Hill, of Minneapolis, and Judge Thomas Wilson, of St. Paul, have closed the deal, paying \$100,000 for the property. The new company will consist of Sam Hill and Thomas Lowry, of Minneapolis; Judge Wilson, of St. Paul; A. S. Chase and G. G. Hartley, of Duluth. Hill will be President of the company and A. S. Chase will continue as Manager. The President of the new company is the owner of a large amount of Minneapolis real estate, and is interested in different elevator companies and other Minneapolis enterprises. Thomas Lowry is the owner of the Minneapolis street railway lines and is President of the St. Paul street railway company. Judge Wilson is heavily interested in the St. Paul street railway system, and is the owner of the three best cable-car patents yet invented. One of these is to be utilized soon in a line of road up the hill, probably on Lake avenue. A. S. Chase, who will be the manager of the business, has held that position since the first establishment of the company. In 1886 it is proposed to lay double tracks on Superior street. Four miles of new track will also be put down. The present line will be extended both to the east and west ends as fast as the streets are graded by the village. A building for stable, cars, repair shops, and office is to be erected at a cost of not less than \$15,000 early in the spring. The old cars will be taken off and thirteen new ones of latest design will be purchased. One hundred head of horses and mules will be required to handle the business before the end of 1886. It is estimated that the expenditure of the company for improvements contemplated will amount to \$175,000.

Geneva, N. Y.

Enterprising citizens of this place are talking up a street railway, and a pronounced move in the enterprise will soon be made.

Gloucester, Mass.

THE GLOUCESTER STREET RAILWAY COMPANY, with a capital of \$60,000, will build and operate four miles of road the coming season.

Greenbush, N. Y.

A portion of the new street railway which connects this village with the capital city has been formally opened. The cars are very handsome, and run every thirty minutes. Upwards of 400 passengers have been carried every day. The cars start from the corner of Ferry street, Greenbush, thence along Broadway to the bridge which spans the Hudson River, thence across the bridge (1,800' long) crossing Broadway, Albany, thence up South Ferry street to South Pearl street, where it connects with the Albany railroad company's tracks, thence up South Pearl street to Maiden Lane, the whole distance about one and one-half miles. The track is built of metal, (Gibbon's patent) and is very smooth riding, and although the frost has been most severe Messrs. Egerton & Gibbon have demonstrated that their system is a success.

The Metallic Street Railway Supply Company have also just finished a single track across Lark street, 1,800 feet, thus connecting Washington Avenue and Hamilton street routes. These two roads have been built under severe trials from frost, and could not have been built under any other system without enormous cost.

We understand from Mr. Gibbon that he intends laying track to the aniline works this winter, a distance of about three-quarters of a mile.

Hamilton, Ontario.

THE HAMILTON STREET RAILWAY, of Hamilton, Ontario, has been leased for five years from January 16th, to J. C. Bigelow, who has purchased the cars and horses. The equipment embraces eleven cars and eighteen horses.

Indianapolis, Ind.

THE ELKHARDT STREET RAILWAY Co., Wm. P. George, President, has been incorporated with \$50,000 capital.

Jersey City, N. J.

THE JERSEY CITY R.R. COMPANY's new stables at Greenville have 210 stalls. While this is more than is necessary to accommodate the present line, provision is made for extension to Bayonne, which is probably to occur in the spring, provided the bridge is built to that place. Their recent improvements also include the laying of a mile and a half of the Johnson girder rail for double track.

Mayor Collin's veto of the Star Horse Company's ordinance was sustained by the motion of the Jersey City Board of Aldermen at their meeting, January 8th. The veto was not called up.

Long Island City, N. Y.

THE LONG ISLAND CITY & NEWTOWN RAILROAD's annual report to the Railroad Commission contains the following figures:

Gross earnings.....	\$15,458.21
Operating expenses.....	12,688.21
Net earnings.....	\$2,770.00
Taxes on property.....	\$462.50
Interest on funded debt.....	4,500.00—
	4,962.50
Deficit	\$2,192.50

The operating expenses were repairs to cars, &c., \$1,600; repairs to harness, \$78;

horse shoeing, \$359.50; provender, \$4,680; wages of conductors and drivers, \$5,814.71; light and fuel, \$130; water tax, \$26.

Thirty horses, eight open and eight closed cars carried 300,000 passengers over the four and one half miles of road various distances during the past year. The employees number ten.

Macon, Georgia.

THE MACON CITY AND SUBURBAN STREET RAILWAY is a belt line, built in 1885. It is now extending tracks to East Macon, and contemplates running to South-west Macon. The small Texas horses and mules are being replaced with larger ones. The entire road is being very much improved. Macon has doubled its population in six years, has increased 85% in last four years. They have seven steam railroads, two more building, and a tenth is agitated. Will soon be the railroad center of Georgia.

Madison, Wis.

THE MENASH & NEENAH STREET RAILWAY Co. is a new enterprise in this city. Capital stock, \$25,000. We understand the work is already begun.

Meriden, Conn.

THE MERIDEN CITY RAILWAY Co. is an enterprise on paper that is expected to soon assume tangible shape.

Milwaukee, Wis.

A very determined movement is being made by patrons of the West side street railway lines for conductors in place of fare boxes. The crowded condition of the cars and the inconvenience of getting through to the front end, has caused a very considerable amount of free riding.

Montgomery, Ala.

THE CAPITAL CITY RY. Co., are experimenting with a view to the use of Electric Motors on their road in place of mules.

Nashua, N. H.

THE NASHUA HORSE RAILROAD COMPANY has decided to build its line in the Spring, and has appointed a committee to purchase supplies.

New Bedford, Mass.

THE ACUSHNET STREET RY. Co. have added several new cars from the works of J. G. Brill & Co., fitted with the Bemis box.

New York City, N. Y.

THE JOHN STEPHENSON Co., (LIM.) is building twenty-four new cars for the Chambers Street Cross-town Line of New York, and a number for a road in Montevideo, Uruguay. They are also fitting up the busses that are to run upon the Fifth avenue temporary line in New York.

THE THIRD AVENUE LINE has granted its drivers' request for reduction of hours. The time now is twelve hours with half-an-hour out for dinner; wages two dollars a day.

THE SECOND AVENUE LINE has voluntarily reduced its drivers' time to twelve hours a day with full pay.

Controller Loew, having got an impression from the statements of the daily press, that the Broadway cars were not turning in

3% of gross earnings for passengers below Fourteenth street, has made a personal investigation, and reports the company as living up to the letter of its contract.

HUMPHREYS & SAYCE. This firm has secured the contract for supplying all material and cars to the Mt. Vernon & East Chester Railroad.

M. M. WHITE & Co., New York, have already begun their spring trade in switches. They are doing some work for the Brooklyn City road, and report a very satisfactory number of inquiries from different parts of the country.

THE SIXTH AVENUE RY. Co. has reduced the hours of car drivers to eleven hours and forty minutes; actual time on cars, nine hours and thirty-four minutes; pay on Canal street line, \$1.96; and on Vesey street line, \$1.98 a day.

THE EIGHTH AVENUE RY. Co. has made its employees' time twelve hours including "swings." The pay remains at two dollars a day.

THE BROADWAY SURFACE RAILROAD speaks in very flattering terms of the large sweeper which they have been trying on their road, which was built by Andrews & Clooney.

JOSEPHINE D. SMITH, 350 Pearl street, N. Y., recently received an order for car lamps through The John Stephenson Company, for St. Louis, amounting to about \$3,000. This is one of the largest orders ever received for street car lamps. A previous month's business was the largest in the history of the establishment.

The stables of the Fifth Avenue Stage and Transportation Company, on Forty-third street, now contain 131 strong, young horses and fifteen old stages which are now running. The contracts for the construction of the new vehicles will be awarded at once.

Alderman Van Reusselaer has introduced a resolution which proposed to regulate the giving of consent by the Common Council to the construction of street surface railroads in this city. An application for a franchise must specify the route or routes and the manner in which it is proposed to construct the road, and the petitioners shall ask the Common Council to sell the franchise at public auction. The board may then order the sale of the franchise at auction by the Controller upon such terms as the Common Council may prescribe. The sale is to be contingent upon the consent of the Common Council to its construction. Such sale is to be made to the corporation bidding the highest percentage of the gross receipts each year from such railroad.

THE FIFTY-SECOND & FIFTY-THIRD STREETS AND EASTERN BOULEVARD RAILROAD COMPANY, to construct a surface railroad in the above thoroughfares in New York, a distance of four miles, has been incorporated. The capital is \$1,500,000. The Trustees are Elsworth L. Striker, Theodosius F. Secor, Jr., William M. Walker, Philip Donohue, Edward F. Brown, New York; Isaac W. Maclay, Yonkers; and William E. Davies, Demarest. Each of the above take ten shares.

The resolution recently passed by the Common Council requiring all persons who drive street cars to be twenty-one years of age, a resident of the State one year, and of this city four months, and to pay an annual license of one dollar, became a law January 14th, by limitation of the time in which the Mayor has the right to approve or veto ordinances. Corporation Counsel says the ordinance is in conflict with the Constitution of the United States, and Marshal Byrnes says it will be enforced after February 1st. We shall see what we shall see.

At Special Term of the Supreme Court, in the suit of Alfred L. Loomis against the Thirty-fourth Street Railway Company, a permanent injunction was granted perpetually restraining the company from constructing its railway in Thirty-fourth street, between Broadway and Fourth avenue. The General Term of the Supreme Court, January 8th, decided that the injunction must be modified so as to merely restrain the company from constructing its road until it shall have obtained the consent of a majority of the owners of the abutting premises or shall have been authorized by the General Term on a report of Commissioners in its favor.

ANDREWS & CLOONEY have among other work in hand, orders for 400 wheels for South America, some 300 for New England roads, and report the outlook good. The Western business of this firm has grown to such proportions that they have concluded to open an office in Chicago, which will be located in the Lakeside Building, and be under the management of their Mr. R. G. Mattern. This enterprising house is growing in prominence.

The Board of Aldermen, January 11th, referred to the Railroad Committee the petitions of several railroad companies, all of which were before the old board. Persons interested in the St. Nicholas Avenue road will be heard on February 2nd; Citizens' road February 8th; Twenty-eighth and Twenty-ninth streets to-day (Jan. 29). An application of the New York, Lake Erie & Western Railroad Company for permission to lay tracks in Thirteenth avenue, between Twenty-third and Twenty-fourth streets, for the use of freight cars, was referred to the Railroad Committee.

Regarding the duplicate cable system in use on the Tenth avenue line, the following extract from the minutes of the meeting of the Board of Directors, held Monday, November 9th, 1885, speaks for itself.

"Whereas; The Third Avenue Railroad Company of the City of New York, have constructed a cable railway on Tenth avenue, in this City, and

"Whereas; said road has been running steadily and uninterruptedly since the opening of the same on the 31st day of August, 1885; Therefore, be it

"Resolved; That we, the Board of Directors of said company, are highly pleased with the system of cable railroads which it represents, and express our entire satisfaction with the same."

THE FORTY-SECOND STREET, MANHATTANVILLE & ST. NICHOLAS AVENUE RAILWAY CO. January 21st, held its annual meeting, and directors were elected as follows:—Arthur Leary, John B. Dutcher, Alfred Wagstaff, Daniel D. Conover, John S. Foster, Alfred Skitt, John Whalen, Henry Steers, Jacob Fleischhauer, James Matthews, Warren A. Conover, Charles F. Naething and Charles Phelps.

Edward A. Klein, January 19th, in the Superior Court, before Judge O'Gorman and a jury, obtained a verdict of \$9,000 against the Second Avenue Railroad Company for injuries received on the 21st of May, 1882. Klein hailed a car at Second avenue and Third street, and after having placed one foot upon the platform, the car started and he was thrown to the pavement striking on his head. He sued the company asking \$50,000 damages. The defense was that Mr. Klein jumped on the car while it was in motion.

THE JOHN STEPHENSON COMPANY, New York, has the new extension to its Street Car Works about ready for occupancy. The building occupies two lots and is two and four stories in height. It gives very advantageous space, well lighted, and will be used for building summer cars, or wood-working machinery, for brass work, &c. It enables the shops to be arranged more advantageously even than heretofore. This company builds only street cars, and it is, of course, well prepared to do that class of work. Among recent orders for summer cars is one for ninety for St. Louis.

THE FOURTH AVENUE LINE, without committees or memorials, without solicitation on the part of those most interested, posted the following communication in its depots.

NEW YORK, Jan. 13, 1886.

To Conductors and Drivers:—On and after February 1st, twelve hours' labor, including time spent on stand at both ends of road, will constitute a day's work. Rate of pay will remain at two dollars.

ALFRED SKITT, Sup't.

Approved.

C. VANDERBILT, Vice Pres't.

Thus those drivers heretofore receiving \$1.85 for twelve hours and six minutes work will be advanced fifteen cents a day to two dollars, while those now working thirteen hours and twelve minutes will earn the same wages in an hour and twelve minutes less time.

Newton, Mass.

A horse or electric railway is being talked of. The legislature has been petitioned for a charter.

Ogdensburg, N. Y.

The proposed street railway in Ogdensburg, mentioned in these notes before, is to be built, the capital, \$60,000, having been raised.

Olean, N. Y.

Olean's street railroad on the first of the year declared a dividend of 10%.

Philadelphia, Pa.

President Harrah, of the Peoples' Passenger Railway Company, Phila., in his

annual report, speaks in favorable terms of the permanent register as compared with the portable, formerly used. This company has added 165 Lewis & Fowler registers during the last year.

The annual meetings of all the street car companies of this city, were held January 17th, and resulted in every instance in the old officers being re-elected.

The incorporators of the Tramway Motor Co., of Philadelphia, chartered by the State Department, with a capital of \$100,000, are L. U. Maltby, Silas W. Petit, Andrew T. James, and Henry Bradley, Philadelphia, and Oliver C. Maltby, Norfolk, Va.

Rochester, N. Y.

THE ROCHESTER CITY & BRIGHTON R.R. Co., Secretary C. C. Woodworth informs us, now has thirty-five miles of track, one hundred and forty cars, and five hundred and eighty-five horses.

Rome, N. Y.

Five thousand dollars have been subscribed by the people of Rome, to build a street railway in that city.

South Bend, Ind.

The Van Depoele system of electric motors for street railways is, we understand, working very satisfactorily at South Bend, Ind., that the horses have been abandoned and the road is running commercially by electricity. At New Orleans, a plant is also in successful operation, but, we understand, the owner of the plant receives less patronage than was hoped for, owing to the lighter attendance on the Exposition than had been anticipated. Recent developments of the Van Depoele system, it is safe to say, have gone far to establish the possibility and practicability of the application of electricity to the running of street railroads.

Springfield, Mass.

THE SPRINGFIELD STREET RY. Co. has completed a new car house at an expense of \$20,000.

THE BEMIS CAR BOX Co. mention recent orders from the Cambridge Railroad Co. and the Middlesex Railroad Co., of Boston; the Globe Street Railway of Fall River and the Union of Providence. They are furnishing gears for Brill, also for J. M. Jones & Sons for cars for Buffalo and other roads.

Springfield, Ohio.

D. W. STROUD, Esq., President of the Citizens Street Railway Company, informs us that his road contemplates a two mile extension this spring.

St. Joseph, Mich.

THE ST. JOSEPH & BURTON HARBOR RY. Co. is in successful operation.

St. Louis, Mo.

The street car dynamiters, Pinkerton, Keenen, Withers, Byrns and Withrow, were placed on trial here, January 6th. Withrow surprised the others by turning State's evidence. He described the meeting which the five dynamiters had held, and told how they had drawn a check on Pinkerton, then the Treasurer of Cleveland Assembly Knights of Labor, for twenty dol-

lars. This amount they turned over to Withers. Withers went to Louisville, got the dynamite sticks, and returned to St. Louis with them. Witness said that after Withers' return from Louisville he met him often. Withers told him how he had blown up the cars. He always put the dynamite stick in his hat, placed the stick on the track, picked up his hat, and then touched the stick off; he said that two or three times premature explosions had occurred, and once he thought the force of the explosion would shake all the teeth out of his head. Witness went into details and told every thing the conspirators had done from the time they entered into the conspiracy up to the time they were arrested.

Staten Island, N. Y.

Street cars will be run on the North Shore Railroad January 29th.

St. Paul, Minn.

THE ST. PAUL CITY RY. Co. will lay fifteen hundred tons of steel rails on extensions to their present twenty-five miles of track. The cost of the extension will exceed \$300,000.

Vicksburg, Miss.

A charter has been obtained and a company organized with a capital of \$25,000 for the purpose of building a street railway in various portions of the city. The line will be about five miles long, and will extend throughout Washington street, with branches to Cherry street and to Clay and Jackson streets, by way of South and Cherry streets. The leading spirits in the enterprise are Captain E. C. Carroll and Mr. E. Martin.

Washington, D. C.

An electric street railway, after the same plans and using the same motors as the Baltimore road, is being agitated. The Central Electric Street Railway Company is the title of the company.

Waterbury, Conn.

There will be a street railway laid in Waterbury, Conn., this spring, seven or eight miles in length.

West Troy, N. Y.

The Midland Industrial Gazette says:—Gradually the enterprising and progressive Covert Manufacturing Company, of West Troy, N. Y., are downing the unprincipled robbers, who have boldly tried to appropriate the valuable patents of that company which have taken years of labor, study and expense to effect. At a session of the United States Circuit Court held at New York, December 5, 1885, Hon. W. J. Wallace presiding, the infringement suit of James C. Covert, of the Covert Manufacturing Company, as plaintiff, against Sargent & Co., of New York, as defendants, was called and an injunction granted, placing the defendants under bonds for damages, etc. For years this company with others has attempted to deceive the public by trying to palm their worthless goods off as Covert's, designating their imitations by the deceptive name of "Covered." The trade journals of the country have time and again shown them up in

their true light as unprincipled robbers, and have been repeatedly threatened with a libel suit by them, but as they know that nothing is libelous that is true, a threat has always been the end of it. We earnestly hope that the Coverts will eventually suppress the "Covereds" and be allowed to reap the honest reward of their toil and study.

The Covert Manufacturing Company is not the first party from the benefit of whose large advertising, others have sought to legitimately derive the advantage. Few, however, have so fully demonstrated their ability to defend themselves.

Wichita, Kan.

The following are the new officials of the Wichita Street Railway Company, under the new management:—B. H. Campbell, President; E. R. Powell, Vice President, Treasurer and General Manager; G. W. Laramer, Secretary; E. C. Ruggles, Attorney. Board of Directors:—B. U. Campbell, E. R. Powell, J. O. Davidson, C. R. Miller, E. C. Ruggles, G. W. Laramer.

Yonkers, N. Y.

A third railroad is projected in Yonkers. The incorporators have filed the necessary papers at Albany and are now asking the city of Yonkers for a franchise to lay their tracks through the streets. The other two companies have done nothing yet toward the building of their roads.

Success of the Cable System in Chicago.

The adoption of the cable system for street car propulsion in Chicago has now after a fair trial of five years been proved a complete success. The last report of the Chicago City Railway Company, to whom is due the credit of introducing this system east of San Francisco, states that the cables and machinery have operated with great satisfaction throughout the year. Although the last winter was the most severe ever experienced by the company, the mercury for several weeks remaining below zero and the falls of snow being frequent and heavy, only one delay of any importance occurred.

This effectually disposes of the argument, which was urged when the use of cables was first proposed for Chicago, that the climate was too severe and that frost and snow would make it impossible to operate them. The report states that the cost of moving a car one mile by cable is about one-half of what it is with horses. Sixty thousand miles of service is the average life of cables in the main line.

As a special safeguard against extreme weather about one-half of the cable channel has been provided with 1½ inch steam pipe for melting snow and ice. The company now operates twenty miles of cable road, with 2,000 horse power of steam engines moving cars at an average speed of 4 miles per hour.

The President says that the struggle which the company has had "against natural difficulties, stubborn prejudices and opposition of the most pronounced character has resulted in a complete success."

the company and its patrons, and has raised the value of property 50 per cent. over many miles of territory."

While San Francisco was the pioneer in the adoption of the cable system, impelled thereto by the steep grades of its streets, Chicago has proved the adaptability of the plan in a northerly climate and for a level surface, and the successful demonstration of the principle here has been the means of introducing it in many other cities. The cable now seems destined to take the place of horses for street car movement in cities quite generally, unless indeed it is superseded by some adaptation of the power of steam or of electricity.—Railway Age.

Experience in San Francisco in Running Cable Roads.

The Mining and Scientific Press in discussing the various systems of cable propulsion, speaks very emphatically in favor of the system in use in San Francisco, and compares the work done with that on the East river bridge. It says, that it is not in possession of exact figures for the weight of cars now used on the bridge, but will assume to be 25,000 pounds each. Assuming an additional standing capacity of four times the seating capacity, and we have 26 passengers per car. This at 125 pounds each, will make the total weight of passengers 27,500 pounds, and of the cars fully 52,500 pounds. Assuming the friction to be forty pounds per ton, the resistance due to friction would be 1,050 pounds, and that due to the grade of 3½% would be about 1,575 pounds, a total of 2,625 pounds total resistance for one car ascending the steepest grade on the East river bridge. The figures are not far from the truth. Now let us compare this with one of the hill roads in San Francisco—say the one on California street.

The grade on this line from Dupont to Stockton streets is 18.2 per cent., and on the other side of the hill but slightly less. The cars now used on that road weigh something over 8,500 pounds. Sixty passengers is not an unusual load (110 having been carried on that grade at one load), which, at 125 pounds each, would make the total weight of a loaded car and dummy 16,000 pounds. Such a load can be found every day at six o'clock in the evening. The resistance due to friction, at the rate of 40 pounds per ton, as before, would be 340 pounds. The resistance due to the lift of 18.2 per cent. is about two-thirds of the total weight, equal to 10,666 pounds, which is considerably greater than the weight of the cars when they entered on the Bridge. Yet there is no trouble, and there is no possibility of the cable slipping out of the grooves of the wheels. The cable has run more than two months on this line. It is not necessary to stop on that grade, as the car is held securely by a hand-brake, which is operated by the driver.

quired to back down to the crossing of the street below, before starting, to avoid damaging the cable. On the Clay Hill road, near by, the grades are the same, but the cars are not quite heavy. The Clay street was the first road ever constructed, and has been in operation more than twelve years. The Sutter street cable road has been in operation nine years, Geary street cable road six, Union street cable road four, and Market street road, which is the most important and busy street in San Francisco, about two years. The safety rail brake is conceded to all roads having steep grades, and is used by all the cable roads on the Geary street.

We are aware that it is much more on the cable starting a load of 2,000 pounds than 16,000 pounds under the same conditions, but the bridge cars always make the start at the same place, and would be an easy matter to make the start down-grade in the direction of the travel for a distance of 50' or 75' under the same places; while on the Market street of San Francisco, cars are required to stop anywhere a passenger may desire to get on or off, so a car frequently makes two stops and starts to each side of a half block.

There is no trouble experienced by a grip-man starting without the shock, but they must start quickly to make the time between terminal points as short as possible. The number of stop-starts for passengers required to make a trip of this character on the Market street road is about 12. The cars weigh 8,500 pounds each, and have carried up a grade as high as 18½% passengers, making a total weight of over 16,000 pounds. The cars are only 16,000 pounds, and the average load of all the cars is 116 passengers (iron).

It is frequently necessary to stop on these grades, and in these cases to depend on wheel brakes. Collisions would be frequent, and a car would slip down such a grade on a slippery track, with all the wheels locked, for when in motion, so the safety brakes are a necessary feature.

There is another feature of the arrangement that is of great importance. That is, the cars are hitched together, so that they will not separate, and the cars are held together by a chain, which is attached to the front of the car, and is held in place by a hook, which is attached to the front of the car. This arrangement is of great importance, as it prevents the cars from separating, and it also prevents the cars from being derailed.

When a car is derailed, it is necessary to stop it, and this is done by the use of a hand-brake, which is operated by the driver. The hand-brake is a simple device, and it is easy to use. It is necessary to stop the car when it is derailed, and this is done by the use of the hand-brake. The hand-brake is a simple device, and it is easy to use.

Advertisement for 'SPECIAL NOTICE' and 'FOR SALE' with various notices and text.

third street, and their lines are leased to the main company.

They propose to run the underground line from the Battery up Broadway to Fifty-street. A branch will lead from the line at Madison Square, going up to an avenue to Harlem river, thence by a bridge to connect with the railroads beyond the river. The underground structure will not be a tunnel, but a continuous roadway. It will be divided into six parts, and will extend from curb to curb, supported by the vaults. The two middle parts will be devoted to express trains, and will terminate at Union Square, Madison Square, Second, and Fifty-ninth Sts.

The way tracks and cars can be built to lead to the express trains. The plan is perfectly feasible. There are no engineering difficulties to compare with those in the underground railways of London. The cars will run by electricity; there will be no vibration, owing to the nature of the supporting columns; ventilation will be self-adjusting, for the cars act like a piston in a cylinder to keep up a draft of air. They anticipate no trouble in securing consents and hope to begin work in the spring. The plan is to extend the system throughout the city. The capital is \$3,000,000 a mile. The work will be done by the use of bridges. Every detail has been arranged, even to every bolt and screw.

Street Railway Stocks.

	Par	Amount	Period	Rate	Date	Bid.	Asked.
erry...	100	500,000	J. & J.	7/8	January, 1886	28	30
.....	1,000	700,000	J. & J.	7	July, 1900	113	116
.....	100	2,100,000	Q.-J.	2	January, 1886	280	290
.....	1,000	1,500,000	J. & D.	5	June, 1904	108	112
.....	1,000	1,000,000	J. & J.	5	July, 1914	108	109
.....	1,000	1,500,000	J. & J.	5	July, 1924	110	112
.....	1,000	1,000,000	J. & J.	5	July, 1905	106	107 1/2
.....	1,000	1,000,000	Q.-F.	3 1/2	February, 1886	205	210
.....	1,000	800,000	J. & J.	5	January, 1902	106	110
.....	100	200,000	A. & O.	4	October, 1885	165	175
.....	1,000	400,000	J. & J.	7	January, 1888	105	112
.....	100	1,800,000	Q.-J.	2	January, 1886	141	142 1/2
.....	1,000	1,200,000	J. & D.	7	December, 1902	132	135
.....	100	1,000,000	F. & A.	2 1/2	February, 1886	132	138
.....	1,000	1,500,000	A. & O.	7	October, 1886	110	116
.....	100	800,000	Q.-J.	1 1/4	January, 1886	162	165
.....	100	250,000	M. & N.	6	November, 1922	114	115
.....	100	1,200,000	Q.-F.	2	February, 1886	202	206
.....	100	1,900,000	J. & D.	7	June, 1893	114	116 1/2
.....	100	1,700,000	F. & A.	6	August, 1914	106	107 1/2
.....	100	700,000	Q.-F.	4	February, 1886	255	260
.....	100	300,000	A. & O.	7	April, 1893	111	116
.....	100	700,000	M. & S.	5	1910	45	50
.....	100	300,000	J. & J.	6	1915	110	112
.....	100	300,000	Q.-J.	6	1915	70	73
.....	100	300,000	Q.-J.	2 1/2	January, 1886	240	265
.....	100	300,000	F. & A.	6	August, 1914	105	110
.....	100	300,000	Q.-F.	2	August, 1885	150	156
.....	100	300,000	J. & J.	7	July, 1894	112	113
.....	100	300,000	J. & J.	5	January, 1886	205	207
.....	100	300,000	M. & N.	5	November, 1909	108	110
.....	100	300,000	M. & N.	7	May, 1888	106	108
.....	100	300,000	M. & S.	5	September, 1885	200	210
.....	100	300,000	J. & J.	7	July, 1890	112	116
.....	100	300,000	Q.-F.	4	February, 1886	315	330
.....	100	300,000	J. & J.	7	January, 1890	110	112
.....	100	300,000	F. & A.	4	November, 1885	280	300
.....	100	300,000	M. & N.	7	May, 1893	110	113
.....	100	300,000	M. & N.	3	September, 1885	138	145
.....	100	300,000				299	325

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Highland.....	141
Lynn & Boston.....	160
Somerville H. Road.....	59 1/2
Boston & Chelsea.....	60 1/2

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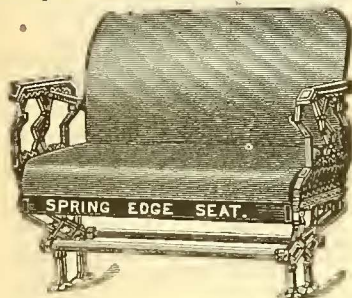
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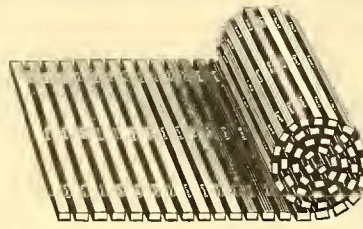
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On account of its cheapness and durability it is the most popular Seat in the market, and our trade in this line has grown, in thirteen years to vast proportions and have given universal satisfaction, both in this and foreign countries. They are made three-ply, and perforated or plain to suit customers.

The wood used in the construction of our Seats are **Birch and Mahogany**; the Birch is most generally used, but Mahogany makes a very handsome seat.

Five of the main street railways of New York City have been using these Seats and Backs for fourteen years and they are in good condition.

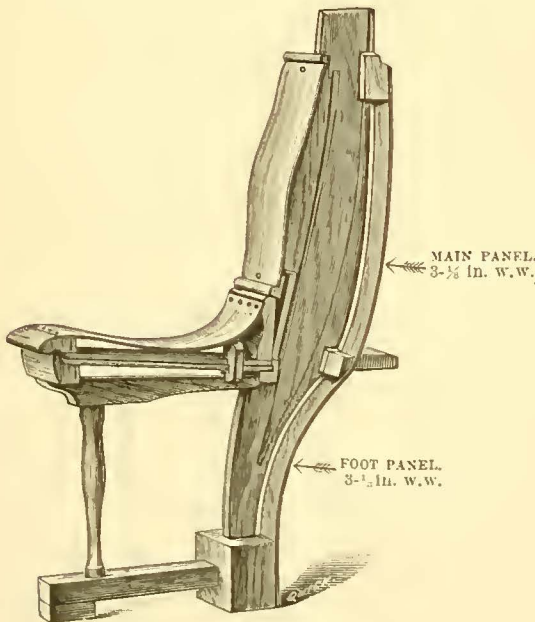
Today, fully half of the railroads in this country are using this Seat. Our **Three-ply Veneered Ceilings**, nicely decorated, adds greatly to the beauty of the car, and for repairing old cars it has no equal. The veneers being hard wood put over the carlines covers up all the old paint and wood work. Woods generally used are Birch Blister and Birdseye Maple, Oak and Mahogany, or other woods if required.

We are prepared to make panels for all parts of cars. We are also making car roofs which give good satisfaction.

We are making **Three-Ply White Wood Car Sides** ¾ inch thick. They possess a number of advantages over the single board, viz:

- 1st. They are fully 75 per cent Stronger.
- 2d. Being stronger, they brace and stiffen the car.
- 3d. They cannot split nor crack by nailing into place, even though the nail be placed near the edge.
- 4th. Being laid up over a form to suit side or shape of the car frame or post, they cannot buckle or twist, a feature which also adds strength to the Car.
- 5th. For Repairing Old Cars these sides have no equal.

They have been on trial for a number of years, and this test has left them as firm and good as the day they were put on.



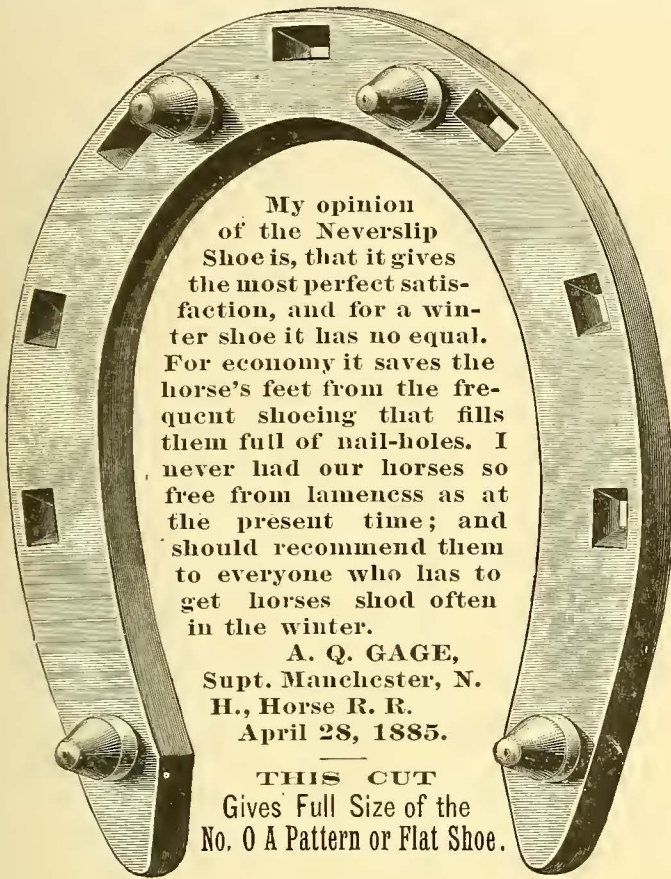
GARDNER & CO.

Manufacturer of Car Seats and Ceilings and Depot Seatings,

OFFICE AND FACTORY: 643, 645, 647, 649, 651, 653, 655 and 657 West 48th St., New York.

Sample and Salesroom: 183 Canal Street.

The NEVERSLIP HORSESHOE



My opinion of the Neverslip Shoe is, that it gives the most perfect satisfaction, and for a winter shoe it has no equal. For economy it saves the horse's feet from the frequent shoeing that fills them full of nail-holes. I never had our horses so free from lameness as at the present time; and should recommend them to everyone who has to get horses shod often in the winter.

A. Q. GAGE,
Supt. Manchester, N. H., Horse R. R.
April 28, 1885.

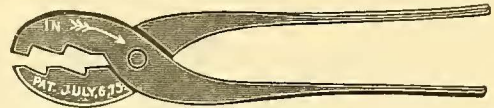
THIS CUT Gives Full Size of the No. 0 A Pattern or Flat Shoe.

WITH
Removable Steel Centering and Self-Sharpening
Calks.

AN ENTIRE SET can be CHANGED in a few MOMENTS with the

NEVERSLIP WRENCH.

Made in Two Sizes.



For applying Neverslip Calks. Is also a handy and useful tool wherever pipe tongs or wrenches are required.

NEVERSLIP TAP.



For cutting threads for Neverslip Calks. The small end, A in cut, of tap indicates size of hole to be drilled in the shoe.

The Neverslip Horseshoe Company,

36 INDIA WHARF,

BOSTON, MASS.

Wm. Wharton, Jr., and Co., Limited,

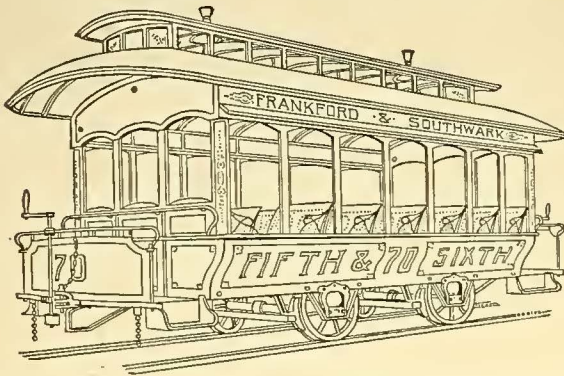
Engineers, Manufacturers & Contractors,

Twenty-Fifth Street and Washington Avenue,

PHILADELPHIA, PA.

The Oldest and Largest Manufacturers of Street Railway Track Appliances in the World. Responsible parties contemplating Building, Renewals or Extensions will find it to their interest to correspond with us,

FOR SALE.



Four Summer Cars, good as new, built in very best manner, perforated seats bronze trimmings, etc., centre aisle, seating room for 30. The company having discontinued the use of summer cars offer the same for sale on very reasonable terms. For description and price apply to FRANKFORD & SOUTHWARK R.R. CO., 2501 Kensington Ave., Philadelphia.

ESTABLISHED 1847.

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CAR WHEEL WORKS,

PHILADELPHIA, PENN.

CAST CHILLED WHEELS,

AXLES AND BOXES

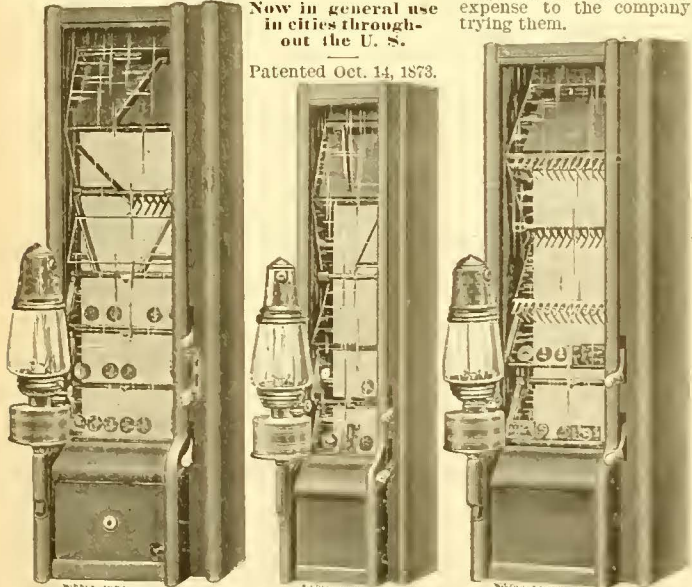
FOR EVERY KIND OF SERVICE.

Street Railway Wheels of all Sizes.

Ornamental to any car. Reduction in price where 2 boxes are placed in one car. TOM L. JOHNSON'S IMPROVED FARE BOX. Roads equipped with boxes on trial, and if not satisfactory, returned without any expense to the company trying them.

Now in general use in cities throughout the U. S.

Patented Oct. 14, 1873.



One of the principal merits of these Fare Boxes over all others, consists in the fact that the fares are not turned out of sight at once by the drivers, leaving nothing but the bare word and memory of the parties as evidence of the payment, thereby making it easy for deception to be practised, even though an officer is on the car, and is endeavoring to see that the driver is faithfully performing his duties. They are so constructed that the fare are kept in sight from one end of the road to the other, and at any point on the line an officer of the company, or indeed any other person, can tally passengers with the fares. The drops can easily carry from 75 to 80 fares, and can be counted without mistake, and counterfeit money can be easily detected. These boxes are very simple in construction, being cleared, when required, in five minutes, what as any other box takes a much longer time. The glass fronts and drops render them so transparent that a person sitting in the further end of car can readily count the fares and make the tally, without making himself conspicuous in the matter, if desirable. They are lighted from an outside lantern, (which is only on the car at night, and should be taken off during the day,) giving an excellent light, for the fares can be seen all most as plain as by day. When the box is put in a car it can not be taken out or tampered with, unless the keys are obtained from the office, and can not be robbed without violence. Special attention given to correspondence on the subject of street railway construction, equipment and operation. Address all correspondence to A. A. ANDERSON, with Tom L. Johnson, Indianapolis, Indian.

WM. P. CRAIG, Street Railway Builder and dealer in Railway Supplies.

OLD ROADS RE-LAID, GRADING, PAVING, &c.

Special attention given to laying Switches, Curves, Turnouts, Connections and Turn-tables; also Building Tracks for Excavation, Grading, Mining and Factories.

Office, 95 LIBERTY STREET, NEW YORK.

STEEL STREET RAILS.

The Pittsburgh Bessemer Steel Co., Limited.

48 Fifth Ave., Pittsburgh, PA.

Section No. 17
46 lbs. per Yard

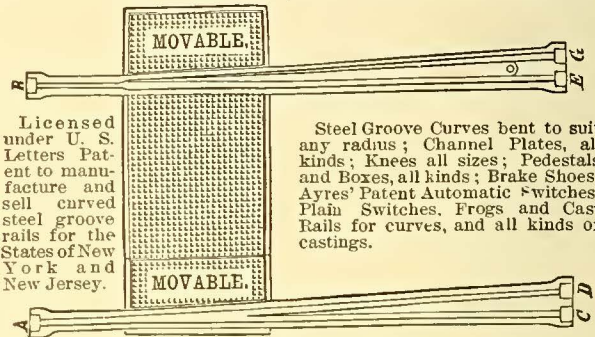
A. AYRES,

Manufacturer and Patentee.

Send me full size section of rails to be used at points A, B, C, D, E, G.

No. 625 TENTH AVENUE,

NEW YORK.



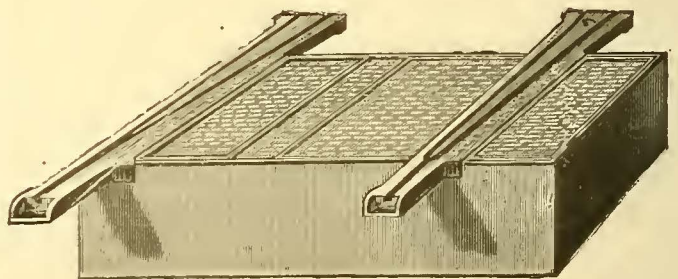
Licensed under U. S. Letters Patent to manufacture and sell curved steel groove rails for the States of New York and New Jersey.

Steel Groove Curves bent to suit any radius; Channel Plates, all kinds; Knees all sizes; Pedestals and Boxes, all kinds; Brake Shoes; Ayres' Patent Automatic Switches, Plain Switches, Frogs and Cast Rails for curves, and all kinds of castings.

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OWNERS AND BUILDERS OF

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Patent Automatic Switch

FOR STREET RAILROADS.

**STREET RAILWAY WHEELS AND TURNOUTS.
Graded Stable Gutter with Straight or Curved Cover.**



Descent 1/8 in. per foot. Pieces 5 feet lengths. Short pieces furnished to suit any length. Spouts to connect with Sewer, &c.

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PRACTICAL, ECONOMICAL, ANTI-FRICTIONAL & EXCEPTIONAL.

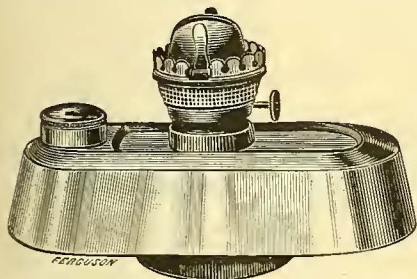
Parties using our AJAX WHITE METAL ALLOY in place of block tin, with copper, can produce a composition for brasses which we will guarantee to give greater mileage, less friction and of greater tensile and crushing strength than any known composition. The first cost is no greater than copper and tin. We make castings of every description, as per patterns received, and at lowest figures.

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Co-partners.



Trade Mark.

**CLUTE PATENT
DOUBLE-BOTTOM
STREET CAR LAMP.**



Is one that assures
Safety, Durability,
and is perfect in
regard to Leakage.

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MANUFACTURERS OF

RUBBER CAR SPRINGS

OF EVERY STYLE AND SHAPE,

CUSHIONS, BRAKE PADS, RUBBER MATTING
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Being one of the oldest manufacturers in the business, we have a MOST COMPLETE assortment of moulds.

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Street Railway Supplies,
OF EVERY DESCRIPTION.

Steel Rails, all patterns; Cars; Automatic Switches; Turntables; Curved Rails; Channel Plates; Frogs; Crossings and other Track Castings, Knees, &c. Countersunk Spikes, specially adapted for Center-bearing Rails.

The "BROADWELL CAR STARTER,"
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We call particular attention of all horse railroad companies to our celebrated

- HARNESS SNAPS,
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- HALTER CHAINS,
- TRACE CHAINS,
- REIN CHAINS AND
- BREAK CHAINS.

Send for illustrated catalogue and price list.

COVERT MANUFG. CO.,

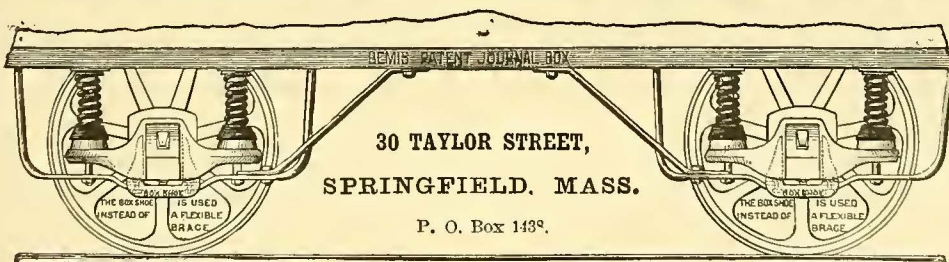
SOLE MANUFACTURERS,

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THE BEMIS CAR BOX CO.,

Light Draft, Easy
Riding, Durable
Economical.

Brasses are war-
ranted for 10 years
and Journal for 20
years.



30 TAYLOR STREET,
SPRINGFIELD, MASS.

P. O. Box 143rd.

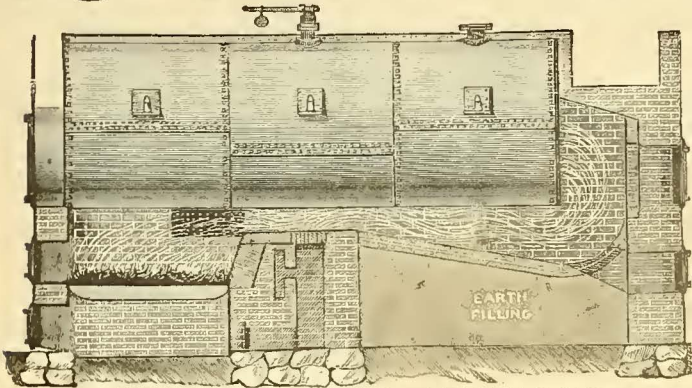
Requires oiling or
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in 12 months.

Boxes are posi-
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FOR ERECTING STATIONS
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USING

Jarvis Patent Furnace

For Setting Steam Boilers to Burn Cheap Fuel, such as Wet Saw-dust, Coal Screenings or Slack Coal.

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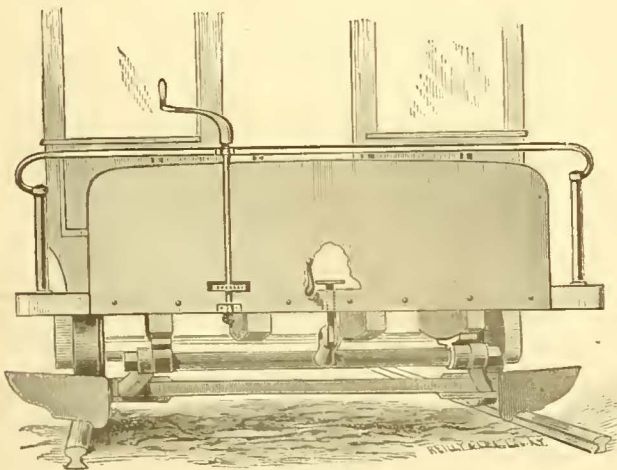
ARMINGTON AND SIMS ENGINES,

Belting direct to Power Dynamoes without using Shafting-

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SEND FOR CIRCULAR.

LITTELL'S TRACK SCRAPER



END VIEW.

Patented June 16th, 1885.

These scrapers are forged from the best steel and wrought iron—no castings to break—easily attached and removed from any street car without disfiguring or cutting the dash. They can be instantly applied to remove any obstruction on the track, or as quickly raised out of position.

They have the great advantage over all other scrapers of being controlled by the foot of the driver, allowing him the full use of his hands to handle the brake lines, make change, etc.

Having once tried them you will abandon all others.

H. H. LITTELL,
LOUISVILLE, KY.

"PAY HERE."

Fare Boxes and Change Receptacles for Street Cars.

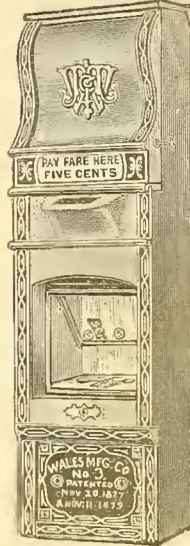
OUR NEW FARE BOX NO. 3.

The following are some points of superiority in this box over others:

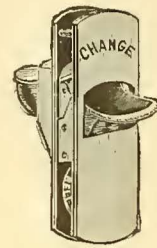
SIMPLICITY OF CONSTRUCTION, QUICKNESS AND CONVENIENCE OF CLEANING, SECURITY OF MONEY DRAWER, BEAUTY OF FINISH, and MUCH CHEAPER IN PRICE.

We have just added to this box a very valuable improvement, viz., a small mirror placed back of first slide or rest, which presents to driver's view the back side of fare as well as front, when resting on first rest. He can by this quickly detect any spurious or mutilated coin or ticket that may be split and put in box.

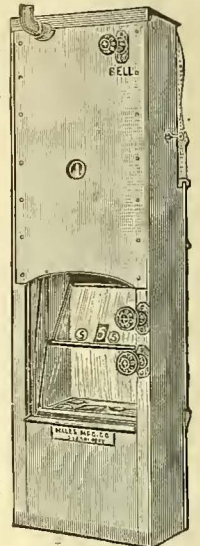
It often happens in all Fare Boxes, to the annoyance of driver and passenger, when several fares are resting on first slide, one or more coins are liable to be behind a ticket, and the driver cannot see them, and quite often a passenger is "rang up," when his fare is concealed behind the ticket, from the driver. This arrangement gives driver view of both sides of fare.



Box No. 3.
Front or Passengers' View.



The only satisfactory arrangement in use for making change with the driver.



Box No. 3.
Back or Driver's View.

Descriptive and illustrated circular on application. Get our prices before buying.

WALES MFG. CO., 76 & 78 E. Water St., Syracuse, N. Y.

THE BRYDEN FORGED HORSE SHOE WORKS

(Limited),

Catasauqua, Lehigh County, Penn.,

Are making a plain, narrow-webbed shoe, with beveled surfaces for Horse Railroad work. It is "FORGED" from the very best Iron, and is tougher and harder than any shoe heretofore made, and will be sold to consumers at a small advance on the prices charged for ordinary mill shoes. They also make a Calked Shoe with a Square Toe, just the same as hand made, and the company warrants them to wear as long as the very best hand work.

Among others who are using this Shoe, are the

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- Crosstown Railroad Co., Brooklyn, N. Y.
- Coney Island and Brooklyn Railroad Co., Brooklyn, N. Y.
- North Hudson County Railroad Co., Hoboken, N. J.
- Jersey City and Bergen Railroad Co., Jersey City, N. J.
- Ridge Avenue Passenger Railway Co., Philadelphia, Pa.
- Citizens' Passenger Railway Co., Philadelphia, Pa.
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- Second and Third streets Railroad Company, Philadelphia.
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Also fully prepared to furnish any kind, weight or shape of shoe desired. Estimates on cost of producing such special patterns will be furnished on receipt of model, with estimate of the probable number of kegs required.

The Rates of Freight are as Low from their Factory West and East AS THE LOWEST.

A Mild Tough Steel Shoe supplied at a small advance over Iron Shoes.

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INCORPORATED 1875.

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BUILDERS OF

Street Cars

OF EVERY STYLE AND SIZE,

For Horse, Cable or Other Motive Power.

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No rattle of glass. No mortises. Less wood. Less weight. Less breakage of glass. Brass corners, giving greater firmness and durability. 84 square inches more light in each opening, giving better appearance to car. Also the best floor rack in use.

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Of **T** patterns, weighing from 16 to 76 lbs. per yard. **CENTRE BEARING** Street Patterns, 42 to 60 lbs. per yard, **TRAM** Street Patterns 45 to 47 lbs. per yard, and Street Patterns for **STEAM ROADS**.

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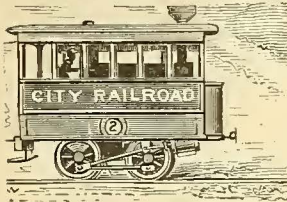
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BUILDERS OF

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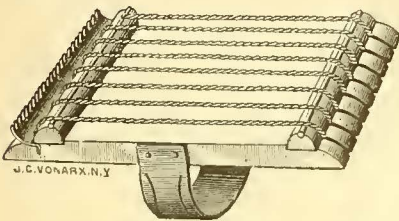
Enclosed Noiseless Motors for Street Railways.

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SPRING TOP UNIFORM CAP,**

Of Every Variety and Color. Not affected by wet, will keep their shape under all ordinary conditions. Manufactured in large quantities and shipped to all parts of the world.

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Best in the World. Can't Scratch or Hurt the horse. Cleans off mud and sweat with ease and rapidity. Most Durable and Lightest Comb made. Give it a trial. Needed in all CarStables.

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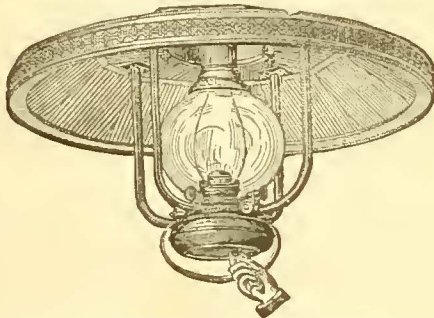
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Manufacturer of Railroad Centre Lamps and Reflectors

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STREET RAILWAY SUPPLIES

Of every Description, for Home and Export Trade.

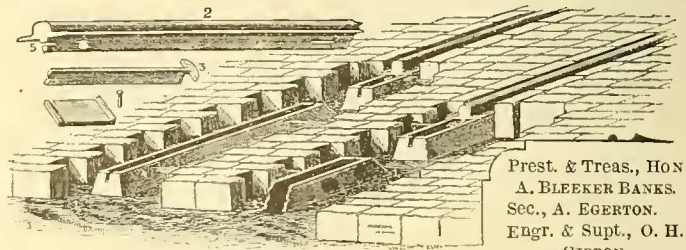
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**FINE COACH
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Bridgeport, Conn., U.S.A.



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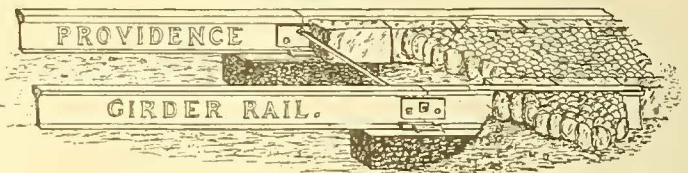
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Cheapest, quickest laid and most durable track known. Dispenses with all timbers, butts, spikes, knees, &c. Estimates for building and relaying street railway tracks and full particulars sent on application.

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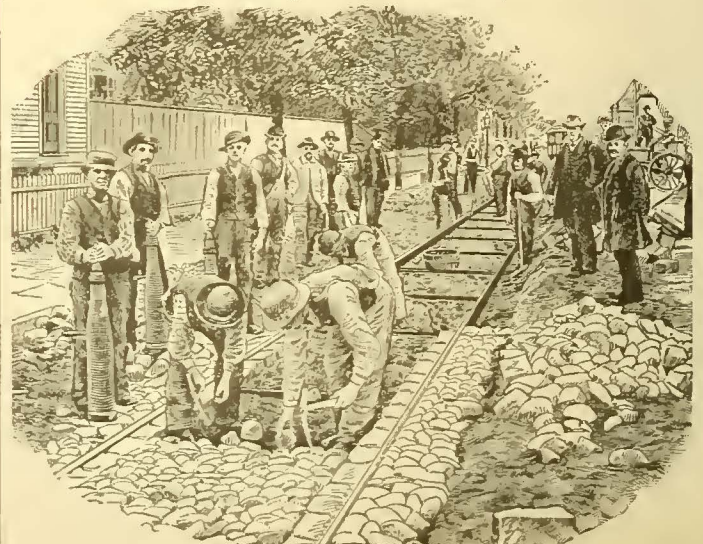


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The most permanent and very best form of railroad construction for public streets. Fully endorsed by city and town authorities. Send for circular.

Prices furnished on application to

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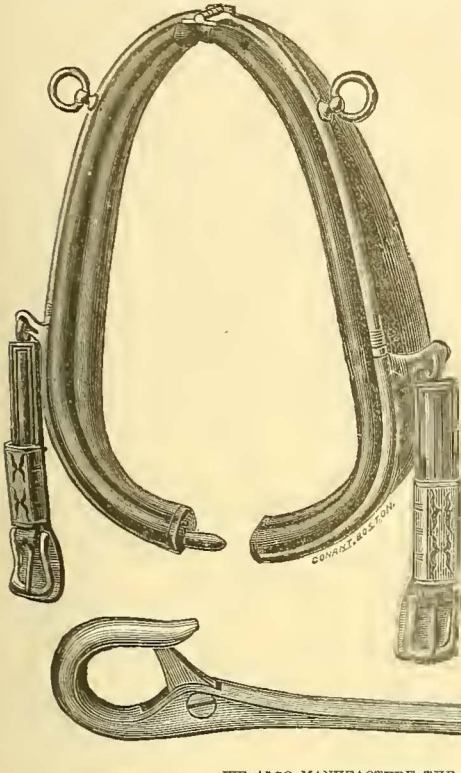
BERRY'S PATENT HARNES.

Lightness, Strength,
Durability, Quick-
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They have the advantage of easy adjustment. No buckles or straps are used. They can be applied in an instant, being fastened to the collar. The collar is divided and there is no strain upon the collar or the eyes of the horses.

In case of accident the whole harness can be removed at once.

They are adapted to the use of Fire Departments, Horse Railroads, Express Wagons, Teams and Light Carriages, and are in use in over one hundred cities and towns in the United States and Canadas.



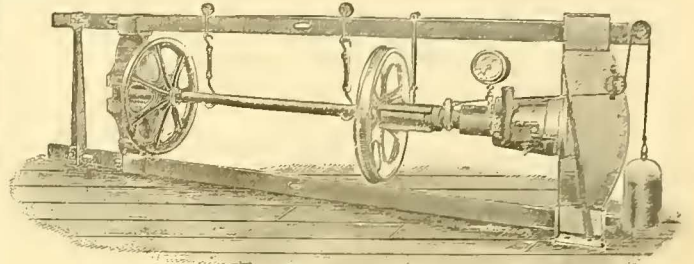
WE ALSO MANUFACTURE THE

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They are made of the best gun metal and malleable iron, with a brass spring which is inclosed in a water-tight socket and made rust and dust proof. It is an impossibility for it to become detached. Write for illustrated catalogue and prices.

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HAND POWER, LEVER AND HYDRAULIC PRESSES.



HAND AND POWER CAR-WHEEL PRESSES. (See page 197, July, 1885.)

Screw and Hydraulic Jacks.

WATSON & STILLMAN,
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FRED. J. KALDENBERG,

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VULCANIZED RUBBER CAR SPRINGS,

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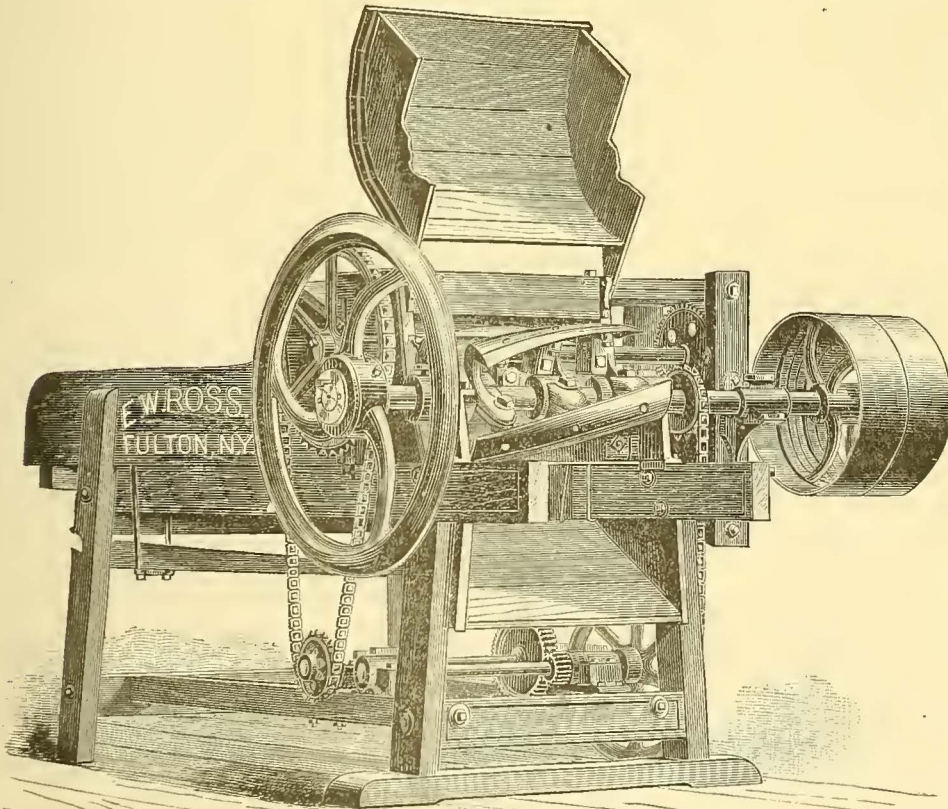
Correspondence Solicited.

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P. O. Box 91. Send for Price List.



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A FULL LINE OF CUTTERS BUILT EXPRESSLY FOR STREET RAILWAY BARNES.

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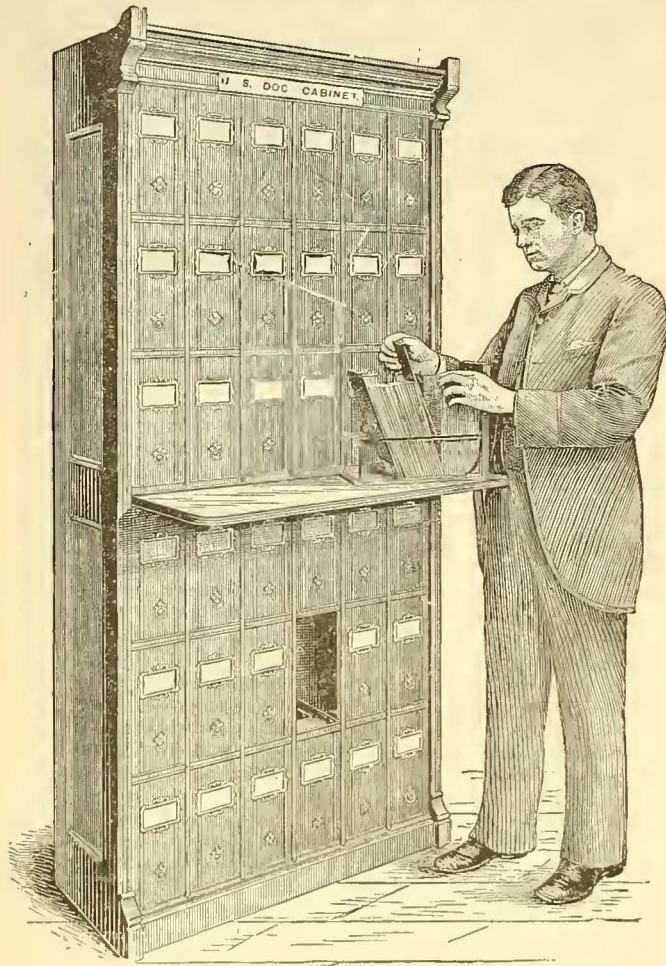
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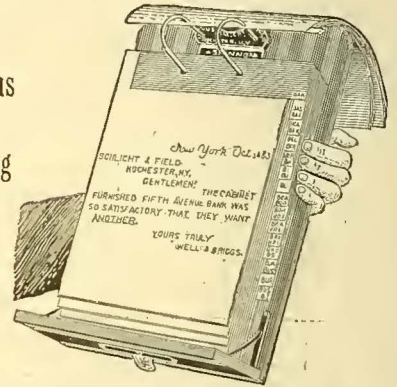
The most perfect systems in the market for filing all kinds of papers.



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WHEN DESIRED

We Combine Both Systems in One Cabinet.

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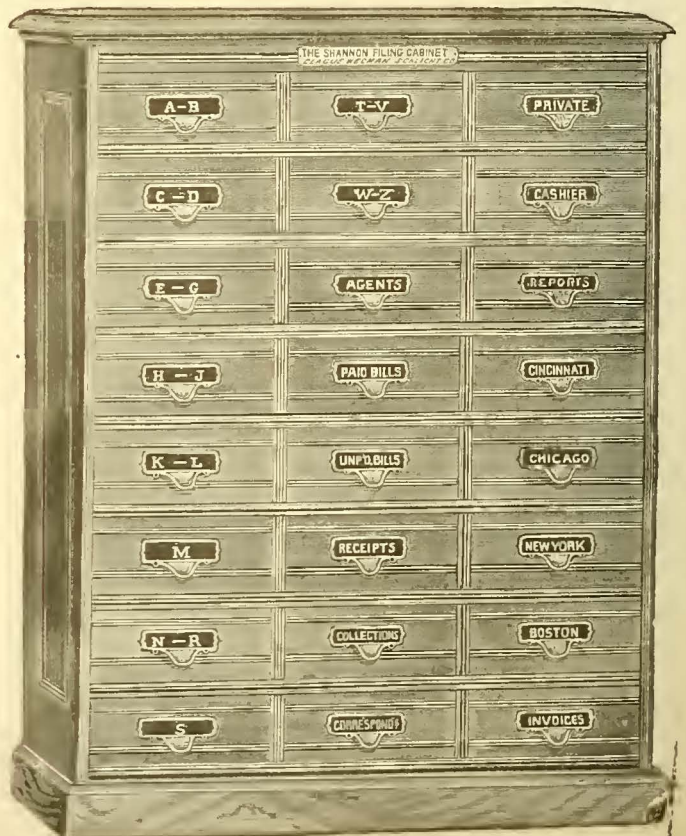
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13 Barclay Street, . New York,

PATENTEE AND MANUFACTURER OF

Graduated Street Car Springs.

RUBBER CONE.

Patented, April 15th, 1879.

ADAPTED TO THE

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BEMIS,

RANDALL,

HIGLEY,

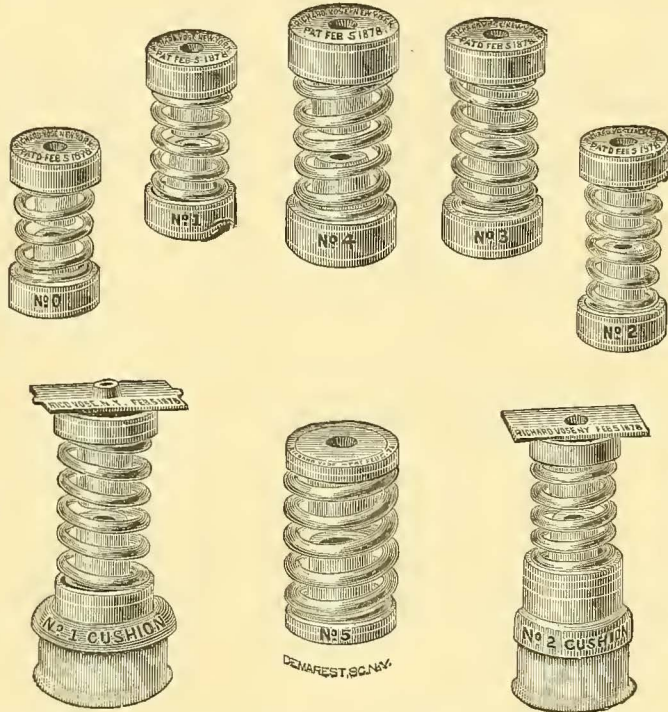
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14-ft. Cars.

TESTIMONIALS.

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RICHARD VOSE, Esq. Dear Sir,—We have had in constant use upon this road for several years the "Vose Graduated Spring," and they have given very general satisfaction. So much so that we shall continue to order them. Very truly,

CHAS. E. POWERS, Prest.

NO. CHICAGO CITY RY. CO., CHICAGO, ILL.

RICHARD VOSE, Esq. Dear Sir,—This company has had in use for the past seven or eight years your Patent Graduated Car Spring, and our experience leads us to the conclusion that they are all in every respect which you represent them to be. And certainly all that we desire. Yours Respectfully,

V. C. TURNER, Prest.

B'DWAY & 7TH AVE. R.R. CO., NEW YORK CITY.

MR. RICHARD VOSE. Dear Sir,—We have 125 cars equipped with your Graduated Springs. They have given entire satisfaction. They are undoubtedly the best in the market. Very Respectfully,

J. W. FOSHAY, Prest.

BROOKLYN CITY R.R. CO., BROOKLYN, N. Y.

RICHARD VOSE, Esq. Dear Sir,—Yours of May 27 to Mr. Hazzard, Prest., has been referred to me for reply. And would say that we have now in use about 600 sets of your Patent Graduated Car Springs. And up to date have given perfect satisfaction.

Yours truly, A. N. DICKIE, Supt.

CHICAGO CITY RY. CO., CHICAGO, ILL.

RICHARD VOSE, Esq. Dear Sir,—Replying to your favor of a recent date I beg to say that we have been

using your Graduated Car Springs since 1881 and have increased the number, until at the present time we are using 369 sets, and the same have invariably proved satisfactory. Yours truly,

C. B. HOLMES, Supt.

CAMBRIDGE R.R. CO., CAMBRIDGE, MASS.

COL. RICHARD VOSE. Dear Sir,—We have used your Graduated Street Car Springs for several years and I need only say with such success that we continue to use them. Very Respy,

W. A. BANCROFT, Supt.

CINCINNATI I. P. R.R. CO., CINCINNATI, O.

RICHARD VOSE. Dear Sir,—Send us 6 more sets of your new pattern Car Spring, same as the lot we ordered of you last Sept. in every way. This is the best answer we can make to your question of "How we like them." Yours truly, J. M. DOHERTY, Supt.

LYNN & BOSTON R.R. CO., CHELSEA, MASS.

RICHARD VOSE, Esq. Dear Sir,—All I can say in favor of the Vose Spring is that we continue to apply them to most of our new cars. Have about 60 cars equipped and think very well of them. If they could be produced for less money should think better of them. Very Respectfully Yours, E. C. FOSTER, Supt.

CREAM CITY R.R. CO., MILWAUKEE, WIS.

Gentlemen,—Yours of May 28 at hand, with regard to your Car Springs. We find they are the best in use. They come a little higher than the Barrel Spring, but they are much the better springs.

Yours truly, H. J. C. BERG, Supt.

LOWELL HORSE R.R. CO., LOWELL, MASS.

TO WHOM IT MAY CONCERN: We have used the Richard Vose Graduated Car Springs for several years, and are well pleased with them. Should be unwilling to change them for any other. All of our cars use these springs. Yours Respectfully,

J. A. CHASE, Treas.

DAYTON STREET R.R., DAYTON, O.

MR. RICHARD VOSE. Sir,—We have eighteen cars equipped with your Patent Graduated Springs, and will use your springs to replace all other kinds as fast as repairs are needed. Your springs give the best satisfaction to our company and patrons of any that we have ever tried.

Yours Respectfully, A. W. ANDERSON, Supt.

FT. WAYNE & ELMWOOD RY. CO., DETROIT, MICH.

RICHARD VOSE, Esq. Dear Sir,—For the past four years we have been using your Graduated Springs on all of our cars (30). Our Superintendent says that none of them have ever had to be repaired and that they are the best springs we ever used.

Yours truly, N. W. GOODWIN, Secy.

DETROIT CITY RY., DETROIT, MICH.

RICHARD VOSE, Esq. Dear Sir,—I have your favor of the 29th ultimo. We have about 70 cars equipped with your springs. Our experience is that they wear well and give general satisfaction.

Yours truly, GEO. HENDRIE, Treas.

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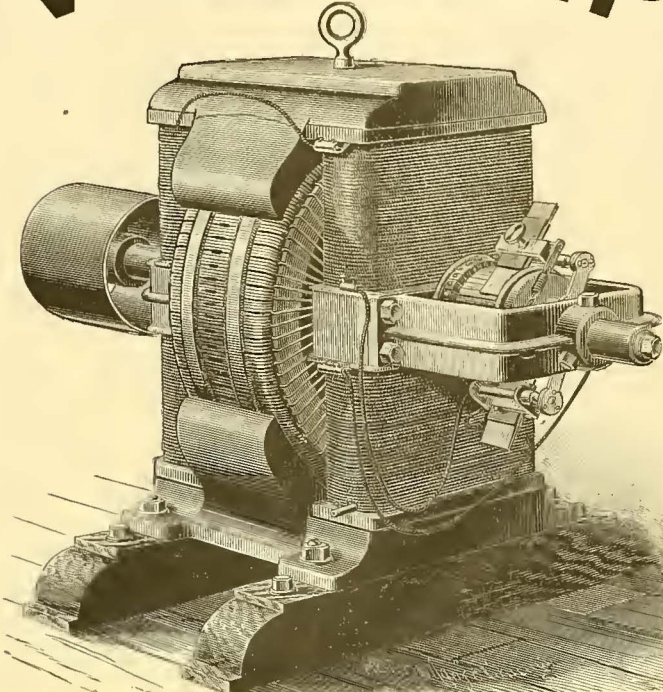
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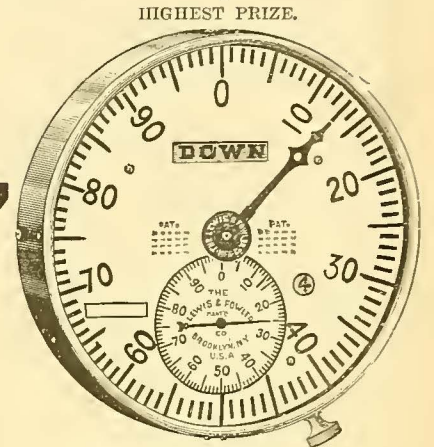
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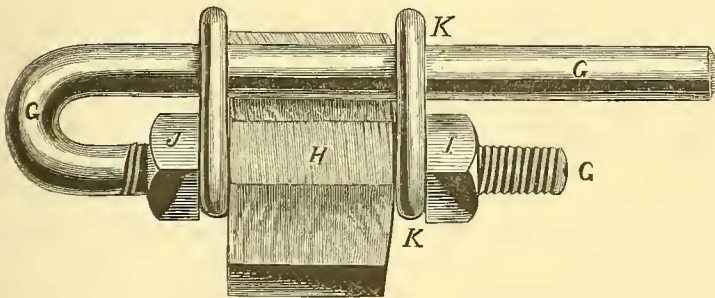


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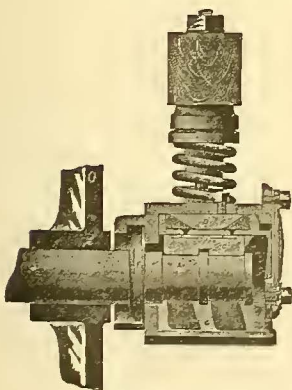


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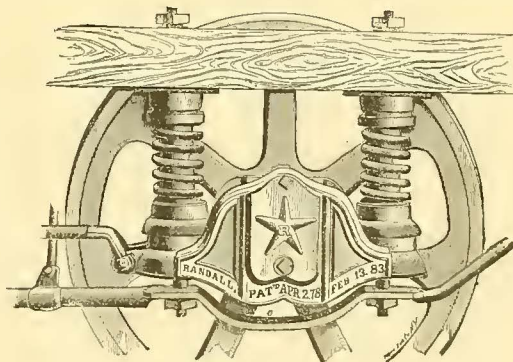


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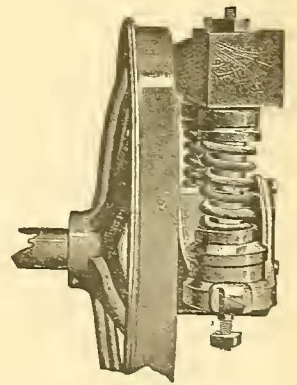
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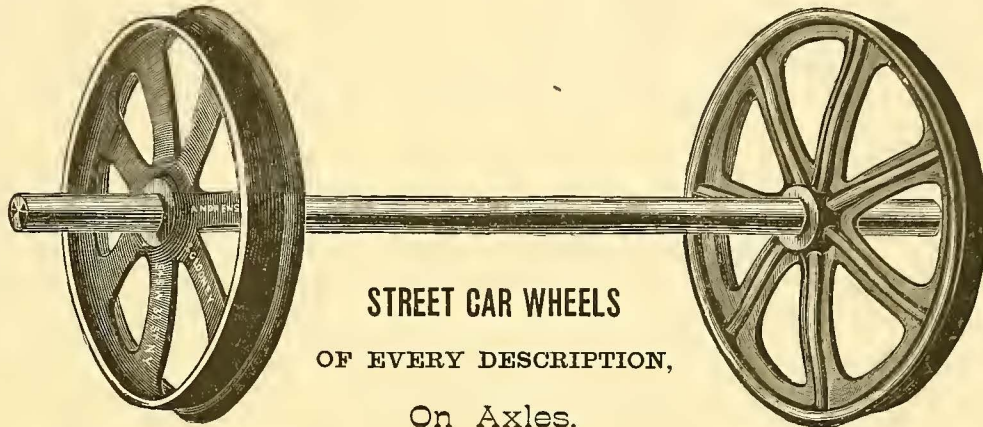
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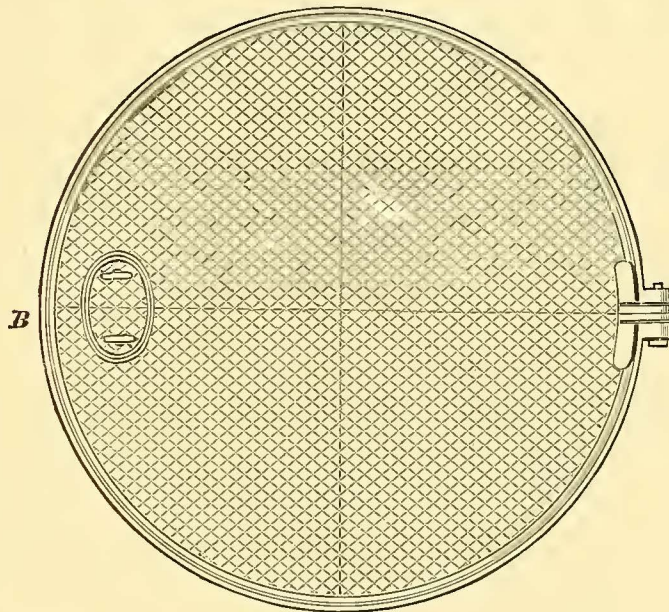
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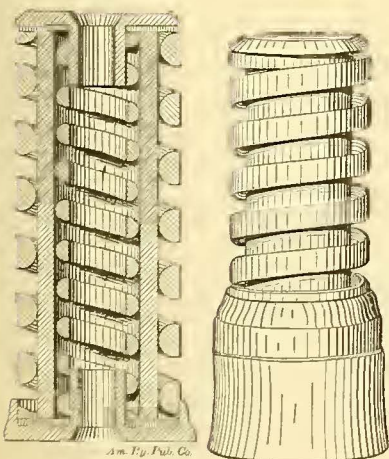
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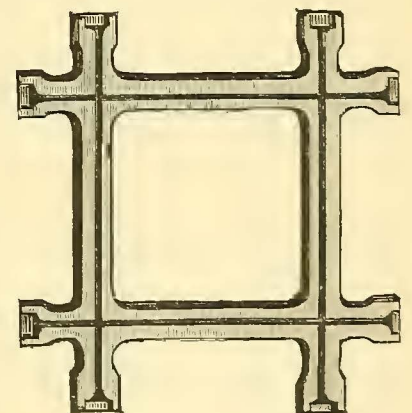
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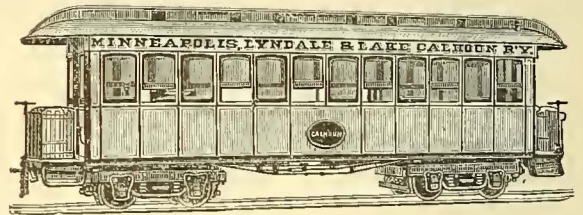
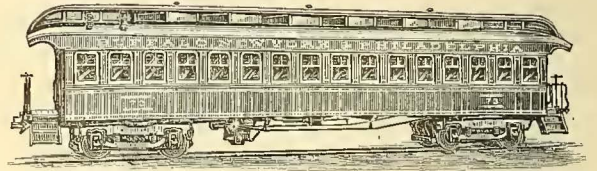
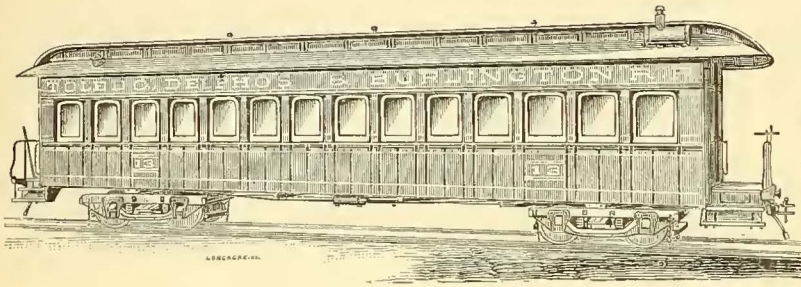
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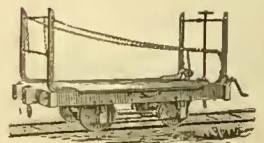
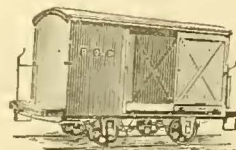
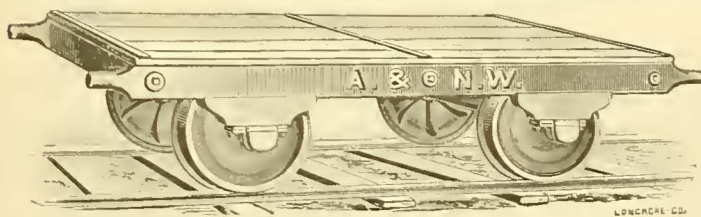
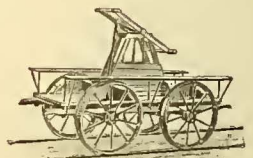
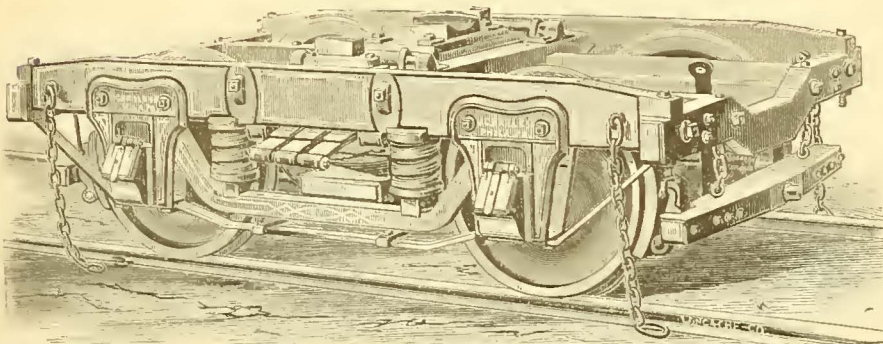
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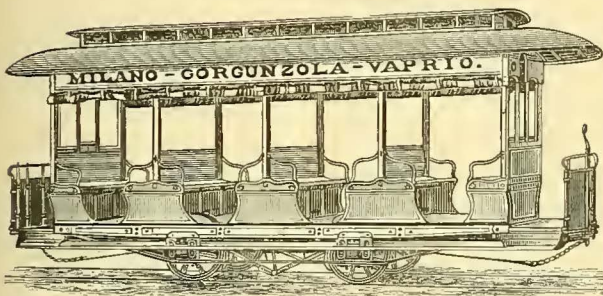
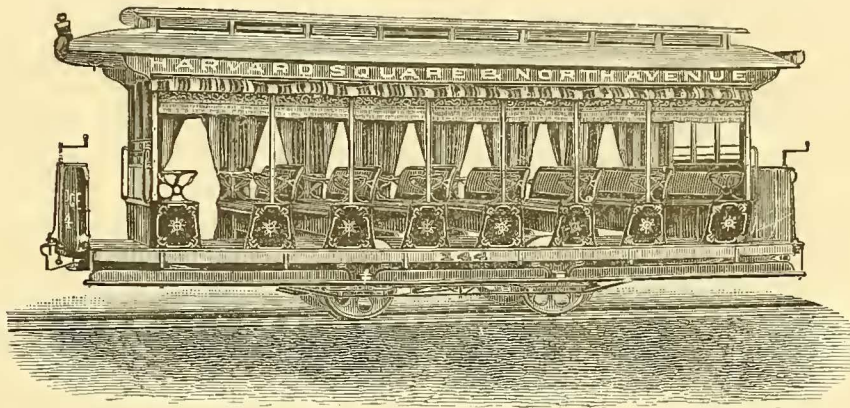


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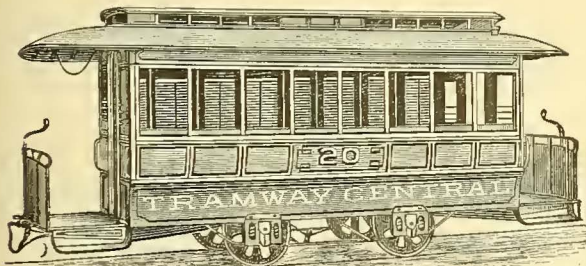
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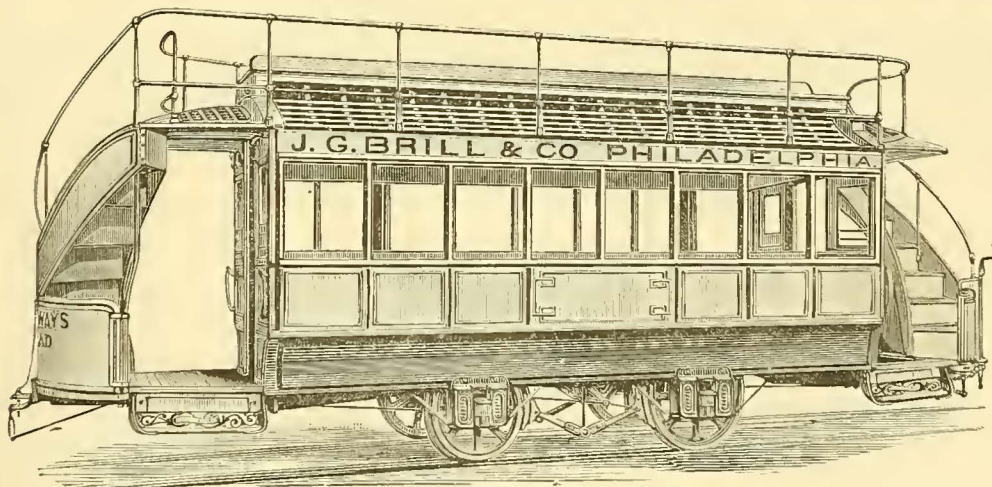
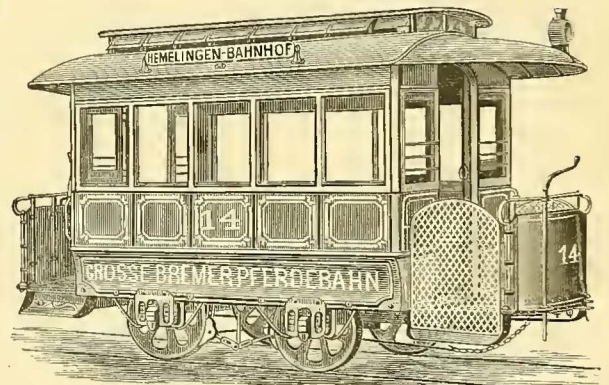
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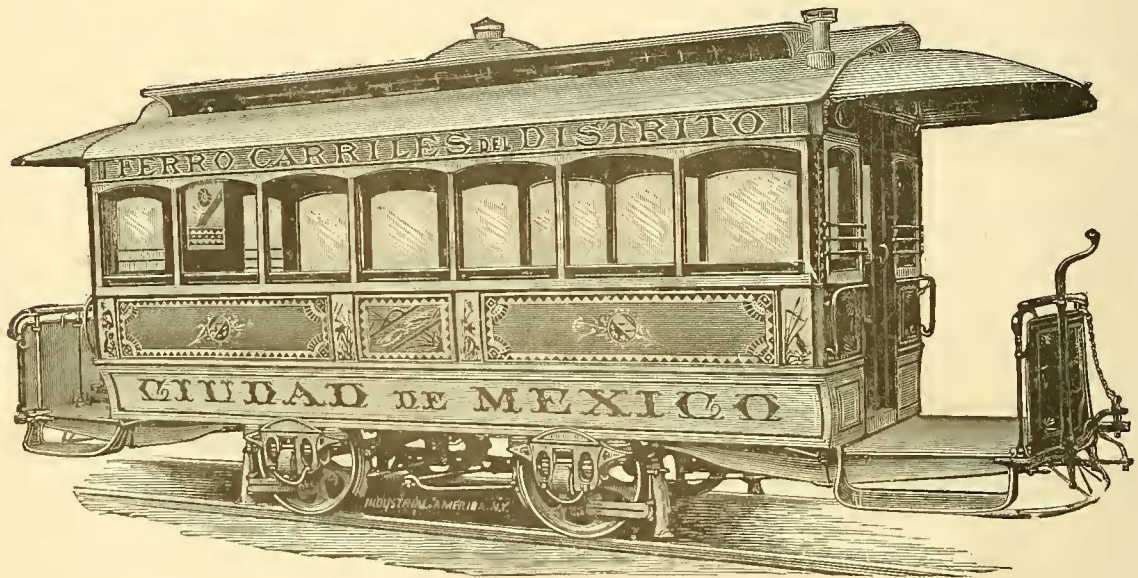
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