

OLD TIME  
PICTURES

# THE STREET RAILWAY JOURNAL

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## The Appleton Electric Railway.

The two views that we present in this connection are taken from photographs of two sections of the electric railway that is now in operation at Appleton, Wis., on the Van Depoele system.

In connection with this road there are a few features that will not be found upon all roads of this kind. The power for generating the electricity is obtained from two

it is possible for a traveling contact to pass over the wires uninterruptedly from end to end of track. This traveler, running upon the overhead conductors, brings the current to the motors in the cars by means of a double flexible cable, the latter being so arranged that it can readily be transferred from one car to another. In order to effect this, the cables hanging from the travelers on the overhead wire are fastened with their lower terminals to a cross bar made

ent case the motors are placed on the front platform of the car, so that the driver can sit near the motor and have at once full view of the road upon which he is running. As the motor is placed upon the front platform of the car, it is at all times under the eyes of the driver. This enables him to take good care of the machine and to see that all working parts are in good order and kept clean. From this point he can also attend to oiling of the shafts, etc ,



THE APPLETON ELECTRIC RAILWAY. FIG. 1.

turbines coupled together, and which are capable of developing 100 horse power. They are used to run a 60 horse-power dynamo.

The electric current so generated is conveyed by means of two heavy copper wires up to the overhead wires for a distance of about one mile. Here the feeders are electrically connected to the double overhead wires, these being placed over the center of the track, about eighteen or twenty feet from the ground, and forming an exact counterpart of the track below. These overhead conductors are so suspended that

of some good insulating substance. To the center of the crossbar is attached a handle, and if the handle be grasped the terminals of the cables can be hooked into two corresponding sockets, fastened to the under side of the roof on the front end of the car. From these sockets the current is led by means of insulated copper conductors to the motor and to a switch, and, in the usual way, by turning the handle either to the right or to the left, more or less current can be sent through the motor, or be altogether shut off when the car is to be stopped. In the pres-

so that there is no reason to neglect any important work.

The motor is illustrated in Fig. 3, and is a very substantial machine although the design is very plain. The commutator brush holder is provided with two pair of brushes, and is so arranged that by turning the handle either to the right or to the left the motor can be run back or forward. On starting a car the driver turns on the current gradually until the maximum speed of the car is obtained, a speed which, for street cars, is ordinarily from six to eight miles per hour.

In the present plant five motors, one of 12 horse-power and four of ten horse-power, are connected as follows: From the armature shaft of the motor a phosphor bronze pinion meshes perfectly in a large gear wheel carried underneath the motor by a solid steel countershaft. Mounted upon the latter are two sprocket wheels, corresponding to two other sprocket wheels

usually succeeded, six years later, in working trains between Washington and Bladensburg, over a line of five miles in length. The speed was only 19 miles an hour, and the undertaking was commercially a failure, owing to the great cost of producing the electric current which worked the motor.

For the time being the subject dropped

practical effect was that henceforth the transmission of power, not only between two fixed dynamo machines, but also between a fixed dynamo machine and a train in motion, has become possible. The actual development of electric railways has, however, only taken place within the last five or six years, and now there are both in Europe and in America many lines worked by electricity.

There are two ways in which an electric railway can be worked. We may either utilize the ordinary rolling stock, and replace the steam locomotive by an electric locomotive, or we may provide each passenger coach and each goods wagon with its own small electromotor, so that each vehicle becomes its own locomotive. In the latter case, the power is applied to each axle in the train, and the whole of its weight is utilized in producing adhesion. Of the difficulties connected with the conveyance of current to the train, and of those which at present stand in the way of an economical and certain method of regulating the speed, we shall speak presently. But, supposing that these difficulties can be overcome, it will be admitted that electric traction, especially when carried out on the latter plan, has many advantages over steam traction.

By making every wheel in the train a driver, the acceleration at which the train can start is greatly increased. There would be no difficulty in obtaining a speed of 30 miles an hour within 10 seconds from the moment of starting, and the strain due to inertia would not be greater, nor the sensation to passengers more disagreeable, than is the case now, when trains are stopped quickly by the application of powerful continuous brakes. In all probability strain

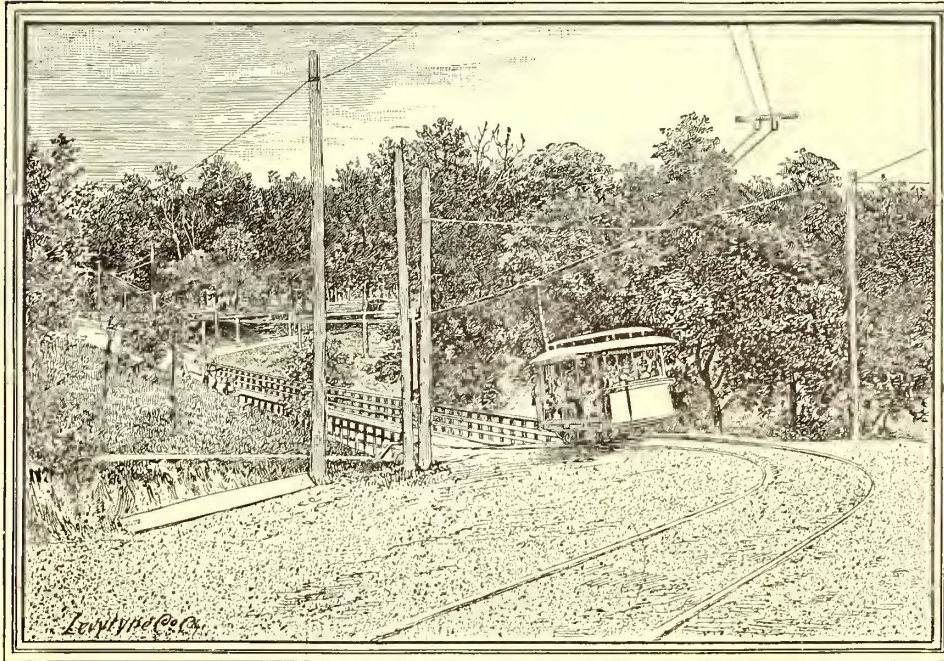


FIG. 2.

fixed solidly to the forward axle of the car; upon these sprocket wheels runs a specially made steel belt, so that on starting the motor the armature shaft revolves its pinion upon the large gear placed upon the countershaft, and the latter communicates motion to the axles of the car by means of the intervening sprocket wheels and steel belts. The grade varies from six to nine per cent and in one place a sixty-foot curve occurs on an eight per cent grade; there are numerous curves forty to fifty feet radius. The views are taken from photographs.

The officers of the road are: President, J. E. Harriman; Vice President, N. B. Clark; Secretary, T. W. Orbison; Treasurer, Jos. Koffend.

### Electric Railways.

The proposal to use electricity as a source of energy for working railways is very old. With whom it first originated will perhaps never be known, but it is probable that Professor Henry's "electric engine," which was invented in 1833, and especially Jacobi's famous experiment in 1839, which showed to the world that electricity could be used to propel a boat, directed public attention for the first time to the question of electric locomotion. This seems the more likely, as the first patent for an "electric railway" dates from 1840, and was granted by the United States Government to Henry Pinkus, who seems, however, not to have developed his invention. We hear nothing more about electric railways until the year 1845, when Professor Page invented a new electromotor, by the aid of which he act-

out of sight, and has only been revived during the last few years. This revival is in a great measure due to M. Fontaine's discovery—made at the International Exhibition in Vienna, in 1873—that, by the aid of two dynamo machines and connecting cables,

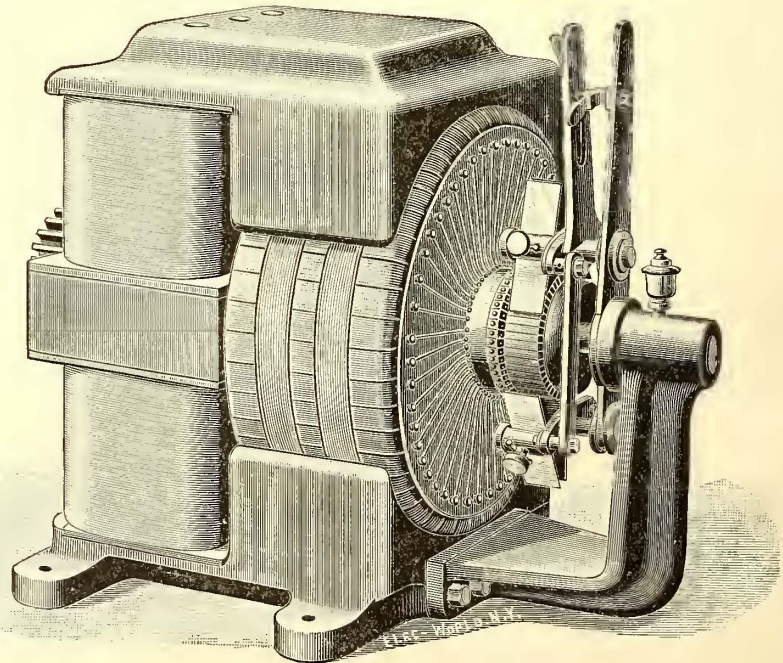


FIG. 3.

motive power could be transmitted over a considerable distance. Whether this discovery was purely accidental, or whether it was the legitimate and logical result of scientific investigation, is to this day a moot point; but whatever be its history, the

and sensation would be less, because no jarring, as with a brake, would take place. This is a point of great importance for metropolitan railways, where trains succeed each other every few minutes, and where the time wasted to get up speed at every

start is a considerable item in the total time required for the journey. On underground lines, the absence of smoke would also be an enormous advantage, resulting in a large increase of passenger traffic. We may here at once remark that the difficulties connected with the conveyance of electricity to the trains are the greater, the longer the line and the fewer the trains which run over it per day. On a short circular line like the Metropolitan Railway, the amount of traffic is so great, that it would pay to place the engine and dynamo almost at every station, and thus reduce the distance through which the current has to travel before it reaches the train, to a few hundred yards. By providing each coach with power, trains can be made up of as small a number of coaches as convenient, and thus a frequent service

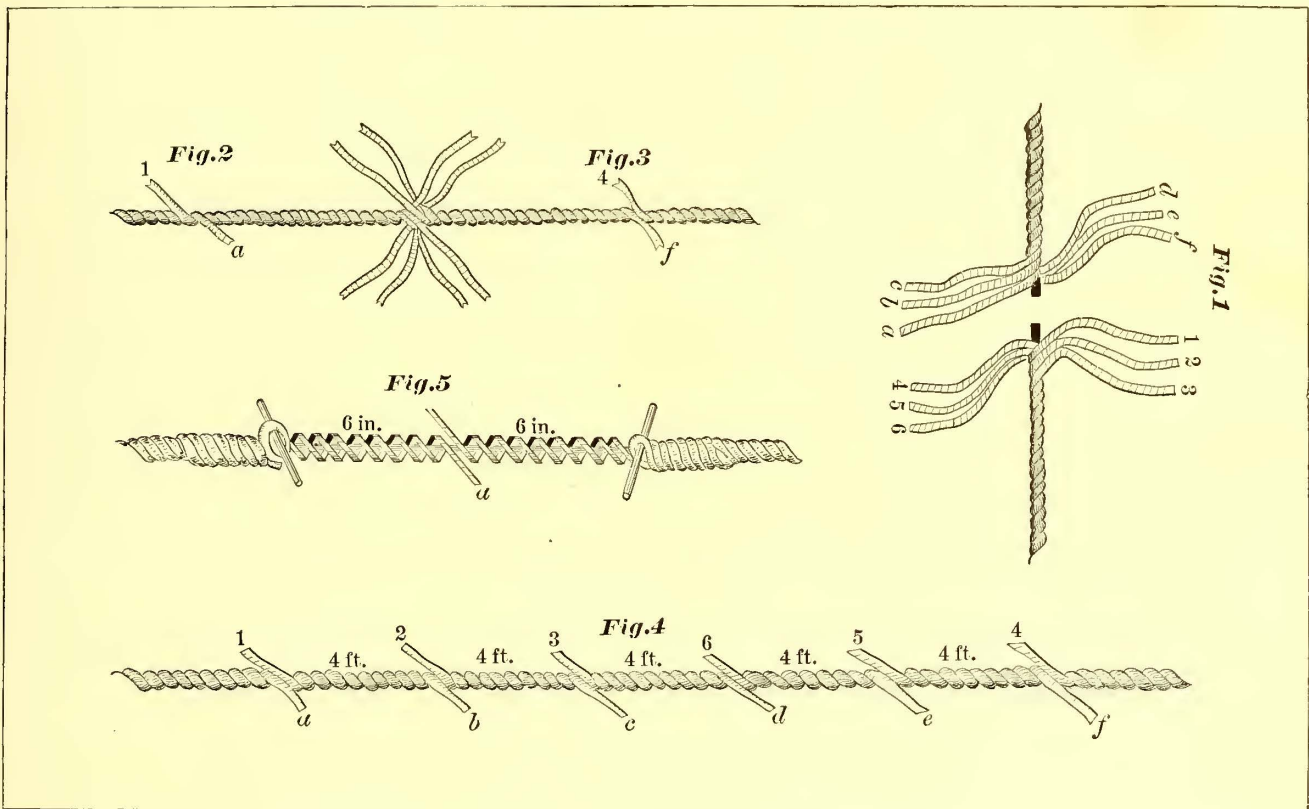
electric railways intended for passenger traffic, and, if added to the ordinary block system, would render collisions almost impossible. Since electromotors contain no parts having a reciprocating motion, such as the piston and connecting-rod of a steam engine, they can run at any speed without oscillation.

There is, consequently, nothing to limit the speed of an electrically-propelled car but the tensile strength of the wheel tire, which, under the action of centrifugal force, might burst if its circumferential speed exceed a certain limit. We may mention here, in parenthesis, what is doubtless known to our engineering readers, viz., that this limiting speed does in no way depend on the diameter of the wheel, but simply on the tensile strength and specific

a 40 ton engine pounding along. Now, it might be asked—How is it that, with all these advantages in favor of electric traction, our railways, and, indeed, those of the whole world, are still worked on the train system by steam locomotives?

The answer to this question is, that up to the present no satisfactory solution has been found for the three great difficulties which stand in the way of applying electricity to railway purposes.

These are, first, the difficulty of conveying the electric energy to the train; secondly, the weight and high speed of electromotors as at present constructed; and, thirdly, the want of some contrivance by which the speed and power of electromotors could be varied in a simple and economical way.—“Industries.”



METHOD OF MAKING A CABLE SPLICE

of short trains can be substituted for the present service of heavy trains at longer intervals—a decided advantage from the passenger's point of view. Another very important advantage is that of almost perfect safety. The late Professor Fleeming Jenkin, when working out the details of his Telpher Line, devised, with the assistance of Professors Ayrton and Perry, an automatic electrical block system, which is intended to prevent one train from overtaking another. As soon as a train enters on a section which has not yet been cleared by the preceding train, the current is automatically withdrawn from the electromotor of the second train, and thus the latter stops for want of propelling power. The first train, in clearing the section, restores the current to the second train, and thus allows it to proceed. Some such arrangement could, no doubt, be adopted on elec-

tricity of the metal. For good steel, the safe limiting speed is considerably over 100 miles an hour, and it is therefore by no means impossible that about double the present speed of traveling might be obtained in future on electric railways. Speaking on this point at the Society of Arts in 1883, Professor Forbes said that he hoped to live to see the day when he could travel from London to Edinburg in three and a half hours.

With these remarks we have not yet exhausted the list of advantages possessed by electrically-propelled coaches over the usual system of trains drawn by steam locomotives. The permanent way, bridges, and viaducts may be built altogether lighter, steeper gradients and sharper curves may be used, and the wear and tear of the road must necessarily be less with light, smooth running electromotors, than with

Wire Rope Splice.

In view of the discussion which has been running in the last few numbers of the STREET RAILWAY JOURNAL regarding the method of splicing cable such as are used for car traction, it will be interesting to note the construction and method used by Messrs. John A. Roebling & Sons in their own practice, and to whom we are indebted for the engraving used in this connection. The splice is, in reality, nothing more than what is called the long splice with manilla rope.

That is, the cable is unrolled back for some distance on both ends, and one strand laid back still further, into which the corresponding section from the opposite end is laid. The tools required are merely one pair of nippers which are used in cutting off the end of the strand; a pair of pliers

o pull the ends of the strands down and raighten them, a stick to open them, and a knife for cutting the core. In the rope nippers are sticks to twist the rope, and a wooden mallet for driving the strand home to place.

The first step to be taken is to haul the two ends taut with a block and pulley until they overlap each other about twenty feet.

Next, the strands on both ends of the rope are opened for the distance of ten feet each, cutting off both hemp cores as closely as possible, as shown in Figure 1. The open bunches of strands are then brought face to

groove of strand *a*. The same course is pursued with two other strands, and one from each end, except that the stopping point is made four feet from the end of the first set, and the third set stopping four feet from the second set. The strands are now laid into each other's places, with the exception of the ends fastening to each other at least four feet apart, as shown in Figure 4. These ends must now be secured and disposed of in such a way that the diameter of the rope may not be increased, its strength remain unimpaired, and so that the ends will not be lifted up or un-

may occur may be taken out by beating the rope with the wooden mallet. The rope nippers are then shifted to each of the other five places in succession, and after the rope has run for a day it will be impossible to detect the locality of the splice, as there are no ends turned under to stick out and the rope is not increased in size, and it is never appreciably weakened in strength. Of course these rules can be applied only to those ropes which have a hemp core, but as this method of manufacture is almost universal with wire ropes, and is quite so with those of the larger size, the method is thoroughly applicable in any case that can arise. The ropes, however, which do have wire centers may be spliced in the same manner as hemp rope by putting in long splice, although, of course, the appearance is not so neat as that of the splice we have just described, and can be more easily detected. The usual method of indicating this splice is to paint it white, or some color, so that the eye can readily catch the place; then, of course, an examination will show where the rope ends are tucked under.

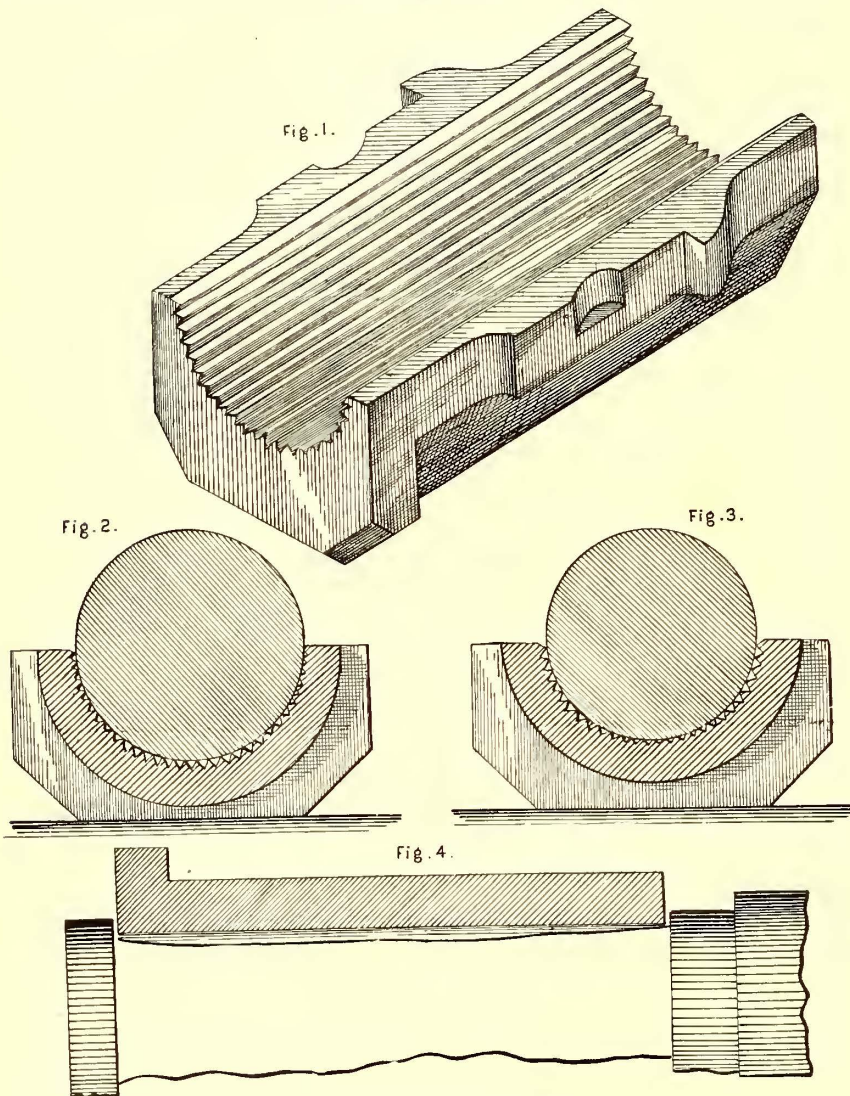
#### Atlas Bronze Bearing.

It is a well-known source of trouble that car-bearings when new seldom conform to the axle, causing much frictional heat and causing great delay. The want of proper fit gives the journal an irregular bearing which speedily destroys both. The object of this invention—an anti-friction, self-fitting journal bearing,\*—is to provide a bearing that will in a very short time fit itself to a journal in use and come to the exact degree of closeness that will enable the axle to move without undue friction. It is claimed that this bearing will readily adapt itself to a journal of different radius, or worn or uneven surface, and afford means for proper lubrication.

Figure 1 represents a bearing comprising the improvement. Figure 2 is a journal having a greater radius than the bearing, showing the advantage of the bearing. Figure 3 is a journal with less radius, showing the manner in which it wears the bearing. Figure 4 shows a journal presenting an uneven surface to the bearing and the manner in which it conforms itself and forms reservoirs along the same for lubricating fluid. The grooves wearing rapidly away allows the journal to find a true bearing in a very short time, the intervening grooves being such as to prevent heating by allowing a passage way for the oil until it gets down to its true bearing. The manufacturers fully guarantee them not to heat or cut, and to wear longer than any other bearings, and to give better results and satisfaction. It has been fully and thoroughly tested.

\*Atlas Bronze and Tuyere Co. Ltd., Pittsburg, Pa.

It has been decided that the Broadway Surface R. R. Co. has no existence and cannot be taxed; that its personal property is in the hands of Receiver O'Brien, and must be taxed in Dutchess County, where he resides.



ATLAS BRONZE BEARING.

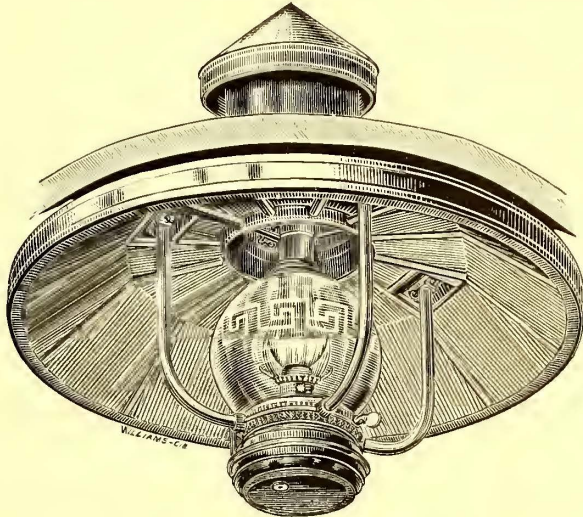
face so that the opposite ones interlock regularly with each other.

The strand marked *a* is then unwound, followed up with the strand *b* of the opposite end, laying it tightly into the open groove left by the unwinding of *a* and making the twist of the strand agree exactly with that of the open groove, until all of *b* is laid in and *a* has become twenty feet long. Then cut off *a* within six inches of the rope, as shown in Figure 2, leaving two short ends which must be tied temporarily. The next step is to unwind a strand from the opposite cable, as No. 4, and this must be followed up with the corresponding end, which in the case in point would be strand *f*, which is laid into the open groove in the same way in which strand *b* was laid into the open

raveled by any action or grip, or other appliance which may be brought in contact with the cable. Two nippers are then brought round the wire rope about six inches on each side of the crossing point of two strands, the stick is inserted through the loop, and they are then twisted in opposite directions, thus laying open the rope, as shown in Figure 5. The core is now cut six inches from the left, and the end of *b* stuck under *a* in the place occupied by the core. The core is then cut in the same way on the right, and *a* is stuck into the core in this way in that position, care being taken that the ends of the strands are straightened out before they are stuck in. The rope nipper is then loosened and the wire rope allowed to close. Any slight inequality that

**Post's Center Lamp.**

The new feature in the lamp\* illustrated in this connection consists in the ring that is placed at the bottom to hold the oilpot. Besides this, the lamp has the usual reflector at the top and this may, of course, be made in any style that may suit the road for which it is intended; though it is represented in this case as the corrugated



POST & CO.'S CENTER CAR LAMP.

reflector. Ventilation is secured at the top through the roof; and the oilpot and attachments are secured to the roof by ordinary brackets.

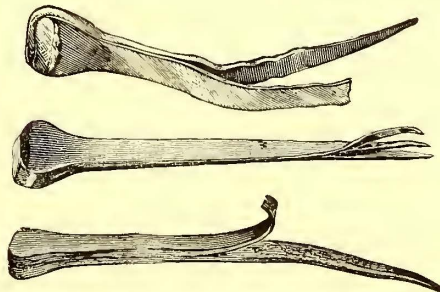
\*Post & Co., Cincinnati, O.

**How to Tell a Horse's Age by the Teeth.**

At three years old the horse should have the central permanent nippers growing, the other two pairs wasting, six grinders in each jaw, above and below, the first and fifth level, the others and the sixth protruding. The sharp edges of the new incisors will be very evident, compared with the old teeth. As the permanent nippers wear and continue to grow a narrow portion of the cone-shaped tooth is exposed by the attrition of the teeth on each other. The mark will be wearing out; the crowns of the teeth will be sensibly smaller than at two years. Between three and a half and four years the next pair of nippers will be changed, the central nippers will have nearly attained their full growth, a vacancy will be left where the second stood, and the corner teeth will be diminished in breadth, worn down, and the mark in the center of the tooth will become faint. The second pair of grinders will be shed. At four years the central nippers will be fully developed, the sharp edge somewhat worn off, and the mark somewhat wider and fainter. The next pair will be up, but they will be small, with a mark deep and extending quite across them. The corner nippers will be larger than the inside ones, but smaller than before and flat, and the mark nearly effaced. The sixth grinder will have risen to a level with the others, and the tushes will begin to appear. At five years the horse's mouth is almost perfect. The corner nippers are quite up, the long, deep mark irregu-

lar in the inside, and the other nippers will bear evident tokens of increased wear. The tushes are nearly grown, the sixth molar is up and the third molar is wanting. This last circumstance will prevent the deception of attempting to pass a late four-years-old as a five-years-old. At six the mark on the central nippers is worn out. At seven years the mark is worn out in the four central nippers and fast wearing away in the cor-

ner teeth. The tushes are rounded at the points and edges and beginning to get round inside. At eight years old the tushes are rounded in every way; the mark is gone from the bottom nippers. There is nothing remaining in them that can afterward clearly show the age of a horse. After this the only guides are nippers in the upper jaw. At nine years the mark will be worn from the middle nippers, from the next pair at ten, and from all the upper nippers at eleven years. At nine years the center nippers are round, instead of oval. At ten years the others begin to become rounded; at eleven years the second pair are much rounded; at thirteen the corner ones have the same appearance; at fourteen the face of the center nippers become somewhat triangular; at seventeen they are all so.—Harness.

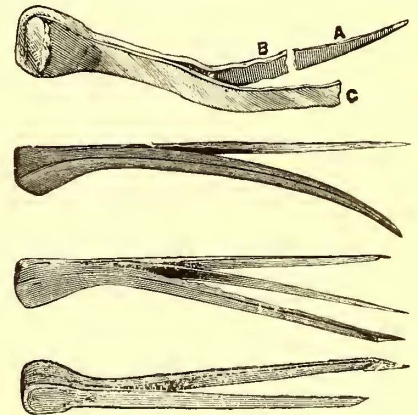


**The Manufacture of Horse Nails.**

Undoubtedly many of our readers can recall the times in their boyhood days when they have stood around the village blacksmith's anvil and watched with wondering gaze the operation of drawing to a point and the shaping by skillful blows the blazing nail rod, and dodged the sparks that flew from beneath the hammer—especially if they happened to have been barefooted urchins.

Many of these same readers would now be equally charmed and astonished should they visit the extensive works of the Putnam Nail Company at Neponset, Mass., and see a large room full of wonderful machines, each performing automatically the same work done by the blacksmith, but with far greater precision and a hundred times greater rapidity. The nail rods are coiled upon reels, from which they are fed into the machines automatically, passing through jets of burning gas, which heats the iron uniformly to a welding heat, in which condition the hammers take it and forge it into the required shape and cut it off. Each machine turns out about sixty nails per minute. These nails are then thrown into a bath of cold water, no acids being used, to remove the scale, and from this into a tumbler or revolving cylinder that wears them smooth. They are then passed through another machine that strikes the blacksmith's last blow, and gives to the points a bevel to turn them outward when driven into the horse's hoof. This ingenious machinery, the patents on which are controlled by this company, gives them an immense advantage over all competitors by enabling them to produce, at low cost, a hot-forged and hammer-pointed nail equal in every particular, and superior in some respects, to the best hand-made nail a blacksmith can produce. This company has already attained a world wide reputation, and their nails are used and recommended by the most noted farriers in foreign lands, as shown by numerous testimonials.

While good nails may be made by other machines and different processes, there is always a liability, which no owner of a valuable horse would willingly take if he knew the danger, of iron becoming laminated, cracked or splintered by rolling and punching or shearing, so that when a nail is driven into the hard and horny substance of a horse's hoof it will split, and a sliver may penetrate to the quick, causing serious damage, as shown by the following cuts representing nails said to have been taken



from the hoofs of horses in different parts of the country.

Out of the six tons a day produced by the machines and over three hundred operatives of the Putnam Nail Company, probably not one nail will ever be found to split or crack in driving, as there never has been since the organization of the company in 1859. Persons interested in the care and protection of horses' feet will do well to call on Mr. Whitmarsh, the genial manager at the works, who will take pleasure in showing them through the factory and explaining the process of manufacture.

### Horse Shoeing.

EDITOR STREET RAILWAY JOURNAL:—

One of the most important things in the management of horse railroads and one that should receive the most careful attention from superintendents and proprietors, is the shoeing of their horses, for the least soreness or tenderness of a foot prevents a horse from exerting his full strength and applying his full power to his work. This being a recognized fact it is plain that any defect in the form or material of which the shoe is made or in the nails used, or want of skill or knowledge on the part of the shoer, must be a fruitful source of loss in the operating of a horse railroad and sufficient to justify the managers in employing the most reliable workmen and procuring for them the most approved materials regardless of any slight difference in the cost. The shoe best adapted to horse railroad purposes in paved streets is a heavy plain shoe without calks and having the nail holes punched deep and beveled to permit the nail to be driven well in, insuring a firm fastening and reducing the strain on the nails. The shoes should always be fitted to the foot and not the foot to the shoe as is too often practiced.

The bearing should come around the outside of the foot for about half an inch and in order to prevent the concussion which would otherwise take place the frog should never be cut away but allowed to come to the ground. The misfit of a shoe or an imperfection in or careless driving of a nail often causes a lameness which although it may be very slight will necessitate the withdrawal of the horse from one or more trips, thereby causing a loss that might have been prevented by proper care and skill but cannot always be remedied by re-setting the shoe, especially if the lameness is caused, as it sometimes is, by the splintering of a nail of cheap quality of iron and improper manufacture, and a sliver penetrating to the quick. The numerous well authenticated cases of valuable horses having been ruined by the use of cold rolled cut nails should be enough to deter every horse owner from allowing the use of any but hot forged nails made from the very best Swedes iron.

A pernicious custom has been adopted by some horse railroad managers in this country of having their shoeing done by contract, believing that by so doing they are enabled to save money and increase their dividends. But do they? And if so why not carry the system still farther and contract for the feeding of their horses? By this they could certainly make a greater saving and with less danger of permanent injury to their animals. The horse that suffers from inadequate or improper feeding will show it in an unmistakable manner and the remedy is very simple, but the horse whose foot is injured by a sliver of a nail may not show lameness for some time afterwards and when it does show it the lameness is often attributed to some other cause.

Therefore if shoeing is to be done by con-

tract it should be specified that only hot forged hammer pointed nails of the best quality should be used.

Another important advantage possessed, by forged nails is their superior strength or toughness allowing the use of smaller sizes, causing less displacement of the fibers of the hoof, and still another advantage of great importance to horse railroad men whose horses travel on pavements, is their superior elasticity.

A horse's foot is not very heavy but it strikes a powerful blow upon the pavement, which is unyielding, and consequently the hoof yields a trifle, and if the nails are stiff and unyielding as cut nails are they sooner work loose.

TUBAL CAIN.

### The Nash Splice.

EDITOR STREET RAILWAY JOURNAL:—

In answer to B. of San Francisco of Sept. 24th, 1886, in an article headed "The Cable Splice," published in your last issue, I do not wish to enter into any newspaper controversy regarding the merits of the Nash splice.

It is speaking volumes for itself in Chicago, where the cable roads are doing the largest business of any cable roads in the country if not in the world. It is meeting with equal success in Kansas City, St. Louis, Philadelphia, Cincinnati, New York and other cities where it has been adopted.

The Chicago City Railway Co. operate 20½ miles of cable roads. The speed of the cables is 9½ and 11 miles per hour. There are three and very often four cars to each train. Each car weighs about four tons and will accommodate 100 passengers. There are sixty trains on State street and about the same number on Cottage Grove avenue. This gives the reader an idea of what labor the cables are performing in Chicago.

Prior to the introduction of the Nash splice, all of the splices known to the trade were used in the Chicago system and proved failures. But since the Nash splice was introduced there has been no trouble whatever from the splice.

The amount of cable required to make a splice is thirty-four feet all told.

When the California splice was used in our ropes, 75 to 100 feet was used up in making a splice.

I never had one of the California splices to draw or the ends to pull out of the heart. But where the meeting ends of the strands are tucked into the heart of the cable, the cable is enlarged at such points, and from this cause the California splice is very objectionable; and where cables are laboring so heavy as in Chicago it is impracticable.

Any practical cable man will see in an instant what the result must be where the cable is enlarged at the points of splicing. For instance, the grip is moving at a less momentum than the cable, which fact occurs with every train in Chicago on account of the heavy street traffic, etc.; the jaws of

the grip are then set as a *die*, and the result is if there is any enlargement at the points of splicing it is crushed or cut away very rapidly. In the Nash system on the other hand, the same strength is maintained in the splice as any other portion of the cable, and the uniformity of the diameter of the cable is preserved.

When properly put in it will do better service than any other splice known to the trade, under favorable circumstances.

Mr. Hovey, who was experienced in cable roads in San Francisco for years, and now of Chicago, says the Nash splice is superior to anything of its kind. Mr. E. J. Lawless, Superintendent of the Kansas City line, latterly of San Francisco, says, "Your splice has many advantages over the California system. First it requires less cable, is made quicker, does better work and I would recommend all cable roads to use it." Mr. Holmes says he tried all manner of splices, which proved to be failures, and that the Nash splice is a success.

THOS. C. NASH.

### Devices for the Prevention of Accidents.

EDITOR STREET RAILWAY JOURNAL:—

In consideration of the matter of devising methods for preventing passengers from entering and leaving the forward platform of street cars, I would respectfully submit to your consideration the following suggestions:

The liability of accidents by persons standing and riding on platforms and leaping off the same before the cars are stopped being especially dangerous, railroad men are looking for some means to prevent this liability. I would suggest that they have fitted to both platforms of the cars, that are running either end forward, folding gates that may be closed on the platforms which are on the front end of the car and folded back out of sight upon the rear of the platform, giving free access to and from the car, leaving the front clear and allowing the driver to have full control of his horses without being obliged to answer questions on the different topics which come so frequently from passengers standing upon the front platform.

The doors leading from the inside to the platform of the cars could also be provided with latches, at a very slight expense, which would thus prevent passengers leaving the cars to go upon the platform. These latches should have a handle on the outside only, thus allowing the conductor or driver to use them, but preventing the passengers from doing the same. Further if cars had a telephone bell such as is manufactured by John Stephenson, so that the passengers could use it freely without endeavoring to attract the notice of the conductor, they might also be prevented from leaving until the car has been brought to a full stop.

S. T. B.

ELECTRIC RAILWAYS seem to be attracting considerable attention just at present, and many managers are looking into the merits of the various systems that are offered with a view to adoption.

## London Railway System. II.

## THE GREAT EASTERN.

As for the east part of London, which represents the most populous and commercial quarters, the docks, the warehouses and the ship yards which extend along the banks of the Thames on Tower street, it is served by the line from Fenchurch to Blackwall, upon which trains are run every quarter of an hour.

The line from Blackwall to Stepney Limehouse and Poplar, by way of the branch from Stepney to Bow, connects with that from Bow to Tilbury, whose stations, Bromley, Plaistow and Barking, have an important position in the transportation of passengers. From Bow there is also a connection with North Woolwich, which is the only road to Victoria Docks. This line from Tilbury connects with Gravesend, like that from North Woolwich to Woolwich, by steam ferries which cross the river on arrival of the train. Thus the inhabitants of the east end of London can go to these different points without making use of the roads along the river bank.

Gravesend is well known from its commercial importance as the point where all vessels which ascend or descend the Thames stop. Blackwall is a stopping point for all passenger steamers which serve the mouth of the river, and many persons come here to embark in order, in this way, to avoid the sinuosities of the Thames, which they would be obliged to traverse in starting from the London Bridge. The outskirts of the North Eastern line which converge at Stratford Junction, have their points of departure at Bishop's Gate, so that travelers are enabled to reach London or depart therefrom from the Fenchurch Street Station, which is far more central than the one which has been mentioned. A service of thirty-five trains a day each way, connects this last station with that of Stratford Junction.

The old station which was originally at Bishop's Gate has been removed into Broad street. In spite of the 224 trains which daily traverse the line from Blackwall and Bow, and in spite of the frequent passages from Bishop's Gate, Mile End and Stratford, the movement is such upon the main Eastern line that omnibus lines running every five minutes besides the street railway lines do a good business. Wherever the population is so dense and is obliged to be kept in continual motion, good means of transportation, whatever may be their nature, always do a good business and only serve to increase the circulation by the facilities they offer.

We will return to the facts upon this question in the South of London, where the railways, tramways, and omnibuses hardly serve to answer the wants of the population. One of the most striking examples of this insatiable necessity of transportation and good service is found in the success with which the Metropolitan Railway is attended while at the same time it is very far from injuring the omnibus lines which circulate about it in all directions.

## METROPOLITAN SYSTEM.

The Metropolitan System comprises a subterranean line somewhat over ten miles in length, and which is connected with another line, also subterranean, and of about the same length, called the District Railway. As far as the public is concerned they form practically one and the same line, which is described under the general name of Metropolitan Railway. The total length of the main line embracing the branch from Brompton to West Brompton, is about 14 miles; the branch from St. John's Wood, which is a mile and three-quarters, and the line from Edgware Road, all known under the name of Hammersmith and City Junction Railway, are not comprised in these figures.

Its construction was undertaken by the Great Western Railway. The Metropolitan actually begins at Moorgate street, near Finsbury square, a short distance from the Bank and the Exchange. Thence it turns westerly towards Aldersgate, which it crosses and where it has a station. From Aldersgate a branch runs from Chatham which redescends towards the freight depots of the Great Western at West street, where it rejoins the line from Ludgate Hill to Farringdon street. The Metropolitan runs under Smithfield, and, turning to the north, runs to Farringdon street. From Moorgate to Farringdon street the road is for the most part open. From Farringdon street the road runs for the most part through cuttings to King's Cross, one of the most important stations of the line. Thence branches start out, which allow the trains of the Great Northern and Midland to use the rails of the Metropolitan. Between King's Cross and Moorgate street the road has four tracks. From King's Cross to Edgware road the line runs underground along the Euston road and Marylebone road. Stations are placed at the junction of Gower street, of Portland, and of Baker streets. The first serves the Euston square station, but has no communication with it. The second is a few steps from Portland place and Regent's park, and is connected with the central bureau of the Metropolitan at Regent Circus by an omnibus line. Finally, the third is at the head of the branch line from St. John's Wood, which runs to Swiss Cottage.

A short distance from the Edgware road station a branch starts out which runs to Bishop's road at the northeast of Paddington station, where it connects with the line of the Great Western. From King's Cross to Edgware road and Bishop's road the Metropolitan runs under ground, excepting at the stations of King's Cross, Edgware road and Bishop's road, where it is open. The next station south of Paddington on the Metropolitan is Praed street. Starting from this point the Metropolitan bends slightly towards the south, passing under Queen's road, where the Bayswater station is located; and under High street (Notting Hill) where Notting Hill station is located. From Notting Hill the line turns again towards the south, skirts the Kensington gardens, reaches High street, where

Kensington station is located. About 1,300 feet from High street a branch starts out which connects with the West London line by way of Earl's Court, in the direction of Kensington (A. R.)

The Metropolitan ends and the District commences at the next station on the Gloucester road, which is more often called by the name Brompton. From Brompton a new branch starts out which connects with that from High street at the limits of West London, where it leaves it to run to West Brompton.

The connection of the Metropolitan, District and West London road is a very curious piece of work.

It was necessary to buy up the property for a short distance back and to make up the difference in grades between them in cuttings.

From Brompton the District runs under South Kensington, Sloan's square, where there are stations at the corner of Victoria street opposite Victoria Station. From this point the line turns in the direction of Westminster Abbey, passes along St. James park, Westminster Abbey and the Parliament House, and finally runs beside the Thames at the head of Westminster Bridge.

From Westminster to Black Friars Bridge the District follows the course of the river. It passes under the Charing Cross road at Cannon street, and serves the Temple and Black Friars Bridge by the Charing Cross and Southeastern stations, whence it runs under the Chatham line.

Starting from Black Friars Bridge the District runs back from the Thames, cut under Upper Thames street, runs in Queen street and stops at Mansion House street, where it originally ended. The Metropolitan has been prolonged along Moorgate street to Tower street and reconnects with the District. The company had once asked Parliament to be freed from the obligation of passing beyond Broad street.

The greatest distance upon the Metropolitan and District between two consecutive stations is about a mile from Farringdon street to King's Cross, and the shortest about 1800 feet from Portland road to Gower street. A cross section of that part of the road running under ground is in the shape of an arch with three centers, with feet resting on the arcs of a circle; the vault is formed of 6 layers of brick 2" thick. In some places they were obliged to start an inverted arch, which is generally arranged so that in the arc of the circle bricks of about 1½" thickness are used. Every 50' they have placed niches into which the employees can step in order to allow the trains to pass.

The cuttings are held up by revetement walls built of brick formed by vertical arches, bound together by lateral bracing, also made of brick. In certain places the sustaining walls are buttressed, which are braced against each other by a cast iron girder which runs below the level of the rails at a depth of about 15". Throughout the whole length of the line an aqueduct, whose dimensions vary, is placed in the

center of the road. At the stations and along the way there are numerous ventilators which allow the air to be renewed in the suburban passages.

The heaviest grade upon the Metropolitan proper is 23 in a thousand, or 121' to the mile; the curves that are used do not exceed 266' radius. The rail adopted is of the Vignole pattern, with a large base resting upon stringers, to which it is fixed by ordinary wooden wedges. The stations upon the Metropolitan road, like those of interior roads and the suburbs of London, are placed upon the principal streets which cross the city. These streets are traversed continually by omnibus lines which take up and set down the passengers near the stations. As far as these arrangements are concerned they are very similar to those of the French road at Auteuil.

The buildings for the suburban stations are composed simply of a platform upon a level with the public street; the lateral stair-cases give access to the platform of departure and arrival. The usage of waiting rooms is almost unknown; as is common in most English stations, the passenger does not stop there. The public waits upon the platform for the arrival of the train which it intends to take, so that its stoppage is reduced as much as possible by the necessity of the service.

To pass from most of the Metropolitan stations into the stations of those lines with which it connects, such as Charing Cross and Victoria, the passenger is obliged to go a short distance on foot. This inconvenience presents itself especially upon the London suburban lines where the crossings are made at different levels from the roads with which they connect. Communication is obtained in these cases by covered passages, giving access from one station to another. This is the case at the New Cross station at East London in its connection with the Brighton road.

The engines have a peculiar arrangement which allows the engineer when he reaches a tunnel, to send back the gases which escape from the chimney into a reservoir of cold water placed under the boiler. As it is essential that great care should be used on the part of the locomotive engineer in order that the steam pressure shall not fail him in the subterranean portions of the line, it is necessary to force the fire in advance and assure himself of reserve steam, which added to that which can be produced while passing through the tunnel will suffice for maintaining the speed of the engine. They thus avoid, for the most part, that inconvenience which will result to the passenger from the circulation of the trains through a tunnel filled with the smoke from the locomotives.

The Metropolitan cars have four axles at equal distances apart. They are composed of first class carriages containing 48 seats, mixed containing 60 seats, 20 first class and 40 second class, those of the second and third class containing 80 places. Their weight is about 16 tons. The interior of the compartments averages about 6' 2" across, and the distance opposite the seats

is 2'; a tall man can pass in and out with ease. In these carriages, as in all the English carriages, the windows in the doors are alone movable. The regular windows are protected with longitudinal slats which prevent the passenger from sticking his head out. This protective measure is rendered necessary by the small space which separates the sides of the tunnel from the body of the carriages. The coaches are lighted with gas by means of a reservoir placed under one or several of the vehicles. Their most salient advantages consist in the reduction of the number of carriages and the diminution of the length of the trains. The interior dimensions of the Metropolitan carriages allow the passenger to leave and enter the carriages very rapidly; they being on the level with the platforms, the stoppage of the train at the stations is reduced as much as possible.

The engines and cars are furnished with power brakes which permit the train to be more quickly stopped. Two trains on the Metropolitan road running in the same direction are not allowed to be between two consecutive stations; that is to say, a train cannot leave one station until the train which preceded it has left the following station. It is upon this principle that the exploitation of the Metropolitan road was based and its safety is assured. For this purpose telegraph stations to signal the departing trains have been placed at all the stations, but since the opening of the line the rapid developments of the circulation forced the company to place these signal offices at several points between two consecutive stations. The original plan resulted in the necessity of the Metropolitan running their trains under such headway that one could clear the greatest distance which separated two consecutive stations before the other can run upon the block.

Between King's Cross and Farringdon street the time required is four minutes. It would have been impossible to dispatch trains from either of these stations every two minutes, had they not put a telegraph station half way between them, where trains are stopped if the road is not clear on to the next station towards which the train was running.

The Metropolitan also comprises a belt line which is operated by trains departing on the average every five minutes from its two extremities, Moorgate street and Mansion House; a service from Moorgate street to Kensington (A. R.) and back, leaving every half hour; a service from Moorgate street to Hammersmith and back, every fifteen minutes, both operated by the Great Western; and finally special service from Moorgate street to Bishop's road.

These different services represent on the part of the Northern Division of the Metropolitan a movement of 213 trains daily in each direction. If we add to this the trains of the Midland and of the Great Northern from Moorgate street to King's Cross, and those of the Great Western from Moorgate street to Paddington, Uxbridge, Windsor and Reading, we have a total of 250 trains a day in each direction, or 500 trains running upon

the line between half-past six o'clock in the morning and midnight. The passage occupies fifty-eight minutes.

In going from one end of the line to the other the passengers are not obliged to change cars, but it is not the same with those who go upon the branch lines from St. John's Wood and from West Brompton; in these cases they are obliged to change from one train to another at the junction points.

The journey between the east and west of London, by means of the Metropolitan, occupies less time than by the other lines, because its route is more direct. A traveler going from the City to Victoria, has the privilege, however, of using the Metropolitan line from Ludgate Hill, although there is no difference in the fare. In the first case the time required is seven minutes, and in the second thirty-five minutes.

The fare, starting from Moorgate street, is 7½ cents first class, 6 cents second class, 4 cents third class, to King's Cross. To Paddington it is 11½ cents 7½ cents and 6 cents. To Kensington (H. S.) and West Brompton it is 15½ cents, 11½ cents and 7½ cents. For all stations beyond this, up to and including the Mansion House, it is 24 cents, 17½ cents and 11½ cents. Trip tickets are sold at a reduced price. The Metropolitan and District both sell commutation tickets over their line and also commutation tickets which are good over every line. These last are sold to the public at the following prices:

	First Class.	Second Class.
For 1 month,	\$8.42	\$46.03
“ 3 “	\$21.71	\$15.78
“ 6 “	\$41.00	\$27.74
“ 12 “	\$59.90	\$50.66

The Great Western, Great Northern, and Midland companies also sell commutation tickets which give the right to travel over their suburban lines and the Metropolitan as well.

It will be readily understood that, with a movement of 500 trains a day and fares such as we have just mentioned, that the receipts of the Metropolitan will reach a very high figure. The capital originally spent for the construction of the Metropolitan amounted to £7,566,666, or over \$36,000,000. The expense which the company afterwards laid out in order to get into Broad street, amounted to \$1,100,000, but part of this expense was covered by the rental of that property, which was utilized for the line itself, and to which the line gave a very high value.

The Great Northern, Midland, and South Eastern immediately entered on negotiations for the purchasing of station property along Farringdon, Red Cross, West street and West street Smithfield, for the construction of freight depots. As these negotiations were carried into effect, the commerce of London, which really needed some warehouse of this kind in the center of the city, was satisfied, but it was, of course, a very expensive operation on the part of the companies.

At first, for some time, the receipts of the District road increased in a very sensible manner to the detriment of the Metropolitan, and this could not be otherwise if the traffic between the termini, instead of being taken, as at first, by the single line, was divided between the two; this, however, has ceased to be appreciable, the passengers from Kensington (H. S.), Brompton, etc., in going from the City, having now the advantage of using the District route, whose stations are very central.

(To be Continued.)



**Stephenson's Running Gear.**

The illustration presented in this connection is the running gear which has been adopted by the John Stephenson Co. as the standard. The jaws or pedestal block are free from rigid contact with the ear, being held in position by bolts and springs, these

These will be made of rubber or steel, according to the specifications of the car, and are graduated so as to ride with equal ease on a loaded or light car. The jaw strap is a brace running underneath the box and bolted to the side of the jaw.

In addition to the regular running gear there is a track cleaner which is an import-

more gently than a stiff rod of iron or wood would do. If it is desired, this rubber cleaner may be replaced by a broom which will come down and sweep the tracks clean from snow or sand that may be heaped upon it, so that it may serve as an important auxiliary to the regular sweepers that are used for cleaning the streets in winter.



STREET CAR BUILT FOR THE NEW YORK BROADWAY LINE BY THE JOHN STEPHENSON COMPANY.

springs being the well-known super-springs which contribute so much to the quiet and easy running of the car. The pedestal is made of the best quality of cast iron, and is strongly ribbed so as to avoid danger of breaking. The super-springs, which are placed immediately under the side sills, are made of fine quality of rubber, and

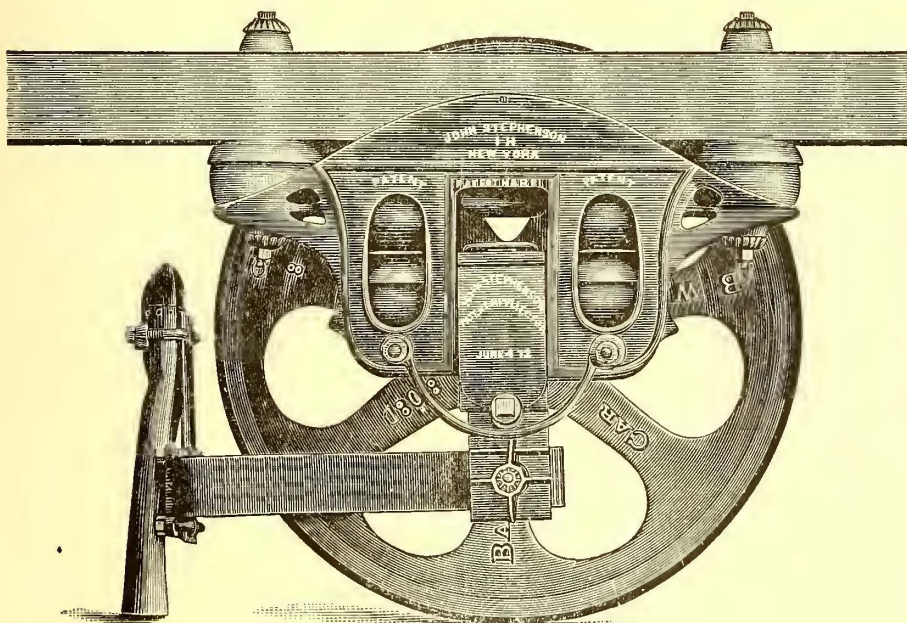
an adjunct for ears running through thickly populated quarters. It consists of a loop placed around the axle and dropping down to catch the slide bar shown in the engraving at the side of the car. This is so attached to the box that it always preserves the same elevation from the rail and does not vary with the vertical movement of the

We also illustrate in this same connection the car that has recently been built for the Broadway line in New York, and which was fully described in our issue for November. It will be seen upon inspection that the car is furnished with the running gear that we have just described.

**Ohio Tramway Association.**

The fifth annual meeting of the Ohio State Tramway Association was held at Dayton, November 17. The association has for its object the promotion and advancement of all matters pertaining to the construction, equipment, and management of street railroads. The following papers were presented: "The Street Railroad Patrons," by A. E. Long, of Toledo; "Charters and Grants," by A. E. Clark, of Cincinnati; "Unpopularity of Corporations—Cause and Remedy," by A. A. Thomas, of Dayton; "Insurance," by Henry A. Everett of Cleveland. At the business session the following officers were elected: President, D. W. Shrivel, of Springfield; Vice-President, James Dougherty, of Cincinnati; Secretary, H. A. Everett, of Cleveland; Treasurer, J. B. Hanna, of Cleveland; Executive Committee, T. F. Shipperd, of Toledo. There are at present thirty-six street railroad companies in the state, of which twenty belong to the state association. The number of horses belonging to those of the association is 5,424; number of cars, 1,965; horses belonging to non-members, 671; ears, 162.

Bribery is bribery. A street railway franchise obtained by bribery is substantially a franchise obtained by theft, and the great mass of street railway managers of this country so regard it.



THE STEPHENSON RUNNING GEAR FOR STREET CARS.

carry the whole weight of the ear. They have a hole through the middle through which a bolt passes, and this is so held in position by cushioned washers which carry no weight whatever but simply take up the slack in the bolt which is caused by the compression of the super-springs. The box is of the regular Stephenson pattern and carries the stirrup for the main springs.

jaws. The bar is a solid slab of wrought iron and carries at its extremity a bracket which holds the rail cleaner in front of the wheel. This latter is made of rubber and is stiff enough to brush any obstacle from the track, and yet is not rigid enough to injure a child that should happen to fall upon the rails, simply brushing them aside, somewhat rudely of course, but much



Monthly, \$1.00 per Year.

E. P. HARRIS, General Manager.

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### The Superintendent.

It is a curious fact that the less a man knows, the less he thinks it necessary for another man to know in the same line; and if there is any piece of business to be transacted or an industry to be carried on, it is almost an impossibility to convince the ignorant man that training will be of any particular value to the firm or corporation that is to engage the man. This is especially true of the position of street railway superintendent. The road is owned, in nine cases out of ten, at the first, by men that have had no practical experience in the running of such a road, and they cannot realize that there can be any economy in the engagement of a man that has had the experience that they lack.

Under these circumstances then it is not strange that the sole recommendation of the superintendent that is engaged to handle the new road is, that he knows how to buy a horse, for even the most reckless of directors are a little afraid of the horse jockey and like to feel sure that the man that is to do their buying for them knows the difference between the heaves and a ring bone.

But beyond this very essential thing there is in nine cases out of ten no inquiry made as to the other qualifications that are required for the successful prosecution of the work. It matters little the new man knows nothing about the construction of the cars that he is to have the care of; that he has had no experience in the amount of oil and other materials that are necessary in order to get the best and most economical service; that the construction of the road bed is a sealed puzzle to him and that he is utterly ignorant of the thousand and one little details that will surely entail expense upon the corporation that employs him. To be sure he may be able to learn all of these things in time, but he will do it at the expense of the company that owns the road. If he is so very smart that this can be afforded there is nothing more to be said, but such a state of affairs rarely obtain and even if they did it might be considered advantageous to give this very smart man the advantage of the experience of a man that has already held such a position and thus let him grow into the work.

In short a road cannot do better than to engage the most competent man available to supervise the manipulation that will fall to the duties of the superintendent.

### The Immediate Right to Wages.

A case has been recently decided before the Supreme Court of the State of Minnesota, upon the right of a discharged employee to the immediate payment of his wages. The question before the court was whether upon the plaintiff being discharged from the services of the company after being employed for only five days, a right of action at once arose for the recovery of his wages, or whether, by force of an alleged usage, or from the inconvenience to which the obligation of immediate payment would subject the defendant, the right of action was deferred, so as to enable the defendant to make payment at its own convenience. It was decided that the obligation of payment arose at once, upon the termination of the contract for service, and that the right of action did exist, unless the case could be deemed to be an exceptional one. It was shown, however, that the usage of the company regarding its manner of paying those employees that were not upon the regular pay roll had not been brought to the notice of the plaintiff; and it was held that there could be no implication on the part of the contract that would show that the plaintiff had entered into any such agreement and could be affected by the custom in question; under these circumstances, therefore, he would be entitled to the payment of his wages as soon as he was discharged, and that no regulation or usage of the employer, of which the servant is not chargeable, could affect the legal obligations arising from the contract. It was further held that the same usage on the part of four other railroad companies did not show the existence of a custom that could be held by implication to be a part of the contract in question. Upon the facts of the case it was finally decided that the plaintiff was entitled to a judgment.

The case in point was that of Thompson against the Minneapolis & St. Louis Ry. Co.

### Seatless Cars.

The Railway Engineer, in a recent issue, has an article upon a new arrangement for increasing the capacity of railway carriages and tramway cars. The principle upon which the invention is based is that when the cars are crowded in what we call rush trips in the morning and afternoon, there are large numbers of passengers, and in many cases a majority of those who are in the car, that are obliged to stand. While they are thus standing they are not only crowded against one another, but they very seriously inconvenience those passengers who are fortunate enough to have obtained a seat. The inventor takes as a fundamental principle by which he is to be guided, that inasmuch as some are obliged to stand, it is better that all should do so. He therefore constructs his seat with a hinge at the back

and prevents them from falling by a stout bar placed before them, when they are folded back against the side or partition of the car, thus increasing the standing room, but removing all seating capacity.

It will readily be seen that this arrangement will greatly increase the capacity of the car, as the passengers can be packed in like so many mummies, being allowed just enough floor space to stand upon. It is exceedingly doubtful, however, or rather there is no doubt whatever in regard to the adoption of this method of car construction. Passengers would hardly care to be packed in like cattle in a box; and although the individual may not have the good fortune to secure a seat, he would still be unwilling to have that luxury entirely dispensed with, and his chances of obtaining one utterly obliterated. If such cars are ever built we shall take great interest in watching the progress of its popularity with the traveling public, and will keep our readers posted in regard to everything which we know of the matter; but unless we guess very wide of the mark, this is the last that will ever be heard of the matter.

### Tenth Avenue Cable Cars.

Mr. John H. Robertson, in conjunction with his M. C. B. Mr. Pfingst, has turned out some new grip cars for the Tenth Avenue Cable Line, which are novelties in the way of car construction. They are light, short cars and intended solely for summer traffic, but the generally accepted principles of car framing have been entirely dispensed with.

The posts are made, in every case, of gas pipe, and all the braces and sills are of ordinary gas pipe fittings, with the exception of a single bracket at the top, which was specially fitted for the purpose. Through the courtesy of Mr. Pfingst we are enabled to give some details and dimensions of the car.

The length is 14 ft. and width of the bottom frame 6 ft.  $\frac{1}{2}$  in. The top frame is built and laid upon the lower one in the same way that the upper, or body, frame was made for the combination summer and winter cars which were illustrated in the October issue.

This upper frame is 7 in. in width. The lower sills are  $3\frac{1}{4}$  in. by  $7\frac{1}{4}$  in. and the end sills are  $3\frac{1}{2}$  in. by  $5\frac{1}{2}$  in. The cross timbers, of which there are four in number, are 3 in. by  $3\frac{1}{2}$  in. for both the cross and end sills. The pit-hole for putting in and removing the grip, is placed in the center of the car between the wheels, in the same way as in the ordinary grip car, a trap door being made to fit nicely into the hole. The framing is  $\frac{7}{8}$  in. thick. The platforms give ample width, and are 3 ft. 7 in. from the body of the car to the outside edge of the buffer timber. These latter are  $1\frac{7}{8}$  in. thick and  $8\frac{1}{2}$  in. wide at the center, tapering down to 3 in. at the end. They are 6 ft. 4 in. long, and are thus brought four inches inside of the upper frame. The platform is also 2 ft. above the track, and the dashboard 2 ft. 8 in.

Another feature which has been introduced, and will be somewhat of a novelty, is the fact that the steps are placed, and are available on the right hand of the rear platform only. This effectually prevents people from entering or going out between the rails, which in a cable road of course increases the safety or traveling.

In the ordinary car, such as they are now using, the same thing is accomplished by the means of gates, which are to be kept closed upon the opposite track side, and no one is allowed to enter upon the front platform, under any circumstances. This gives the conductor absolute control of the passengers, or rather of the movements in the car as regards the outgoing and incoming of the passengers.

The platform gates in the new cars are arranged with reference to the same idea. There is one which swings, and is to be kept open on the right hand side of the rear platform. The corresponding gate on the front platform is closed, and the gates upon the other side are fastened and cannot be opened.

The wheel centers are 7 ft. apart. The car stands rather high from the track, so high in fact, that no wheel houses are needed inside the car. This saves cutting the floor through and greatly facilitates the cleaning of the car. On the outside of the car, as an additional protection to the passengers, is the wire screen dropping down close to the pavement, and acting as a life guard or fender to keep obstacles, either animate or inanimate, off the track and away from the wheels. This is on the same plan as those which are used on all the cars under the control of the Third Avenue Company.

We have said that the posts carrying the roof are gas pipes. They are all of one inch gas pipe and there are twelve to the car; two for the doors, four for the corners, and four for the sides.

The height from the floor to the roof boards inside of the car is 7 ft. 10 in. The height from the floor to the under side of the side plates is 6 ft. 2½ in., the plates being 1½ by 2½ in. At the upper end of the steam pipe there is a fitting, and from this fitting there are wrought iron stays against which the sign boards are screwed and bolted. The board is 1 in. wide and ¾ in. thick. It has a curve at the bottom edge, bringing it down between the pipes. The body of the car is a wire screen; that is, the portion usually occupied by the panels.

The seats run lengthwise of the car and can be taken out at any time. They are made in exactly the same way as the park benches of cherry and basswood. The body hand rails for the use of passengers in exit and entry are bolted to the upright gas pipes. The trimmings are of bronze. The width of the upper deck is 3 ft. 2½ in. at the bottom.

There are 32 lights in the roof, 16 upon each side, of cathedral glass in different designs. White paint is used for the roof boards.

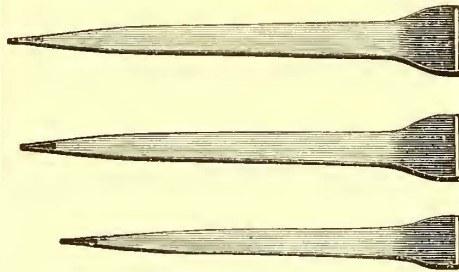
In the door way there is an extra iron head on the end plate of the roof, and when

screwed to it in this way, it makes a very fine finish.

Storm curtains are, of course, placed upon the sides of the car, which may be drawn down to the bottom of the side sills, thus enclosing the car in case of stormy weather, and giving the passengers most efficient protection. The paint of the pipes and screens on the sides and ends of the car are carmine. The platform, dashers, side sills running gear and boxes are white stripped with red. The sign boards and roof white with black stripes. The bumper iron on the platform projects 6½ in. Underneath this bumper there is a swing draw bar. The car has a very attractive appearance, and will draw the attention of any one who is at all familiar with car construction, on account of the marked departure of this car from cars as ordinarily constructed. It seems there is no good reason why a car such as this could not be constructed for winter use, with panels to be fastened to the sides.

Champion Horse Nails.

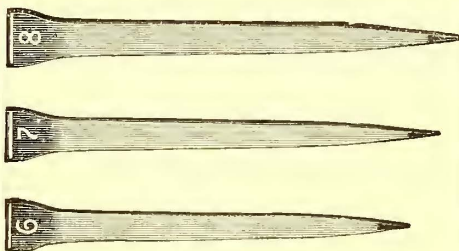
We illustrate some nails\* which were on exhibition at the Cincinnati convention, that are most carefully made and especially adapted for different purposes. The two sets of illustrations which we are able to



LARGE HEADS.

show represent two sizes of heads which the company make.

The nails are made from the best quality of Swedes iron, which is first carefully examined for the detection of any defects and



CITY HEADS.

only those sections used which pass examination. The two patterns shown show the heads as arranged for city, and for shoes carrying a large hole. These latter are adapted for re-setting and machine made shoes, the heads being so shaped that they fit the nail holes nicely and snugly without sticking out at the corners in an unsightly way. The nails are receiving a wide application throughout the East and West.

\*Champion Horse Nail Co., Appleton, Wis.

Removal.

The STREET RAILWAY JOURNAL, issued since its first number, from 32 Liberty street, New York, will hereafter be published at 113 Liberty street.

Notes and Items.

The Editors would consider it a favor if those who are interested in street railway matters will send in any items that may come to their notice of changes, extensions or improvements. These memoranda will be duly inserted under this heading, and the proper changes made in our Street Railway Directory.

Albany, N. Y.

THE METALLIC STREET RAILWAY SUPPLY Co. have issued a new illustrated catalogue of the Gibbon Metallic system. The cuts are perspective and sectional views of the road, as well as of the details of the rail and stringers, giving an accurate idea of the construction.

Alvarado, Texas.

A street railroad is in course of development at this point, but it has not as yet materialized and the promoters wait further developments before reporting progress.

Ann Arbor, Mich.

THE ANN ARBOR STREET RY. Co. have in contemplation the construction of a street railway line. The length of the line has not yet been determined, but it will be 4 ft. 8½ in. gauge. The number of cars and the method of propulsion is also undecided. The officers are: President, Junius A. Beal; Vice-President, Edward Duffy; Secretary, Zina E. King; Treasurer, Louis B. Taylor; Superintendent, Thomas J. Keech. The capital is \$20,000, and the office is at 46 Main street.

Appleton, Wis.

THE APPLETON ELECTRIC ST. RY. Co. are operating four and one-half miles of track with five cars. It is operated upon the Van Depoele system. The following is a list of officers: President, J. E. Harriman; Vice President, N. B. Clark; Secretary, T. W. Orbison; Treasurer, Jos. Koffend.

THE CHAMPION HORSE NAIL Co. are furnishing a large number of street railways, both in the East and West, with their excellent horse nails.

Ashtabula, O.

THE ASHTABULA CITY RY. Co. have made no changes during the past year.

Atlanta, Ga.

THE METROPOLITAN STREET R. R. Co. report six miles of track, four feet eight and a half inch gauge, and are using a twenty pound rail, twenty cars, and eighty-four horses. The officers are: J. W. Rankin, President; and G. S. Hanluttu, Secretary. The road contemplates building a one-half mile extension. The general office is corner Hunter and Butler streets.

Baltimore, Md.

THE BALTIMORE & POWHATAN RY. Co. are using a 30-pound rail. Their general office is 436 Laurens street.

Belleville, Ill.

THE CITIZENS' STREET RY. Co. report 4½ miles of track, of which about 2 miles has just been completed. They also report 7 cars and 20 horses. The office is corner Main and High streets.

Berea, Ohio.

Mr. F. I. Pomroy is Treasurer of the

Berea Street R. R. Co. instead of Mr. A. H. Pomeroy, as previously reported.

**Binghamton, N. Y.**

THE PARK AVENUE RY. Co. report one mile of track of a 4 foot gauge, 20 pound rail, and E. Ross as President; F. E. Ross as Treasurer, and E. A. Matthews as Secretary. The road is run in connection with the Wade Street road.

**Boston, Mass.**

NEW BRILL CARS. Two elegant new cars arrived from Philadelphia last week and were put on the Union Square Line of the Boston Consolidated Railroad this morning. The cars contain all the modern improvements, and are fitted up quite handsomely. It is understood that there are more to follow.—Boston Herald.

THE CAR TRACK FRICTION APPLIANCE Co., manufacturers of the Reliable Sand Box, 19 Tremont street, will furnish an entire equipment for the Metropolitan road. They are sending sand boxes to the following street roads: Hannibal Street Ry. Co.; Rochester City road; Pittsburg, Oakland & East Liberty; Pavia Horse Railroad; and Gloucester St. Ry. The box is in use on the State street road in Albany, doing good service on a remarkably steep grade.

As we go to press, we are informed that William Reed, who has been for the past ten years Treasurer of the South Boston Horse R. R. Co., has been arrested on the charge of embezzlement of the company's funds to the amount of \$35,000. He has been very active in looking after the affairs of the company, and has had the fullest confidence of the Board of Directors, and his unauthorized personal use of the company's funds began as long ago as 1881. He invested heavily at that time in Mexican Central securities and has succeeded, until a few days ago, in entirely concealing his operations from the other officers of the company, and it is said that if the discovery had not been made when it was Mr. Reed would have closed his stock at a profit and have made full restitution to the company. A few days ago the annual election of the corporation was held and Charles H. Hersey was elected President, and Benjamin Dean became one of the directors. They seemed to know that the old management had been loose in its work of looking after the interests of the company, and began an investigation. In looking over Reed's account they found several unpaid bills which they supposed paid some time previous. This led to the employment of an expert, who found that Reed had taken \$69,500 in cash and an overissue of stock to the amount of \$34,500, making \$104,000 in all, and on discovery of this a warrant was issued for his arrest. He has made full confession to the President and Counsel of the road and has turned over to them all his property, including his seat in the Boston Board of Brokers, which is valued at about \$15,000, besides securities to the amount of \$10,000. He has also made over all his stock contracts, and it is thought that this will fully cover the amount of his embezzlement. He has made no attempt to secure bail and was taken to jail. One

of the methods by which Mr. Reed accomplished his purpose was that of accepting a draft in the name of the company and taking a receipt for the original bill, then as that bill would furnish him a voucher of the payment, when the draft was presented the directors would order its payment without inquiring into the means by which it was incurred. Some of these drafts have been carried along four years on interest, others have been taken up. The overissuing of stock was accomplished by closing certain accounts as though the stock was sold and then taking one of the old certificates which had been signed in blank and using it by closing of the stock. As the Treasurer had practically sole charge of the stock ledger he could do what he did without anybody's knowledge. The news of the defalcation caused a drop in the South Boston stock from 104 to 85, and owing to the doubt of the genuineness of the stock certificates of the company sales of its shares in the Broker's Board were enjoined.

**Brooklyn, N. Y.**

THE BROOKLYN RAILWAY SUPPLY Co. report that they are very busy just now and have had to employ quite a number of extra mechanics to keep up with orders. They are building sweepers not only for use in large cities but for more medium sized roads in smaller cities than ever before. For plows they act as agents for cities about here and for the New England States for the Fleming Manufacturing Co.'s snow scrapers, which are sold at a price that bring them within easy reach of the smallest roads. They have also accepted the agency for Carpenter's patent turntables and transfer tables, the excellence of which they propose to demonstrate by tables in use in Brooklyn.

THE ATLANTIC R. R. Co. have now 297 cars and 1,169 horses, being an increase of 69 cars and 214 horses since our last report.

THE BROOKLYN CROSS-TOWN RY. Co. are now using 50 and 60 pound rails instead of 40 and 50 as previously reported. Mr. M. Joust has been appointed Secretary, relieving Mr. Connor of that portion of his duties.

John L. Partridge has succeeded Louis Fitzgerald as President of the Grand Street, Prospect Park and Flatbush Railway Co. Charles Crifields has been appointed Treasurer.

The present equipment of the Broadway Co. includes 199 cars and 750 horses, making an addition of 33 cars and 93 horses since their last report.

Mr. Richardson, President of the Atlantic Avenue R. R., recently appeared before a meeting of 300 Knights of Labor who were employees of the road, and spoke with them in regard to the relations between the company and the men. He was there by special invitation, and in order that he might state the position which he occupied, he said that he had always tried to act fairly by them, that he had always made it a point of promoting the men to the places of starters, conductors and drivers, and was always opposed to bringing in new men and placing them over the old ones. When

he first assumed control of the road he had personal acquaintance with a majority of the men, but this was impossible now from the fact that the weekly pay roll was \$7,000 instead of \$1,200 as it was when he took charge. He denied that he had taken any steps to have the men who were engaged in the spring strikes punished in any way, but though he had been summoned before the grand jury and compelled to testify, his evidence was in no way prejudicial to any man engaged in the strike. He expressed his regret that the same confidence was not manifested in him as in former years. It is said that about half of the employees of the road attended the meeting.

The directors of the Brooklyn City R. R. Co. have reconsidered the resignation of President Hazzard, which was presented some months ago and laid upon the table. The fault that has been found with President Hazzard by the company is on account of the concessions which it is claimed he made to the Knights of Labor in the troubles of last spring. Mr. Hazzard retired from the control of the company on the 1st of December.

It is said that one of the chief reasons for changing the jigger cars on the Brooklyn Cross-town line for cars similar to those run on Broadway was the large amount of counterfeit money passed on to the drivers. The company paid no attention so long as the cheating was confined to coins of small denomination, as dimes and quarters, but when it came to the manipulation of the silver dollar, they thought it was time to interfere. In one night, it is said, \$85 were taken on the line. This was more than the drivers could afford to lose, as they are held accountable for all money received by them.

**Bridgeport, Conn.**

THE BRIDGEPORT HORSE R. R. Co. have now six miles of track, and have increased their stock to 20 cars and 90 horses.

**Cedar Rapids, Ia.**

THE CEDAR RAPIDS & MARION ST. RY. are building about one mile new road on Sixteenth street. The "Central Park addition" will be the terminus of this line. Two new cars have been purchased and about ten horses will be added. The company are extending their city line from Sixteenth street about three-quarters of a mile.

**Charleston, S. C.**

THE MIDDLE STREET SULLIVAN ISLAND RY. Co. are using 14 mules for their seven cars.

**Chester, Pa.**

THE CHESTER STREET R. R. Co. are now building two miles of extra road.

**Chicago, Ill.**

THE CHICAGO WEST DIVISION ELEVATED RY. Co. has been incorporated with a capital stock of \$10,000,000. The company is to build and operate an elevated road from some point in the city between Lake Michigan and the south branch of the Chicago river, and between Lake street and Harrison street, to a point on the west side of

Cook county, between the lines of said two streets, extended west to said line, with branches leading therefrom to Humbolt Park, to the Stock-Yards, to Douglas Park and one to the corner of Western avenue and Blue Island avenue. The incorporators are Anson H. Lawrence, Edward T. Cahill and George A. Dupuy.

The following is a statement of street and other railways being run every day by the Van Depoele Electric Railway system. Some of them have been running over nine months continuously. Appleton, Wis.—Operated by the Appleton Electric Street Railway Co. 4½ miles of road and 5 cars run separately, electricity generated by water power. Montgomery, Ala.—Operated by the Capital City Street Railway Co. 2 miles of road and 2 cars. Plant being completed to 10 miles of road and 12 cars. Steam power. Detroit, Mich.—Operated by the Dix Electric Railway Co. The "Dix road," 2½ miles of road and train of 3 cars. Steam power. Port Huron, Mich.—Operated by the Port Huron Electric Street Railway Co. 4 miles of road and 4 cars. Windsor, Ont.—Operated by the Windsor Electric Railway Co. 2 miles of road and train of 2 cars. Being put in. Scranton, Pa.—For Scranton Suburban Railway Co. 3 miles of road and 2 cars.

THE ELECTRIC ELEVATED RAILWAY Co. received license of incorporation Oct. 25th. Capital stock, \$5,000,000; to construct and operate electric railways in Chicago and Cook county; incorporators, Charles W. Rigdon, Silas S. Willard and George P. Everhart.

THE PULLMAN CAR Co. of Chicago is building eight coaches for the Metropolitan Railroad of Kansas City and has the contract for forty 35 feet cars for the Grand Avenue road of the same city, all of which will be fitted with the Bemis gear.

THE VAN DEPOELE ELECTRIC MFG. COMPANY are manufacturing now the largest electric generator in the world; capacity, 150 horse-power. The largest ones ever made before this were of 60 horse-power. This monster machine will be used by the Capital City Street Railway Company, of Montgomery, Ala., on their new electric street railway, which the Van Depoele Company are equipping.

#### Cleveland, O.

FULTON FOUNDRY have shipped within the last few days turntables to the following street railway companies: Three to East Harrisburg Pass. Ry. Co.; one to Cedar Rapids & Marion St. Ry. Co.; two to Beatrice St. Ry. Co.; two to Port Huron Electric Ry. Co.

THE BROADWAY & NEWBURG STREET R. R. Co. have now 11 4-10 miles of track, are using a 43 pound rail, and have 26 cars, for which they require 165 horses. Mr. H. E. Andrews has succeeded Samuel Andrews as Vice-President, and Mr. J. J. Stanley is Superintendent. The general office is 1,373 Broadway.

The works of the Street Railway Supply Co., successors to the Higley Journal Box Co., have been destroyed by fire, with their entire contents.

#### Clinton, Ia.

J. M. Hartzell is making arrangements to push the street railway enterprise at this place.

#### Columbus, O.

THE GLENWOOD & GREEN LAWN R. R. Co. have added two cars to their stock. Their office is No. 9 South High street.

#### Des Moines, Ia.

CAPITAL CITY ST. RY. Co., incorporated July last, have just completed five miles road and will construct about ten more the coming year. Six cars are now running, and more will be added at once. Thirty horses are used. All lines will be standard gauge, and next season some portions will be equipped with Johnson Rail.

THE DES MOINES BROAD GAUGE STREET RY. Co. report the following officers: President, G. Van Gintel; Secretary, H. E. Teachout, and Treasurer, John Weber.

THE DES MOINES STREET RY. Co. have only 12 miles of road instead of 14 as previously reported, are using 25, 30, 38 and 52 pound rails, and have 18 cars and 125 horses.

THE CAPITAL CITY STREET RY. Co. report 5 miles of track of 4 feet 8½ inches gauge, 6 cars and 30 horses. The officers are: President, G. Van Gintel; Secretary, H. E. Teachout, and Treasurer, J. Weber.

#### Detroit, Mich.

THE FORT WAYNE & ELMWOOD RY. Co. have now 9 1-10 miles of track, 33 cars and 212 horses. Mr. E. S. Heineman has succeeded George B. Peases as Treasurer. The office is 129 Griswold street.

THE MICHIGAN STOVE Co. report themselves well pleased with the results of their exhibit at the Cincinnati Convention. They report a fair amount of inquiry, and orders from various sections of the country, among which is one from Messrs. J. G. Brill & Co., of Philadelphia, one from the Minneapolis Street Railway Co., and different parts of the east, including Albany, Hartford, Gloucester, and other points, and are adding largely to the car stoves in Detroit.

#### Dubuque, Ia.

THE DUBUQUE STREET R. R. Co. report 7 miles of track and the use of a 55 pound rail. They have also increased their number of horses to 65. The office is on Coulier avenue.

#### East Oakland, Cal.

THE OAKLAND, BROOKLYN & FRUITVALE RY. Co. report two miles of track, a five feet six inch gauge, thirty-five pound rail, four cars and twenty-two horses. The officers are: President and Treasurer, H. Tubbs; Secretary, W. C. Mason, Superintendent, James Dixon, and Purchasing Agent, J. Reed. The office is at 301 Central avenue.

#### El Paso, Tex.

THE EL PASO STREET R. R. Co. report that the improvements now in progress consist of the addition of 3½ miles of new track. They are using 20 and 30 pound rails; have 18 cars, which are hauled by 40 mules. They are relaying 3,700 feet of track with the Johnson girder rail. The La Clede Car Co. of St. Louis are building them 7 new cars, and they also contem-

plate building new offices and stables. A line of 13 miles is also in contemplation to Ysleta. The general offices of the company are on Seventh street.

#### Emporia, Kan.

THE EMPORIA CITY RY. Co. report that their gauge is three feet six inches, instead of five feet as we have heretofore reported it. They have eight cars and twenty-four horses.

#### Erie, Pa.

THE ERIE CITY PASS. RY. Co. now report seven and three-fourths miles track.

#### Eureka Springs, Ark.

THE EUREKA SPRINGS CITY RY. Co., which we have previously reported, was incorporated, but the scheme died out.

#### Flushing, Mich.

The report which has been circulated that a street railroad was to be built at this point, was based upon the the contemplated railroad to Flint. No street railroad scheme is in existence.

#### Fredonia, N. Y.

THE DUNKIRK & FREDONIA R. R. Co. report that their fares vary from five to fifteen cents.

#### Galesburgh, Ill.

THE COLLEGE CITY RY. Co. have now five miles of track, and are operating it with seven cars and twenty horses. L. W. Sanborn is President; A. S. Hoover, Vice President, and Geo. S. Clayton, Superintendent and Secretary.

#### Galveston, Tex.

THE GALVESTON CITY R. R. Co. have twenty-five miles of track, and have increased the number of their cars to eighty, which are hauled by 125 mules. The office is the corner of Twenty-first and I streets.

#### Grand Rapids, Mich.

W. J. Hayes has succeeded C. A. Otis as President of the Grand Rapids Street Railroad Co.

#### Greencastle, Ind.

Ralph Rogers, not Rudolph Rogers, is Treasurer of the Greencastle City Street Ry. Co.

#### Greenville, N. J.

The Daft Electric Light works recently gave an experiment of their motor before a number of railroad men, which it was said was successful.

#### Glens Falls, N. Y.

The following is a list of officers of the Glens Falls, Sandy Hill & Fort Edward Street R. R. Co.: President, Henry Crandall; Secretary and Treasurer, T. S. Coolidge, and Superintendent, Albert V. Brayton.

#### Haverhill, Mass.

THE HAVERHILL & GROVELAND ST. R. R. Co. have thirteen and seven-tenths miles of track, and are using thirty and thirty-five pound rails. They have increased the number of cars to thirty-six, for which 131 horses are required. Jackson B. Sweet has succeeded James B. White as President. The office is No. 3 Water street.

#### Holyoke, Mass.

THE HOLYOKE ST. RY. Co. have three and one-half miles of track, they having added five cars and nineteen horses, making thirteen of the former and forty-five of the latter now in use.

**Hoboken, N. J.**

A petition has been presented to President John H. Bonn of the North Hudson C. R. R. to restore the line of horse cars from the ferry through Hoboken to the Heights. The petitioners object to the withdrawal of the line, and the compulsion of the passengers to walk several blocks to reach a depot for an elevated train. For instance, a person living in Monroe or Jackson street, must walk a number of blocks before they reach their station, while the Court House cars carried them directly thither. Again, a person living in central Hoboken must either pay two fares or walk a number of blocks before they can reach the cars for the Heights.

**Hong Kong, China.**

A cable tramway is constructed from the town to the Peak, a range of very steep hills, on which are fine villa residences, and where the climate is more salubrious than near the harbor. The incline where they have to work is 4,800 feet long, and the line, which is partly single and partly double, is laid with 35 pound steel rails on steel sleepers. The gradients vary between 1 in 2 and 1 in 10, closely following the natural contour of the ground. The total height to which the carriages have to be raised is 1,300 feet, and the ropes, of which one is the working rope and the other the safety rope, run on separate sets of friction-rollers. The carriages are attached to each end of the ropes, and as one pair of carriages ascends the incline, the other pair descends. Each car is to contain sixty passengers, the maximum load being 7½ tons at each end of the ropes. The working rope is passed over a pair of drums eight feet in diameter, and the safety rope over one drum, the drums being fixed at the top of the incline and driven by two compound steam-engines, 40 nominal horse-power each. The speed of the car is to be six miles an hour.

**Hutchinson, Kas.**

The gauge of the Hutchinson Street Ry. Co. is four feet six inches, instead of three feet six inches.

**Ilion, N. Y.**

THE FRANKFORT & ILION STREET RY. Co. are running five cars. We add P. A. Skiff to our list of officers. Mr. F. Remington has been succeeded by J. L. McMillan as Treasurer, Mr. D. Lewis by John A. Giblin as Secretary, and Frederick Gates by J. J. Hannahs as Superintendent.

**Indianapolis, Ind.**

THE CITIZENS' ST. RY. Co. are using 550 mules for all their seventy cars. The office is No. 80 West Louisiana street.

**Jamestown, N. Y.**

THE JAMESTOWN STREET R. R. Co. have now four miles of track, for which they employ thirty-nine horses. R. N. Marvin has been succeeded by J. B. Ross as President. The other officers remain the same.

**Jersey City, N. J.**

THE JERSEY CITY & BERGEN R. R. Co. are adding a large number of conductors and drivers to their list. They are constantly adding new cars to their several lines, which necessitates the employment of more help.

The new horse car line of the Jersey City & Bergen R. R. Co., which crosses the new bridge over Morris canal in Bayonne, has been opened and is regarded by the residents of Greenville, Bayonne, and Bergen Point as an event of great importance. The first car was hauled over the line by four handsome gray horses with new harness and flowing plumes, and the car was gayly decorated with flags. The car was driven by George Bowly of Register Fielden's office, and on the car were President Charles B. Thurston, Thomas M. Sayre, Edward F. Brooks, besides a number of stockholders of the company. To these should be added officials from Bergen Point and Bayonne, and the omnipresent reporter. The road is in excellent condition. The party went to McDonald's Riverside Hotel, where the event was duly celebrated. The road was formally opened on a later day. Seven handsome and commodious jigger cars were put on, which number will be increased in connection with the needs of traffic. The fare from Jersey City ferry to Bergen Point will remain the same as it now is to Greenville, namely five cents, and the passengers for Bayonne and Bergen will be transferred at the Greenville stables. The bridge has been entirely completed, and a force of laborers have laid a new track at Washington and York streets and also on Grand street through Henderson and Grove streets. Next summer the company expect to run through open cars from the ferry to Bergen Point, a distance of about eight miles.

**Johnstown, N. Y.**

THE JOHNSTOWN, GLOVERSVILLE & KINGSBORO HORSE R. R. Co. have only four miles of track instead of five and a quarter as previously reported.

**Kalamazoo, Mich.**

THE KALAMAZOO STREET R. R. Co. have only eight miles of track instead of ten as previously reported. They have thirty cars instead of twenty-eight, according to their last report. We add to our list of officers Mr. Wm. Dewing as Vice President; J. W. Boynton takes the position of Manager instead of Secretary; R. S. Jackson has succeeded E. H. Brown as Treasurer, assuming also the position of Secretary.

**Kansas City, Mo.**

THE KANSAS CITY CABLE RY. Co. have now eight miles of track. Their rolling stock has been increased from ten to seventy-five cars. We add F. A. Tucker to the list of officers as Superintendent. The office is S. E. corner Ninth and Washington sts.

THE METROPOLITAN STREET RY. Co. are now operating several lines of horse railroads with a total mileage of 11½ miles, and contemplate changing some of them to cable lines, but just how far these changes will extend has not yet been determined. The gauges of the roads operated are 4 ft. and 4 ft. 8½ in. The officers are C. F. Morse, as President; Vice President, Geo. H. Nettleton; Secretary, W. J. Perry; Treasurer, R. W. Armour; Superintendent, E. J. Lawless; Chief Engineers, Knight & Benticon; General Counsel, Pratt, Baumbach & Ferry;

Auditor and Cashier, R. J. McCarthy. The capital stock of the company is \$1,250,000.

Work is now in progress by which three miles of track will be changed to the cable system by spring. The whole system operates about sixty cars a day.

THE JACKSON COUNTY HORSE R. R. Co. is a part of the Metropolitan system.

**Knoxville, Tenn.**

THE MARKET SQUARE & ASYLUM ST. RY. Co. report two miles of track of 5 ft. gauge, 22 pound rail, 3 cars and 18 horses. We add to the list of officers W. B. Henderson as Secretary, and L. O. Rogers as Superintendent. The general office is 148 Gay street.

THE MABRY BELL & HARDY ST. RY. Co. report 4 miles of track, 4 cars and 29 horses. M. E. Thompson is Superintendent and Manager.

THE METROPOLITAN RAILROAD is having eighteen grip cars built by the La Clede Car Co. of St. Louis.

**Larchmont, N. Y.**

THE LARCHMONT MANOR Co. intend adding one new car and a new switch in the spring. E. E. Flint is Secretary, and W. H. Campbell Superintendent.

**Lansing, Mich.**

THE LANSING TRANSIT RY. Co. is not a street railway, but a spur from the track of the Detroit, Lansing & Northern R. R. to serve the factories on the west side of the river.

**Lawrence, Mass.**

THE MERRIMAC VALLEY HORSE R. R. Co. have 6½ miles of track.

**Lawrence, Kans.**

THE LAWRENCE TRANSPORTATION Co. report 5½ miles of track and 8 cars as corrections to our last report.

**Lenox, Mass.**

Stephen D. Field of New York is getting out the plans for a new electrical railroad between Lenox and Glendale for the special accommodation of New York summer travel. The proposed line will run by the side of Stockbridge Bowl through Curtisville, where the power may be chiefly obtained. The estimated cost of the line is \$150,000.

**Lewiston, Me.**

THE LEWISTON AND AUBURN HORSE R. R. Co. report that they have now 10 miles of track, and are running 20 cars hauled by 60 horses. This is an increase of 4 cars and 15 horses since we received our last report from them. On the board of officers Charles C. Corbett has succeeded H. C. Packard as Treasurer, and J. E. Fairbanks succeeds E. P. Stinchfield as Superintendent.

**Lexington, Ky.**

THE LEXINGTON CITY R. R. Co. have now 8 miles of track. R. P. Metcalfe has succeeded John Cross as President. He also holds the position of Treasurer. Albert Cross has succeeded C. R. Diver as Vice-President and Manager. He also holds his old position as Secretary.

**Lincoln, Neb.**

THE LINCOLN STREET RY. Co. report 8 miles of track, 13 cars and 100 horses. The road has also purchased the franchise and all the stock of the Capital City Ry. Co.,

and the two will be consolidated under the name of the Lincoln Street Ry. Co., giving the latter 12 miles of track, 150 horses and 21 cars. A two-thirds interest in the stock has been purchased by A. E. Touselin, President of the Chicago & Northern R. R. Co. and a Boston syndicate, who will immediately greatly improve the plant.

#### London, Canada.

THE LONDON STREET RY. Co. report 5 miles of track, and will lay at least 1 mile more in the spring.

#### Long Island City, N. Y.

THE RIKER AVENUE & SANDFORD'S POINT RY. Co. have commenced operations. They will build two miles of track of 4 ft. 8½ in. gauge, with 47 pound steel rails. Horses will be used as the motive power, but it has not been yet decided how many horses or cars will be used. The horses and rolling stock will be supplied, and the road managed by the Steinway & Hunter's Point R. R. Co. The officers are: J. H. Hempstead, President; and Oscar F. Steins, Secretary. It is expected that the road will be open by June 1, 1887. The office is 109 E. 14th street, New York.

THE STEINWAY & HUNTER'S POINT RY. Co. report sixty-eight cars and 225 horses.

#### Louisville, Ky.

THE CENTRAL PASSENGER R. R. Co. report 49 miles of track of 5 feet gauge, 52 pound rail, 150 cars and 750 horses. B. DuPont is President, and T. C. Donnigan Secretary. The office is at No. 18 Walnut street.

#### Lowell, Mass.

The office of the Lowell Horse R. R. Co. is at 33 Hildreth street. They have 7½ miles of track, 33 cars and 125 horses.

#### Lynchburg, Va.

Stephen Adams has assumed the office of President in addition to that of Treasurer, which he already held, of the Lynchburg Street R. R. Co. The office is at 811 Main street.

#### Macon, Ga.

THE MACON & SUBURBAN STREET R. R. Co. report 10 miles of track and 5 ft. gauge. They will build extensions early in 1887.

#### Manchester, N. H.

THE MANCHESTER HORSE R. R. Co. has 7 miles of track. The office is on Depot street.

#### Meriden, Conn.

The officers of the new road now in process of construction are: G. R. Curtis, President; Charles L. Rockwell, Secretary and Treasurer, and H. S. Wilcox, Auditor.

#### Meridian, Miss.

George F. Covert is President of the Marine Street Ry. Co. instead of George S. Conant, as we have before reported.

#### Memphis, Tenn.

THE MEMPHIS CITY R. R. Co. report that they have now 80 cars in the place of 66 as at the time of their last report. We also add to our list of officers: S. P. Read, Treasurer, and James Frost, Secretary.

#### Michigan City, Ind.

THE CITIZENS' STREET RY. Co. report two miles of track, 4 ft. 8½ in. gauge, 30 pound rail, 4 cars and 16 horses. The officers are: William G. Knight, President; John Lyons, Vice-President; Jacob D. Henderson, Sec-

retary; Jerry H. Knight, Treasurer. The office is on West Washington street, South Bend, Ind.

#### Middletown, Conn.

THE MIDDLETOWN HORSE R. R. Co. are using the 56 pound rail. John M. Douglas is President. The office is 166 Main Street.

#### Milwaukee, Wis.

The office of the Milwaukee City R. R. Co. is at 209 West Water street.

#### Mohawk, N. Y.

C. W. Carpenter has succeeded J. Brown as President of the Mohawk & Ilion R. R. Co.

#### Moline, Ill.

THE MOLINE CENTRAL STREET RY. Co. report 2½ miles of track. P. H. Wessel is now President instead of Vice-President, succeeding F. H. Velie, N. Y. Cady succeeding him as Vice-President.

#### Muscataine, Ia.

Mr. W. Hoffman has succeeded D. C. Richman as Vice-President of the Muscatine City Railway Co. O. J. Chapman has retired from the position of Superintendent and no successor has as yet been appointed. The company have now 34 horses and mules at work hauling the cars.

#### Natick, Mass.

THE NATICK & COCHITUATE ST. RY. Co. has now seven cars. We add to our list of officers the names of Harrison Harwood President, and Frank Hayes Clerk.

#### New Albany, Ind.

The office of the New Albany Street Ry. Co. is at the corner of Vincennes and Spring streets.

#### Newark, N. J.

THE NEWARK & BLOOMFIELD ST. RY. Co. is now the Bloomfield division of the Essex Passenger Ry. Co.

#### New York, N. Y.

WARNECK & TOFFLER's exhibit of Roller Matting we omitted to mention in our list of exhibits at the Cincinnati Convention.

CHARLES B. MILLER, of 2½ Coenties Slip, has established the business of manufacturing the Magnolia anti-friction metal. The metal has undergone most severe tests, and has shown such results as to justify the interest of street railway men.

POMEROY & FISCHER, 30 Frankfort street, New York, will succeed Adolphus Keppleman on the 1st of January as American representative of Noble & Hoare's varnishes.

THE STREET RAILWAY JOURNAL, established in 1884 at 32 Liberty street, New York, has moved its offices to 113 Liberty street, where the publishers have secured much larger and more convenient quarters. They are now enabled to conduct the growing business of their editorial, publishing, and printing departments under one roof. They invite all their street railway friends to call and see them in their new quarters.

The One Hundred and Twenty-fifth street surface railroad has been converted to a cable road, the work of putting the cable in position being begun at midnight of the night of November 23. Twenty-four horses were required to pull the cable along the road.

There have been several experiments re-

cently in the use of electric motors for traction purposes in New York. Among them was one of the Sprague motor, which was exhibited on the 34th street branch of the Third Avenue Elevated R. R. The car, which is about the size of an ordinary car, was operated without brakes by a series of switches on the platform. The car was run back and forth several times between Third avenue and 34th street ferry. It is said that the main practical obstacle in the way of adopting the motor on the elevated system is the difficulty of handling and furnishing the enormous power required by the 63 trains in operation at one time. This amounts to 11,700 horse power.

Another experiment was made with the Julian electric street car on the Eighth avenue surface road. The car ran from the stables at 49th street, up to 61st street and back. The car is an ordinary horse car raised on an iron frame somewhat higher than the ordinary, and provided with eight electric storage batteries and motors. The storage batteries are inserted on the outside under the seats of the car, and the motor itself is entirely concealed in a space under the floor. The bearing is covered by a device on the platform, by means of which the car can be started, stopped and backed. The larger brace is used for stopping. This is the system of electric cars now in use in Brussels and Hamburg, and is being tried in Paris and Lisbon. The car is also lighted by electricity.

According to Mayor Grace, the Aldermen have found a method of evading the law requiring the sale of street railroad franchises. It is said that the arrangements are so made in the case of the proposed 28th and 29th street road, that the franchise was granted in such a way that only one road could bid for it. The Mayor promptly vetoed this scheme, but it is thought probable that there will be enough votes in the board to override the veto. Again, in the face of a strong protest from the property owners, it has been voted to authorize the construction of a street railroad on that part of Fourth avenue above the Grand Central Depot. It was understood that when this avenue was used for a tunnel no railroad should be constructed on the surface obstructing any space available for street traffic, but as the New York Times remarks, if they had the power the Aldermen would give the whole earth to the corporation provided they could get enough for it.

THE JOHN STEPHENSON Co. seem to be as busy as usual. They are building cars for Ecuador and for various sections of this country, including Baltimore, Schenectady, Auburn, Pittsburg, Meriden, Orange, Jacksonville, Lowell, and California.

Judge Lawrence has entered a judgment for \$43,861.21 in favor of the city, as license fees on the cars of the Third Avenue R. R. Co.

The suit of Mrs. Annie E. Daly in Superior Court, against the Second Avenue line, to recover damages for injuries received from being thrown from a car which started suddenly before she alighted, has

been decided, and a verdict given in favor of the company by Judge O'Gorman. The counsel for the plaintiff, however, made a motion to set aside the verdict, and for another trial, on the ground of fraud. The fraud is claimed to be on the part of one of the witnesses, who claimed that she saw Mrs. Daly get off the car and trip over a rail, and afterwards told a friend that she knew nothing about the accident, but did not want the conductor to get into trouble.

The demand of conductors and drivers on the Sixth Avenue line, for \$1.50 to trippers to Carmine street, has been granted, and the trippers are to be paid that instead of \$1.20 as heretofore.

It has been proposed to reduce the wages of the trippers on the Eighth Avenue road from \$1.75 to \$1.50. A committee of men has been appointed to wait on the company.

#### North Adams, Mass.

THE HOOSAC VALLEY STREET RY. Co. report that they have 6 miles of track laid to a gauge of 4 feet 8½ inches, with a 40 pound rail. They are running 10 cars with 29 horses and two steam motors. The officers are: William B. Baldwin, President; W. Cronkhite, Vice-President; S. Procter Thayer, Secretary and Treasurer, and G. W. Lincoln, Manager.

There is no such road as the North Adams Street Ry.

#### Orlando, Fla.

THE ORLANDO & WINTER PARK RY. Co. contemplate building 6 miles of road to 4 ft. 8½ in. gauge. Steam motors will be used. The officers are: President, R. J. Gillham; Treasurer, T. J. Beeks; Superintendent and Engineer, J. H. Abbott. The capital stock is \$100,000. The road will be opened this winter.

#### Pawtucket, R. I.

THE PAWTUCKET ST. R. R. Co. report four foot gauge, twenty-four cars and 100 horses. The officers are: President, A. B. Chase; Vice President and General Manager, G. F. Longstreet, and Treasurer, E. M. Littlefield. The office is on Broad street.

#### Philadelphia, Pa.

THE GREEN & COATES R. R. Co., forming a portion of the leased lines of the People's Passenger Railway Co., report Moses A. Bropsie as President and Lewis S. Renshaw as Secretary and Treasurer. The offices are on the northwest corner of Tenth and Chestnut streets.

#### Peoria, Ill.

THE EAST BLOCK PEORIA HORSE R. R. Co. is in process of construction. It will be 1½ miles long, 4 ft. 8½ in. gauge, laid with 30 and 40 pound rails. At first 4 cars and 24 horses will be used. The officers are: President, N. Giles; Secretary, R. R. Boureaud. The road is to be operated as a branch of the Central Horse and Cable road. The capital stock is \$11,000. Work was commenced on November 1st, and the road will be opened about December 15th.

#### Raleigh, N. C.

THE RALEIGH ST. R. R. Co. was opened for traffic about the middle of November. It has five miles of track and two and one-half miles will be constructed. The gauge is

four feet eight and one-half inches. It is laid with a thirty-five pound side bearing strut, and sixteen pound T steel rail. The road is run with six cars hauled by thirty-six mules. The officers are: Geo. M. Snodgrass, President; R. T. Gray, Treasurer; J. F. Scott, Secretary and Superintendent, and F. H. Busbee, Attorney. The capital stock of the road is \$25,000. The location of the office has not yet been determined.

#### Salem, Mass.

THE SALEM & DANVERS ST. RY. Co. report twelve miles of track, twenty-four cars and 117 horses, which makes an increase of seventy-two horses since our last report. Geo. A. Vickery has assumed the position of Treasurer in place of Geo. W. Williams, still retaining his old position of Secretary. David N. Cooke has been promoted from the position of Assistant Superintendent to Superintendent, instead of W. B. Perkins, resigned.

#### Seneca Falls, N. Y.

The following is the list of officers of the Seneca Falls & Waterloo R. R. Co.: Geo. H. Stayner, President and Treasurer; C. H. Williams, Assistant Treasurer; Charles B. Haines, Vice-President and General Manager; A. G. Haines, Superintendent, and Henry S. Ide, Secretary. It may be added that Mr. A. G. Haines is also Vice-President of the Seneca Falls & Cayuga Lake R. R. Co., and General Manager of the Cayuga Lake Park Co. Mr. Charles D. Haines is President of the Hoosac Valley R. R. Co., of North Adams.

#### Springfield, Ill.

THE SPRINGFIELD CITY R. R. Co. report 7 miles of track, employing 90 horses and mules. The officers are: President, A. L. Ide; Treasurer, William Ridgely; Secretary, George Brinkerhoff.

#### Springfield, Mass.

THE BEMIS CAR BOX Co. are furnishing twenty-five sets of their patent car box and gear to the Chicago Passenger Ry.; forty sets to the Minneapolis St. Ry. Co.; nine sets to the Eau Clair road; eight sets for the Detroit City road; besides a number of smaller orders. They also furnish Pullman and other leading builders, with boxes and gears. They are now located in their new office on Main street, near the depot.

THE BEMIS CAR BOX Co. has done more than treble the business, during the past year, done by it the previous year. Their new office is at 227 Main street, opposite the depot.

#### St. Louis, Mo.

A correspondent writes as follows: "At the first meeting of this session of the Council nearly every street railway in the city presented bills asking for a change of motive power from horse to anything but steam. The St. Louis Cable & Western is, no doubt, the lever that has brought about the change of heart.

"A number of new franchises was also asked for.

"A bill for an elevated road running out St. Charles street and to connect at the western terminus with the West End Nar-

row Gauge. This route will take the cream of the city. The Lindell road runs just one block to the north and Missouri road (Olive street) just two blocks to the south. It is safe to say it will not pass, however. Another important bill is that of the Grand avenue, Lafayette Park road, said to be cable. They propose to use the tracks of the Missouri (Olive street) line from Fourth to Thirteenth street, thence across Thirteenth street to Clark avenue to Eighteenth street, over the Eighteenth street bridge, to Chouteau avenue, thence to Dolman street to Hickory to Mississippi avenue, Park avenue, California avenue and Russell avenue, Shenandoah, Grand avenue and Tower Grove Park. Bill Swift, the contractor, is fathering this bill, and says it's going through. It has a fine territory to draw from, a class of people who can all afford to ride.

"Two different companies are desirous of occupying Grand avenue, with a cross-town line. Mr. Julius Walsh, the owner of the Citizens' Railway, has been anxious for some years to extend his line, which already occupies a portion of the street, but has been waiting for the completion of the Bridge before presenting his bill. He is now forestalled by the Shaw's Garden, Tower Grove and Fair Ground Railway. Mr. Walsh's bill has been presented, however, and I think it would only be fair, all things being equal, to give it the precedence."

#### Syracuse, N. Y.

THE SYRACUSE & SOUTH BAY STREET R. R. Co., previously reported as a street railroad is a steam railroad 15 miles long.

E. F. Rice is President of the Seventh Ward Ry. Co.

#### Taylorsville, N. C.

It has been reported that Mr. Stevenson is contemplating the construction of a street railroad. That gentleman writes that no such scheme is on foot.

#### Toledo, O.

THE TOLEDO CONSOLIDATED STREET RY. Co. report 19 miles of track, 50 cars and 225 horses. We add John Gilmartin as Superintendent to our list of officers.

#### Utica, N. Y.

THE UTICA, CLINTON & BINGHAMTON STREET R. R. Co. are adding 1½ miles of branch line.

#### Waterbury, Conn.

THE WATERBURY HORSE R. R. Co., listed in our last issue among the new roads, is now in operation.

#### Worcester, Mass.

THE WORCESTER ST. RY. Co. have lengthened their track and added six open Brill cars, three open Jones cars, six Jones box cars, all equipped with Bemis gear and "alarm" registers.

THE CITIZENS' ST. RY. Co. are now operating seven and one-quarter miles of track, and have their equipment complete. Their new stables are situated at opposite ends of the line.

THE CITIZENS' STREET RY. Co. report 7½ miles of track laid to 4 ft. 8½ in. gauge with 45 pound rail. They have 19 cars and 100 horses. H. S. Seeley has succeeded F. W. Brigham as Secretary and Treasurer. J. N. Akarman is Superintendent.

THE WORCESTER STREET RY. Co. report 7½ miles of track and 31 cars. H. S. Seeley has succeeded Henry S. Searls as Secretary and Treasurer. J. N. Akarman is Superintendent, and J. B. Chapin Assistant Superintendent.



### The Reliable Sand Box.

We illustrate in this connection a new device\* which has recently been placed upon the market for the purpose of sanding or salting the rails of street railways, although, of course, it may be used for other purposes. It consists primarily of a hopper with a movable side, and into this sand, gravel, or salt in any condition, may be placed. It matters nothing whether the sand and gravel contain large stones and are wet, or whether the salt is in large lumps, it is sure to be fed upon the track wherever it is desired it should be done, as the passage from the hopper is merely a chute.

The device is operated by a treadle placed in convenient position to be used by the

was fed upon the rails without the slightest difficulty, for the simple reason that each time the hopper closed the whole body of the sand was moved, and thus placing it in an unsettled state, and causing it to drop down upon the rails wherever it was desired that it should do so. Of course, it is not claimed that wet sand is better, or as good, as dry sand, but simply that the device can be used with wet materials when the dry is not at hand and convenient.

The engraving, which we are enabled to present in this connection, shows very clearly the construction of the machine and how it is placed upon the car. There is no necessity of any cutting away of the seats, as it can be placed underneath them, and only requires that a hole should be cut in the floor large enough to allow the sand to

The sides stand at an angle of about 45 degrees to the vertical, making a right angle with each other. The box is 13½ in. high, 10 in. wide, 30 in. long at the top of the chute and 3½ in. at the bottom.

### Personal.

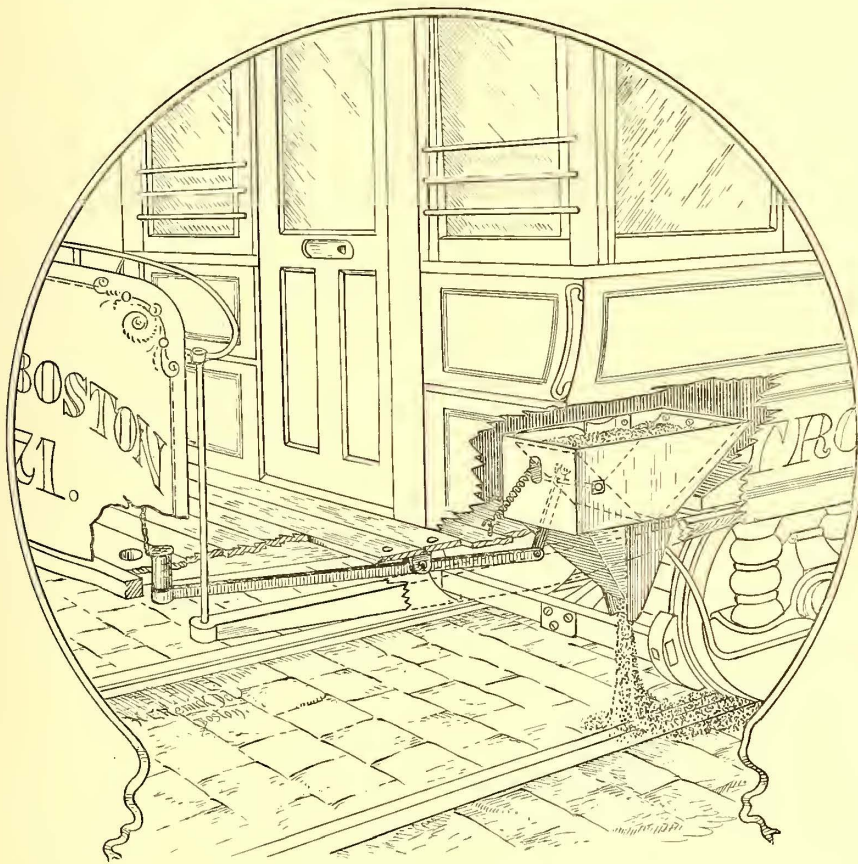
J. N. AKARMAN, formerly with the Charles River road, is now acting superintendent for the Worcester Street Railway and the Citizens' Street Railway of Worcester, Mass.

M. Napoleon Ney, President of the Geographical Society of Paris, Col. Laussadat, Director of the Conservatory of Arts and Métiers, and Leon Chabert, engineer of the city of Paris, with several other distinguished French officials, visited the Tenth avenue cable road, in company with Dr. Otto A. Moses, electric engineer, and Dr. J. Miller, on Saturday, Nov. 6th, 1886. They were very much interested in the working of the road. Cars were stopped, started and moved at various speeds for their special benefit. After the ride they inspected the machinery at the depot at One Hundred and Twenty-eighth street, and expressed themselves as well pleased.

At the meeting of the street railway company held last evening, Mr. Orange J. Chapman, who has been Superintendent of the company since its organization, tendered his resignation, to take effect immediately, and Mr. Peter Donovan, the stable foreman, also resigned. Mr. Chapman has been the right man in the right place; he is a thorough superintendent, and has been faithful to his trust, which is one of great responsibility. During his term of office he has been ever zealous and watchful to the interest of the company, and that organization owes the present excellent condition of its property to Mr. Chapman. In accepting his resignation it loses a good superintendent, and one whose place will be hard to fill. Mr. Fred Bloomer, who has had charge of the Muscatine Lumber Co.'s yards, has been elected foreman, and Mr. Chapman continues with the company until December 1, to assist Mr. Bloomer in obtaining the "run of things." Mr. B. will make a good foreman and will be faithful to every trust reposed in him.—Muscatine (Ia.) Tribune.

### The Employees' Position.

The public will sympathize with horse-railroad employees when they protest against working long hours for wages that will barely support them, but they will not support them when they play the part of bullies and cowards. They have a right to demand more wages than they are receiving, and to strengthen their demands by all peaceable means, but they have no right to interfere with other men's work, or to insist by forcible means that they shall not sell their labor at what price they please. The disgraceful scenes which were enacted in New York have not advanced the interests of street-railway men. They may gain a temporary advantage by such actions, but in the long run they will be looked upon as disturbers of the public peace, who have placed themselves on a level with the anarchists, and will be given the go-by by all law-abiding citizens.—Ex.



THE RELIABLE SAND BOX.

driver with his foot, and the cap of this treadle being so adjusted that the opening into the hopper may be made sufficient to allow large gravel stones to drop through, or just a break to allow a stream of fine dry sand to pass.

When the device is not in use, the cap can be lifted out by means of a chain and dropped into a safe place in convenient position so that passengers when standing upon the platform will not step upon it and thus sand the rails unnecessarily. The moving part of the hopper is so arranged that as it moves back and forth it can act as a crusher and pulverize the sand, which may be in lumps, or start it when it is wet. We saw a device of this kind in use some days ago, and although the sand was soaking wet it

pass through. It may be filled through the top of the hopper and the seat, as may suit the convenience of the road using them. The mechanism for operating is merely a system of levers which it will be impossible to get out of order, and a stout spring to hold the hole in its proper position.

It is solidly and substantially made of japanned or galvanized iron, and will stand a great amount of wear. It has been introduced upon a number of the Boston roads, among them the Metropolitan, which have adopted it for all cars upon their road.

The advantages that are to be derived from such a device cannot but be thoroughly appreciated by street railway officers, in that it gives the driver a complete control of the car at all times.

The details of the construction are these:

\*Car Track Friction Appliance Co., W. T. Butler, 19 Tremont row, Boston, Mass.



# SOME INFORMATION OF VALUE



To Druggist and Public in regard to COMBAULT'S CAUSTIC BALSAM, The Great French Veterinary Remedy

Office of LAWRENCE, WILLIAMS & Co., }  
Sole Importers and Proprietors for the U. S. and }  
Canadas. Cleveland, Ohio. }

As we have, at very great expense, introduced the *genuine* GOMBAULT'S CAUSTIC BALSAM in this country, and its great value is being appreciated wherever it is known, and being anxious to protect its reputation, and also dealers and the public from being imposed upon with any imitation of the genuine article, we have procured from MR. GOMBAULT, who is the sole proprietor and only living manufacturer of the *genuine* GOMBAULT'S CAUSTIC BALSAM in the world, a certificate, of which the following is a true and exact copy, and all who are interested should not fail to read it carefully:

EUG. GOMBAULT }  
Negotiant }  
NOGENT-SUR-MARNE, }  
Near PARIS, FRANCE, }  
Feb. 23, 1884. }

a NOGENT SUR Marne (Seine).  
To all Druggists and the Public of the United States and Canadas:

The above is an exact Fac-Simile of the Label on every genuine bottle of GOMBAULT'S CAUSTIC BALSAM, the Great French Veterinary Remedy, only the back-ground of label is bright redin color. Any other is a worthless imitation.

I, the undersigned, Eugene Gombault, of Nogent-sur-Marne (Seine), France, do hereby certify that I am the sole and exclusive proprietor and preparer of the Veterinary Remedy Gombault's Caustic Balsam, originally invented and for many years prepared by my late father, Joseph E. Gombault (deceased), ex-Veterinary Surgeon to the French Government Stud.

I further certify that I have made a contract, under date of June 23, 1880, with Messrs. Lawrence, Williams & Co., of Cleveland, Ohio, U. S. A., under a twenty years' limit, which constitutes them my sole and exclusive agents for the genuine Gombault's Caustic Balsam for the United States and Canadas. I further certify that *not one drop* of Gombault's Caustic Balsam has been, since date of above contract, or will be, shipped to any other party or parties except the said Lawrence, Williams & Co., in the United States or Canadas; and further decline any responsibility as to the genuineness or purity of any preparation offered in the United States or Canadas purporting to be Gombault's Caustic Balsam other than that sold by Lawrence, Williams & Co., and bearing their trade-mark and label, as the said Lawrence, Williams & Co. are, to the best of my knowledge and belief, the sole and *only* importers of the genuine Gombault's Caustic Balsam to the United States and Canadas.

I further certify that the Gombault's Caustic Balsam as put up and sold by Messrs. Lawrence, Williams & Co., in octagon-shaped bottles, with the signature of my deceased father, J. E. Gombault, around the neck of bottles, and label with red back-ground, printed in English language, and bearing fac-simile of the signature of Lawrence, Williams & Co., and their name blown into the glass on each side of said bottles, *is the only genuine* Gombault's Caustic Balsam that is sold in the markets of the United States to my knowledge or with my consent. I further certify that the preparation in above-described bottles is all prepared by me, and exported direct to the said Lawrence, Williams & Co., and introduced by them into the markets of the United States and Canadas in strict purity, and is the genuine Gombault's Caustic Balsam. I feel grateful to the trade and public of the United States for the favor they have shown me by so liberally patronizing this preparation, and *to* protect them from any possible imposition, and in order to give them all possible security in obtaining the genuine article, I thought it my duty to place this declaration before them, which I certify to be correct in every particular.

Very truly and courteously,

SEAL

On the original of the foregoing, which we hold, the Mayor of Nogent-sur-Marne certifies to the individuality of Mr. Eug. Gombault, and to his signature, with his official signature and seal. It is also certified to by the Prefect of Department of Seine, Minister of Foreign Affairs of France, and the whole bears the certificate and seal of the United States Consul-General of Paris. We certify above to be correct. M. J. LAWRENCE & M. E. WILLIAMS.

STATE OF OHIO, Cuyahoga County, ss. CLEVELAND, OHIO, April 25th, 1884.  
Personally appeared before me, M. J. Lawrence and M. E. Williams, of the firm of Lawrence, Williams & Co., and to me personally known, and after being duly sworn, stated that the foregoing was a true and exact translation of the original document as set forth, and of the statements made therein are true and correct. Before me a Notary Public in and for the County of Cuyahoga, this 29th day of April, 1884. C. L. RICHMOND, Notary Public.

[SEAL]  
We think this will be sufficient evidence to convince all that the goods we are introducing are the only genuine Gombault's Caustic Balsam goods in this country, and hope this may prevent all dealers and consumers from being imposed upon with any imitations of this very valuable veterinary remedy. We would further caution all parties from being deceived by any French labels or wrappings, as these can be as easily printed in this country as in France, and this is a well-known trick for counterfeiting many French preparations in this country, and should be accepted as no evidence of genuineness.

Price \$1.50. Sold by Druggists, or sent by us by express, charges paid, on receipt of price. Descriptive Circulars, with testimonials, sent to all applicants. Address,

**LAWRENCE, WILLIAMS & CO., CLEVELAND, O.**









WATERLOO, IA.—Waterloo St. Ry. Co. 2 m, 3 g, 20 lb r, 2 c, 1 baggage wagon, 9 h. Pres. Lorán W. Reynolds, Sec. and Treas. J. H. Kuhn, Man. M. K. Kent.

WEST HAVEN, CONN.—New Haven & West Haven R.R. Co. 6 m, 4-8 1/2 g, 54 lb r, 24 c, 115 h. Pres. Geo. R. Kelsey, Supt. W. W. Ward, Treas. D. 1 row bridge, Sec. Sam'l L. Smith.

WESTPORT, CONN.—Westport & Saugatuck Horse R.R. Co. 1 1/2 m, 4-8 1/2 g, 40 lb r, 3 c, 5 h. Pres. A. S. Huribaut, Sec and Treas B L Woodworth, Supt. E S Downe

WHEELING, W. VA.—Citizens Ry. Co. 10 m, 5-2 1/2 g, 45 lb r, 20 c, 55 h. Pres. Dr. C. A. Wingelter, Sec. Van B. Hall, Supt. Michael J. O. tus.

WHEELING & Elm Grove R.R. 7 m, 4-8 1/2 g, 30 lb r, 12 c, 4 Baldwin Motors. Pres. J. D. Dubols, Sec. E. J. Ritter, Supt. E. Hirsch.

WICHITA, KAN.—Wichita City Ry. Co. 7 1/2 m, 11 c, 60 mu, 4 h. Pres. B. H. Campbell, V. Pres., Treas. & Gen. Man. E. R. Powell, Sec. G. W. Laramer, Atty. E. C. Ruggles.

WILKESBARRE, PA.—Ilkesbarre & Kingston Pass. R.R. Coarville Passenger R.R. 2 1/2 m, 4-8 1/2 g, 20-34 lb r, 3 c, 10 h. Pres. Geo. W. Klunkendall, Supt. A. S. Orr, Sec and Treas Geo Loveland. Capital, \$62,675

WILLIAMSPORT, PA.—Williamsport St. R.R. Co. Wilmington City Ry. Co. 6 m, 5-2 1/2 g, 45 lb r, 19 c, 80 h. Pres. W. Canby, Sec. & Treas. John F. Miller, Supt. Wm. H. Burnett.

WINDSOR, CAN.—Sandwich & Windsor Passenger R.R. Co. Windsor & Walkerville Electric Ry. Co. 2 m, 2 c.

WINFIELD, KAN.—Union St Ry Co 2 1/2 m 4 g, 28 lb r, 2 c, 8 mu Pres — Shuler, V Pres H E Sillman, Treas John D Pryor, Sec John A Eaton Capital, \$25,000

WINNIPEG, MANITOBA, CAN.—The Winnipeg St. Ry. Co. 5 m, 4 8 1/2 g, 35 lb r, 13 c, 75 h. Pres. Duncan MacArthur, Sec. & Mangr. Albert W. Austin, Supt. Geo. A. Young.

WINONA, MINN.—Winona City Ry. Co. 4 m, 3-6 g, 27 lb r, 10 c, 39 h. Pres. John A. Mathews, V. Pres. B. H. Langley, Sec. & Treas. C. H. Porter.

WOBURN, MASS.—No. Woburn St. Ry. Co. 2 1/2 m, 4 8 1/2 g, 40 lb r, 5 c, 4 h. Pres. & Treas. J. R. Carter, Supt. Dexter Carter.

WORCESTER, MASS.—Worcester St. Ry. Co. 7 1/2 m, 4-8 1/2 g, 43-45 lb r, 31 c, 151 h. Pres. Geo. H. Seeley, Sec. & Treas. H. S. Seeley, Supt. J. N. Akarman, Ass't. Supt. J. B. Chaplin

Citizens' St. Ry. Co 7 1/2 m, 4-8 1/2 g, 45 lb r, 19 c, 100 h. Pres. Chas. B. Pratt, Sec. & Treas. H. S. Seeley, Supt. J. N. Akarman.

WYMORE, NEB.—Wymore and Blue Springs Ry Col. 2 1/2 m, 3-6 g, 3 c, 8 h. Pres. E. P. Reynolds, Rock Island, Ill., V. Pres. I. H. Reynolds, Gen. Man. Ben Reynolds, Sec. Treas. and Acting Supt. E. P. Reynolds, Jr.

YOUNGSTOWN, O.—Youngstown St. R.R. Co. ZANESVILLE, O.—Zanesville & McIntire St. Ry. Co. 3 m, 3-6 g, 38 lb r, 12 c, 54 m. Pres. J. Bergen, Sec. W. C. Townsend, Treas. T. B. Townsend.

NEW ROADS.

ANN ARBOR, MICH.—Ann Arbor St. Ry. Co 4-8 1/2 g. Pres. Julius E. Beal, V. Pres. Edward Duffy, Sec. Zina P. King, Treas. Louis D. Taylor, Supt. Thomas J. Keech. Capital \$20,000. Office, 46 Main St.

BIRMINGHAM, ALA.—East Lake Land Co. 7 m, 4-8 1/2 g, 45 lb r, 4-8 c motor power. Pres. Robt. Jennison, V. Pres. A. A. Clisby, Treas. T. B. Lyons, Sec. S. M. Hanby. Capital \$200,000. Work in progress, to be completed in January, 1887.

BROOKLYN, N. Y.—Union Ry. Co. of the City of Brooklyn.

COVINGTON, GA.—W. C. Clark & Co. Incorporators and owners. 1 m, 20 or 30 lb r, 2 pass. c, 2 flat c, pass. cars for 1 h, 6 to 8 mu, or h. Work will be commenced by Nov. 1 or delayed until spring.

CHICAGO, ILL.—The Crosstown Pass. Ry. Co. of Chicago, 30 m, 4-8 1-2 g, 45 lb r, 75 c, 500 to 800 h. Pres. John J. Curran, Treas. Geo. P. Bunker, Sec. James A. Taylor. Capital stock, \$1,000,000. Gen. office, room 18, No. 164 Washington st. Time of commencement of work undecided.

DANBURY, CONN.—Danbury St. Ry. Co. 4m, between Danbury and Bethlehem. Work in progress.

KANSAS CITY, MO.—Grand Avenue Ry. Co. (For officers see Directory). Now constructing: 8 m, double track cable road.

LOCKPORT, N. Y.—Lockport, St. Ry. Co. (Work in progress.)

LONG ISLAND CITY, N. Y.—Riker Avenue & Sandford's Point R. R. Co. 2 m, 4-8 1/2 g, 47 lb steel r. Pres. J. H. Hemplead, Sec. Oscar R. Stehls. Capital \$20,000. Work in progress; to be opened June 1, 1887. Office, 109 E. Fourteenth st., New York.

MERIDEN, CONN.—Meriden St. R. R. 4 1/2 m, 4-8 1/2 g, 35 lb r, 12 c, 56 h. Pres. G. R. Curtis, Sec. & Treas. Chas. L. Rockwell, Auditor, H. S. Wilcox, Man. John L. Billard. Work in progress.

NEW BRITAIN, CONN.—New Britain Tramway Co., chartered by C. S. Lander. 3 1/2 m, Capital \$25,000.

NEW LONDON, CONN.—New London Horse Ry. Co. John Tebbets, Incorporator.

NEWTON, MASS.—Newton St. Ry. Co. 5 m, 4 8 1/2 g, 5 c, 5 electric motors, 35 lb r. Pres. Horace B. Parker, V. Pres. Lucius G. Pratt, Treas. Herbert G. Pratt. Capital stock, \$50,000. Present office, 87 Milk st, Boston, Mass. Work will be commenced and the road opened in the spring of 1887.

NEW YORK, N.Y.—St. Nicholas and Crosstown R. R. Co. (Incorporated and franchises partly granted.)

OMAHA, NEB.—Cable Tramway Co. of Omaha. 4 m, 4-8 1-2 g, 58 lb r, 10 c, each with grip; operated by cable. Pres. S. R. Johnson, V. Pres. L. B. Wil-

lams, Sec. and Treas. C. E. Yost, Chief Engineer Robert Gillham. Capital stock, \$300,000. General office, 215 South 13th st.

ORLANDO, FLA.—Orlando & Winter Park Ry. Co. 6 m, 4-8 1/2 g, steam motors Pres. R. J. Gillham, Sec. Geo. R. Newell, Treas. T. J. Beeks, Supt. & Eng. J. H. Abbott. Capital \$100,000. To be opened in Feb. 1887.

PEORIA, ILL.—East Bluff Horse R. R. Co. 1 1/2 m, 4-8 1/2 g, 30-40 lb r, 4 c, 24 h. Pres. N. Giles, Sec. R. R. Boureaud, Treas. M. E. Culver. Capital stock, \$11,000. Work in progress. Road to be opened Dec. 15, 1886.

PLYMOUTH, MASS.—Plymouth & Kingston St. R.R. Co. 2 1/2 m, 4-8 1/2 g, r undecided, 6 to 10 c, 10 to 12 h. Capital stock, \$25,000. Joseph D. Thurber and others incorporators. Work to be begun in spring of 1887.

PITTSBURG, PA.—Wilkinsburg and East Liberty Ry. Co. 3 m, 4-8 1-2 g, Johnson T rails, Pres. Ed. Jay Allen, Sec. and Treas. W. H. Allen. To use about 5 c and 20 h. Not decided when road will be opened. Capital stock, \$15,000. Present office, 517 Wood st.

SCRANTON, PA.—Scranton Suburban Ry. Co. In process of construction, will use electric motor on Van Depoele system. 2 1/2 m, 4-8 1/2 g, 52-40 lb r, number of cars undecided. Pres. Edward B. Sturges, Treas. T. F. Torrey, Sec. Geo. Sanderson.

SAN FRANCISCO, CAL.—The Powell & Jackson St. R.R. Co. 11 m, 3-6 g. Pres. W. J. Adams, V. Pres. I. H. Lynch, Treas. W. H. Martin, Sec. G. H. Waggoner. Capital stock, \$2,000,000. Work in progress. Cable traction.

SYRACUSE, N. Y.—Butternut St. Ry. Co. 2m. To be built in the spring of 1887.

SAYRE, PA.—Sayre St. Ry. Co. Pres. Howard Elmer. No work done.

STAMFORD, CONN.—J. B. Curtis and W. W. Jillsbee, Incorporators.

UTICA, N. Y.—Utica Belt Line St. Ry. Co. 8 m, 15 c. Pres. Dr. C. Tefft, V. Pres. W. A. Jones, Sec. and Gen. Man. Isaac J. Griffith, Treas. Chas. W. Mather. To be opened about Dec. 1. Work now in progress.

WINSTED, CONN.—Geo. S. Rowe, Incorporator.

WICHITA, KAN.—Riverside and Suburban Ry. Co. Pres. J. O. Davidson, Sec. N. G. Lee. Capital stock \$100,000. Work now in progress, road to be opened about January, 1887.

Clark's Tramways.

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AMER. RAILWAY PUBLISHING CO., 113 LIBERTY ST., NEW YORK.

STREET RAILWAY STOCK QUOTATIONS.

Corrected by H. L. GRANT, 145 Broadway, N. Y. City.

Table with columns: New York Stocks, Par, Amount, Period, Rate, Date, Bld, Asked. Lists various street railway stocks like Bleecker St. & Fulton Ferry, Broadway & Seventh Avenue, etc.

Phila. Street Railway Stocks.

Corrected by ROBERT GLENDINNING & Co., 303 Chestnut street, Philadelphia, Pa.

Table with columns: Par, Period, Amount, Rate, Date, Bld, Asked. Lists Philadelphia street railway stocks like Citizens, Continental, Frankford & Southwark, etc.



### Shall the City Own the Horse Railroads?

In bringing forward in the city council an order to have the city of Boston purchase the horse railroads, Mr. Cherrington is following out the suggestions of a number of the labor organizations. Several of these associations have formulated platforms in which the ownership and control of horse railways by the city are demanded. It is only natural that the plan should meet with opposition, as it would involve a change to which the community is not accustomed. But it does not follow on that account that it would not be a wise change to make. The managers of the various street railway systems are discovering that their companies could be much more economically and efficiently managed if they were consolidated into a single corporation, and ownership by the city would bring about that unity of management that is now looked upon as desirable.

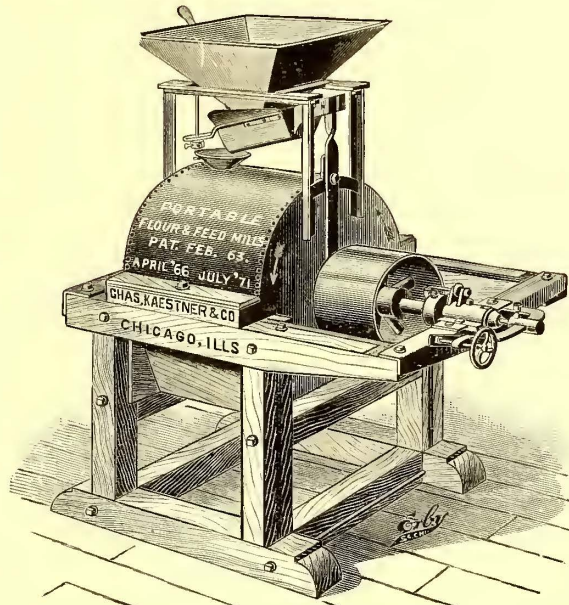
In the city of Paris the tramways and omnibuses are owned by a company that is worked under the supervision of the municipal government, and in its profits the municipal government has a considerable share. The city authorities direct when and where omnibuses and horse cars shall be run. There may be a section where the demand for transportation is so small as not to pay the company a profit for extending its system in that direction, and if left to itself, such an extension would not be made. But the government judges of the question on the ground of convenience as well as on the ground of profit, and compels the company to put down new tracks or establish a new line of omnibuses. So in the matter of maintaining a night service. It insists that the company shall run its cars and coaches at frequent intervals between sunset and sunrise, although the trips may be made without a profit during the hours after midnight.

It may be said: What reason is there for running horse cars at intervals during the entire night? It would only be a very small number of people who would be accommodated thereby, and their accommodation would impose an added expense to the rest of the community. While this argument may be true, it is equally applicable to other services which the municipal government now performs. We keep our streets lighted with gas from sunset to sunrise, although it is probable that from midnight to 5 A. M. there is not one person in five hundred of our people who is accommodated or benefited by the continuous illumination.

If the city had control of the railroads, it is quite probable that it would be forced by public opinion to run horse cars, at least as often as once an hour, throughout the night, over each of the several routes, and it is also probable that it would be called upon to extend the tracks to a number of

the suburban districts that are now poorly supplied with means of transportation, for the reason that the companies have seen no way toward an immediate profit by the construction of new routes.

But the great obstacle in the way of such an acquisition on the part of the city government is the uncertain character of municipal control. If the city authorities could be implicitly trusted, it is probable that in these railroad affairs municipal management would be better than corporate management; but not only is there no assurance of this kind to be given, but, on the other hand, there are many reasons for thinking that the horse railroad system would become a fruitful source of municipal corruption. The thousands of conductors, drivers and stable employees would become, collectively, a powerful political factor, and we should have men, and possibly Mr. Cherrington might be among their number, seeking to gain support at



KAESTNER'S PORTABLE GRIST MILL.

election time for profitable municipal offices by voting to largely increase the railroad men's pay, greatly lessen their hours of work, and in other ways make life exceptionally easy for them.

It is to be feared that if such an enlargement in municipal control was made, the city council would show itself much more solicitous for the comfort and welfare of the railroad operatives than of the general public, that the railroads were built to accommodate. For this reason, until some assurance can be given that the system will be managed in an impartial and businesslike manner, it will hardly be safe for the city to undertake the performance of duties that private corporations are now doing with a tolerable degree of efficiency.—Ex.

The new cable road on One Hundred and Twenty-fifth street, New York, was successfully opened December 1, at 10 P. M. The cars are of the type designed by Supt. Robertson and described in our October number.

### Kaestner Portable Grist Mill.

The mill\* illustrated in this connection was one that was on exhibition at the Cincinnati convention, and which has been extensively adopted by street railway companies for grinding feed for their horses. It is convenient in form, easily handled, and portable. It is a stone mill, in which the French buhr stone is used. It is made in four sizes, 16, 20, 24 and 30 inch stones, and is adapted in this way to powers ranging from three to fifteen horse power. The mill is illustrated in this connection on account of the interest which street railway men are taking in the matter of grinding their own feed, and thus knowing what is fed to their horses; and from the fact that it seems to be a conceded point that it requires less to keep a horse in good condition when the feed is thoroughly ground and well mixed than when it is fed to them in a rough condition. The general appearance of the mill is clearly shown by our engravings and its arrangement can be readily studied therefrom. Of course, it can be placed in any position, and the hopper at the top made any size which is required. Adjustment is effected by the gearing shown at the end.

\*Chas. Kaestner & Co., Chicago, Ill.

### A Fare-Box Episode.

The Detroit Free Press gives the following concerning Lewis & Fowler's Small's fare collector:

"In some of the St. Louis one-horse cars there are brass nickel carriers that run the whole length of the car. From any part of the car you can drop a nickel into one of these carriers and then watch it as it rolls along on its edge down the incline and finally goes rattling into the fare-box. I saw a

Western ranchman come into a car, and after putting his fare in in the ordinary way he noticed a new-comer drop a nickel down the elevated railway.

"The device aroused his utmost admiration. He at once changed a couple of dollars into five cent pieces. Then he took his place at the door and started two nickels simultaneously down each side of the car and offered to accept bets as to which would get into the fare-box first. He kept this up until his \$2 worth of coin was gone, and wound up by saying, 'Well, that's the durndest contrivance I ever see.'"

### Success of Electricity in Scranton.

We receive just as we go to press, a copy of the Scranton Republican, containing an account of the trial of the new Suburban Railway Co.'s electric motors in that city. The Van Depoele system is used, and the Republican speaks very enthusiastically of the success of the trial, says that rapid transit is practically solved in Scranton, and thinks the enterprise reflects great credit on those who have been instrumental in introducing electricity there.

We hope to give further details of the road latter.



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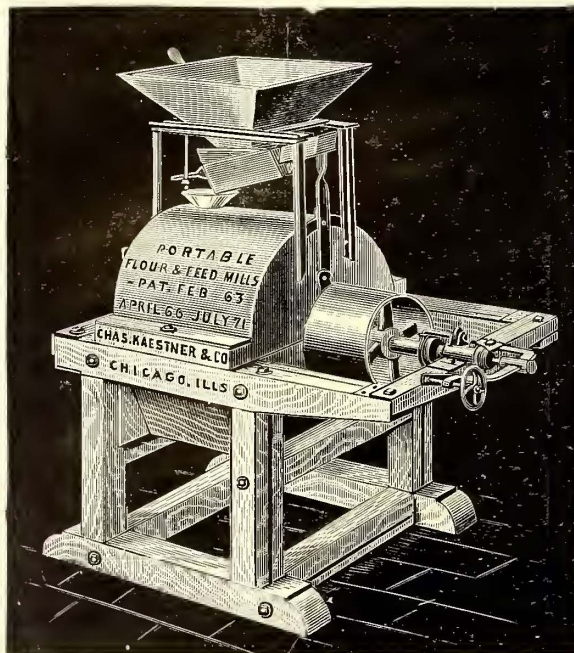
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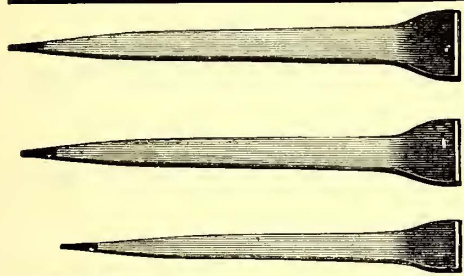
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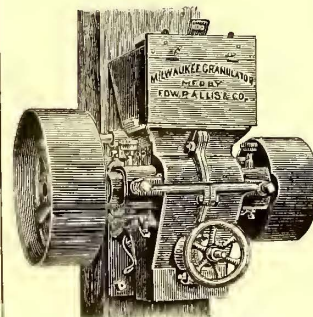
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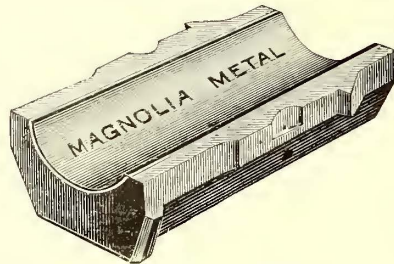
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## TESTS.

J. S. GRAHAM & Co. MANUFACTURERS OF WOOD-WORKING MACHINERY.

J. S. GRAHAM. J. KANE.

ROCHESTER, N. Y., October 28, 1886.

CHAS. B. MILLER, Proprietor,  
SAMUEL SINGLEY, Inventor,

Gentlemen,—We herewith hand you a report of the various tests we have made of your metal in comparison with the best Genuine Babbitt Metal to be had. These tests were conducted with a view of ascertaining the merits of your metal, and to that effect we made them as severe as possible. They were made in a machine arranged for the purpose having two boxes or bearings  $4\frac{1}{2}$ " long,  $1\frac{1}{2}$ " diameter and lined with metal averaging 7-32 of an inch thick.

In these bearings, one of which in every test was lined with Magnolia Metal, and the other with the Genuine Babbitt Metal was placed a steel arbor with pulley. The box caps were put in place without bolts and were held in place by a scale beam lever properly weighted and having the fulcrums on top of box caps. No self-oiling bearings or cups were used in these tests, it having been decided best to apply the oil as occasion seemed to require, and giving each bearing the same amount by counting the drops. We might say, however, that a fair amount of oil was used.

The following is a correct report of the different tests:

### Test No. 1, October 21, 1886.

Started at 9 A. M. with a pressure on each bearing of 240 lbs., using lard oil. Number of revolutions 850 per minute. At 10.30 A. M. changed the pressure to 150 lbs. on each bearing until 12 M., when both were found to be warm, but the one having the Gen-

ine Babbitt Metal very much higher in temperature than the other.

Started again at 1.30 P. M. under the same pressure (240 lbs.), and speed 850 revolutions per minute, and at the end of fifteen minutes increased the load or pressure on each box to 380 lbs., using oil freely. After running forty minutes with this pressure it was again increased to 550 lbs. per bearing, and oiled at this time, receiving no more oil; after running fifteen minutes the Genuine Babbitt metal melted or ran out.

### Test No. 2, October 23, 1886.

The same testing machine was used and all other conditions were the same as in test No. 1, with the exception of speed and pressure.

The bearings were relined and fitted, and started again at 3.30 P. M. at a speed of 4,000 per minute; pressure on bearings 550 lbs. Oil was used freely, and a small piece of tallow placed in the gateway. It ran one minute and the frictional resistance was too great for the belt to drive. At this time the Genuine Babbitt was the hottest. The pressure was changed to 238 lbs.; ran thirty minutes and melted the Genuine Babbitt out. Magnolia metal showed very slight signs of fusion.

### Test No. 3, October 23, 1886.

On this test in the same machine the length of bearings on journal was reduced to  $2\frac{1}{4}$ " long, which was in the center of the boxes; speed 4,000 per minute; pressure 150 lbs. on each box; ran forty-five minutes and increased the pressure to 238 lbs.; ran fifteen minutes and then adjourned test until the following morning.

Oct. 25th, continued the test with a speed of 4,000 per minute; pressure 238 lbs.; ran fifty minutes and then found the end of the box cap (iron) containing the Magnolia metal touching the arbor greatly inducing friction; ran twenty minutes longer and burned the box out.

### Test No. 4, October 25, 1886.

Same machine and conditions, except that the length of bearings was again made  $4\frac{1}{2}$ " long; speed 4,000 revolutions per minute; pressure on each box 240 lbs.; ran twenty-five minutes and showed signs of fusion; then removed box caps and cleaned them off; started again at 160 lbs. pressure; speed 4,000 revolutions per minute; ran fifteen minutes and increased pressure to 240 lbs. on each box, and after running twenty-five minutes melted the Genuine Babbitt enough to stop motion.

### Test No. 5.

This test was made in the same machine, substituting the "Cooper" metal in place of the Magnolia, and the genuine Babbitt metal in the other box or bearing; speed 4,000 revolutions per minute; pressure 160 lbs.; after running fifteen minutes pressure was increased to 240 lbs., and ran for twenty-five minutes, at which time both metals fused or melted, the Cooper metal, however, holding its place much better than the Genuine Babbitt metal.

Yours truly,

(Signed) J. S. GRAHAM, M. E.

(Signed) JOHN KANE, M. E.

(Signed) W. E. REPINE, (Draughtsman.)

MESSRS. J. S. GRAHAM AND JOHN KANE ARE MEMBERS OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS.

TRADERS' NATIONAL BANK OF ROCHESTER, N. Y.

OCTOBER 28, 1886.

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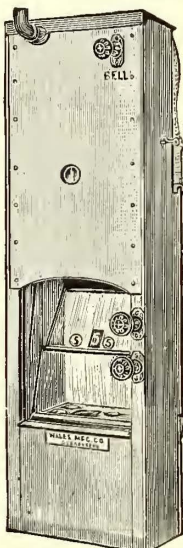
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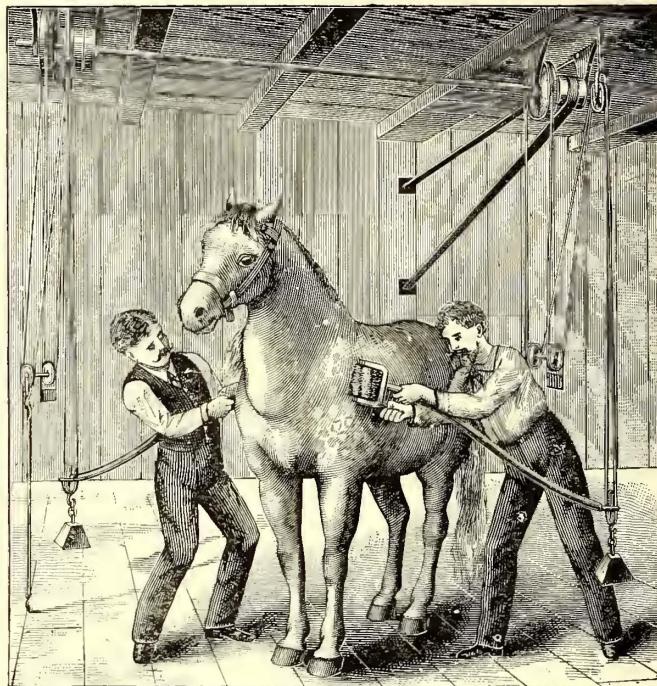
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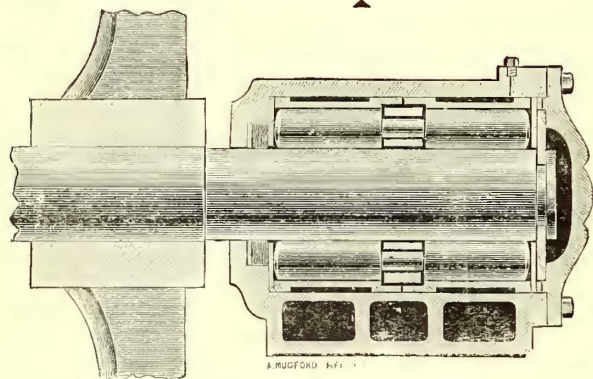


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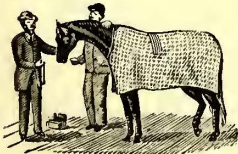
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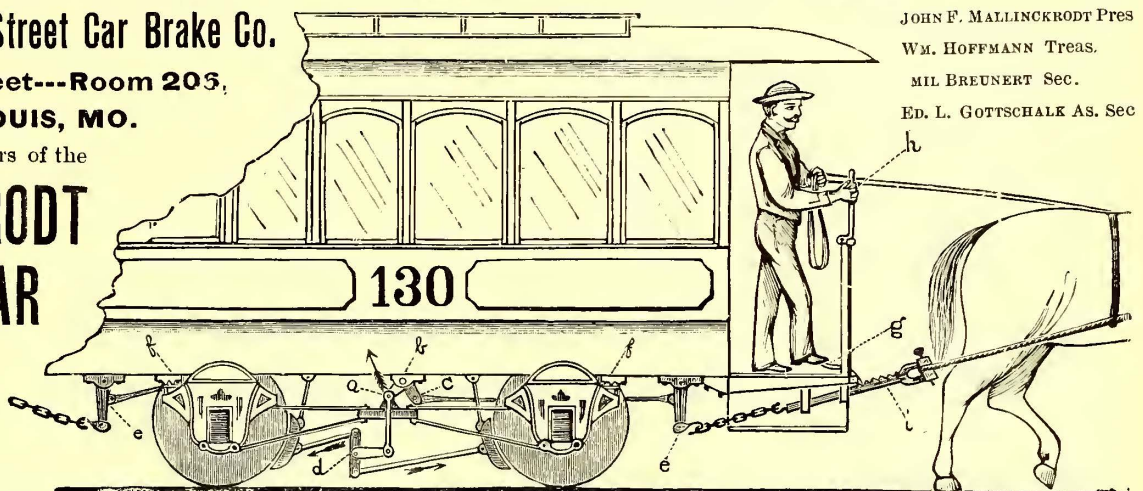
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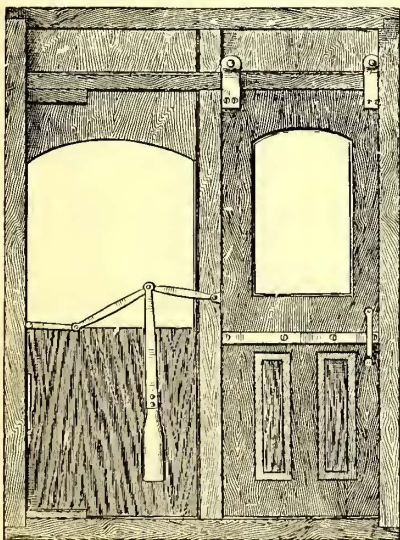
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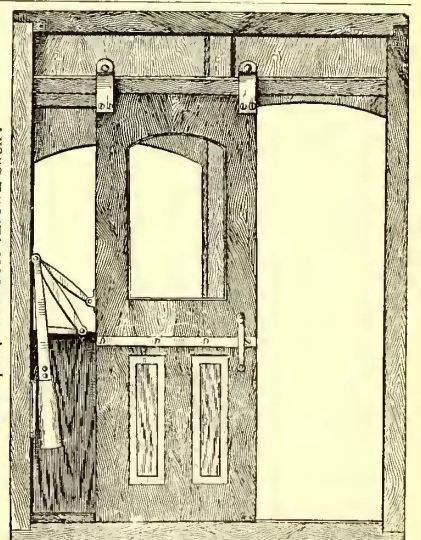
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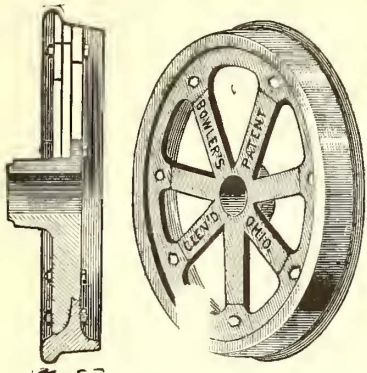
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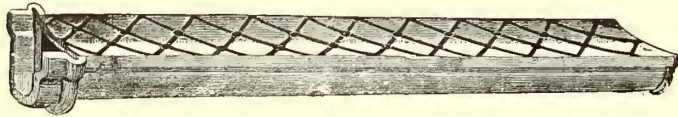
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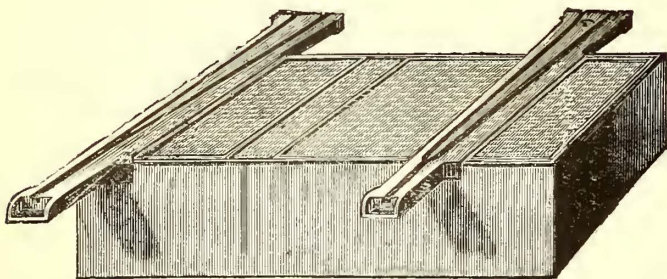
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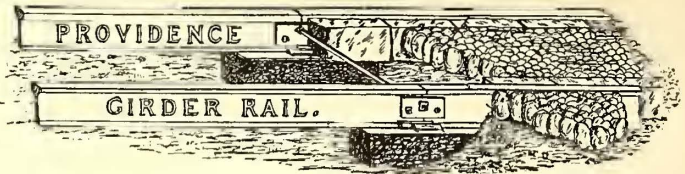


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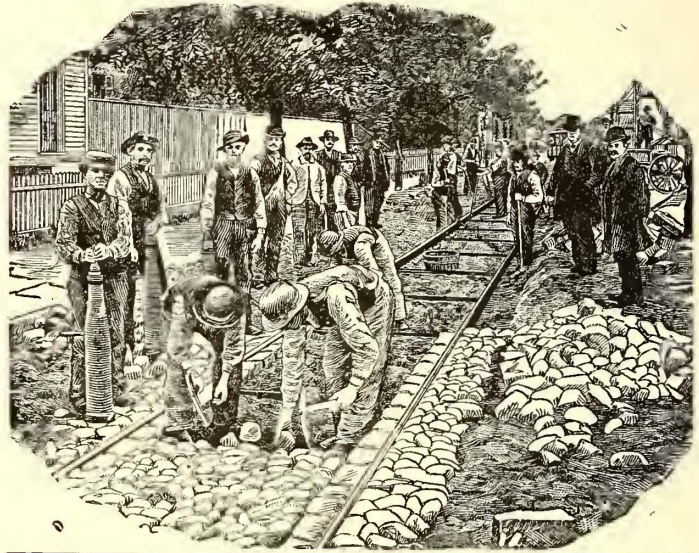


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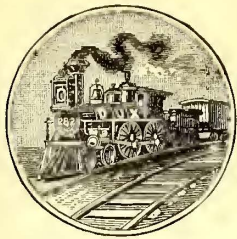
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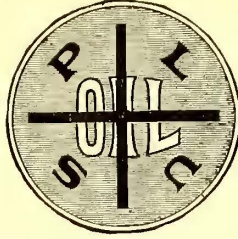
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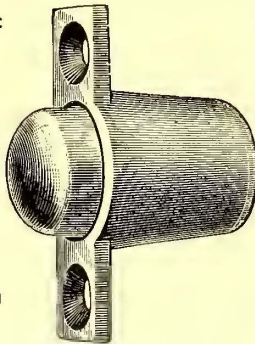
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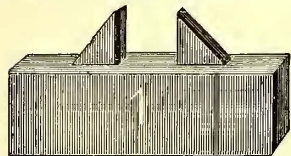
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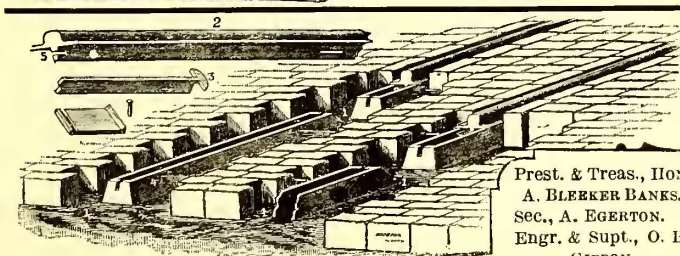
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**A. J. HUTCHINSON,**  
**CONTRACTOR**

And PRACTICAL BUILDER of STREET RAILWAYS.

Roads Relaid, Switches, Turnouts, Warehouse Tracks. Materials Furnished.

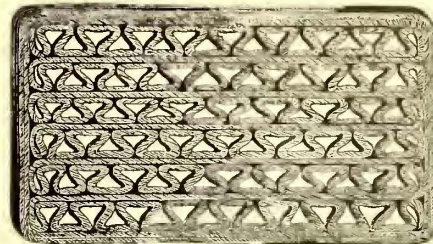
ROOM 11, - 95 LIBERTY STREET, N. Y.

**LYNN & PETTIT,**

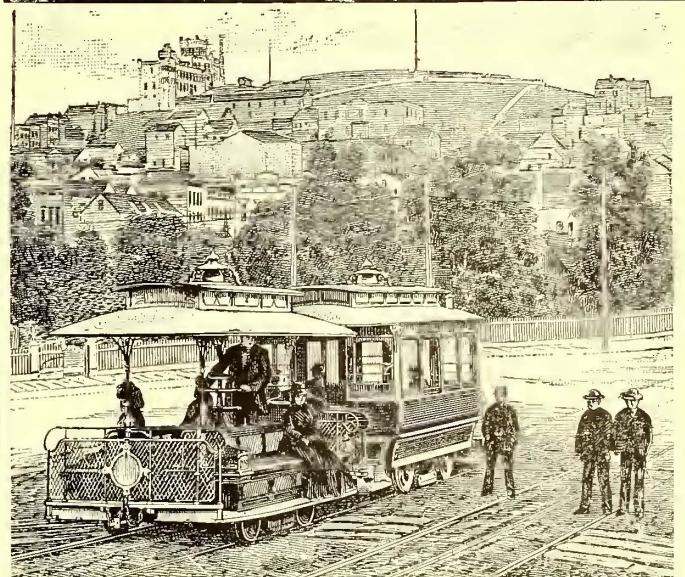
MANUFACTURERS OF

**Machine Braided Cocoa Car Mats.**

707 Market Street, Philadelphia.



A Sample  
Order  
Solicited.



**CABLE ROADS.**

Am. System Traction Rope Railway, operated by Independent Duplicate Cables.

FULLY PROTECTED BY PATENTS IN THE FOLLOWING COUNTRIES.

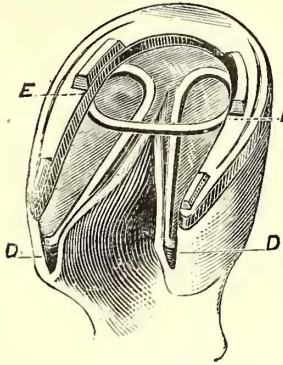
- |                |                             |
|----------------|-----------------------------|
| UNITED STATES, | FRANCE,                     |
| ENGLAND,       | BELGIUM,                    |
| GERMANY,       | DENMARK,                    |
| AUSTRIA,       | VICTORIA, Australia,        |
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**D. J. MILLER, ENGINEER,**

234 BROADWAY,

NEW YORK.

### USE PROF. ROBERGE'S PATENT HOOF EXPANDER,



Which Cures Corns, Contraction, Quarter-Cracks, &c.

It is the best invention for expanding a contracted foot, or keeping a sound foot in its natural shape.

It is used and approved by the leading horse owners of the New York Driving Park, such as

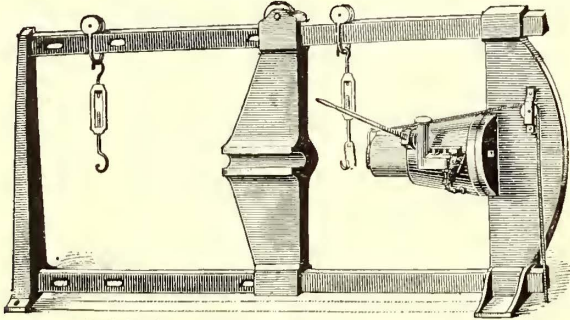
Robert Bonner, Frank Work, and hundreds of other gentlemen of repute. In ordering, send diagram of foot with price. Same will be forwarded free by mail.

**F. P. ROBERGE,**  
VETERINARY SURGEON,

1,741 BROADWAY, NEW YORK.

Liberal discount to the trade. They are kept by all first-class Horseshoers, Saddle and Hardware men.

### HAND POWER, LEVER AND HYDRAULIC PRESSES



See page 197, July, 1885.

**Scr w and Hydraulic Jacks.**  
**Watson & Stillman.**  
204 to 210 East 43d Street. N. Y.

## Wilson Brake Shaft.

ENTIRELY NEW & NOVEL IN CONSTRUCTION.

POSITIVE AND SURE IN ACTION.

BRAKES SET WITHOUT COMPLETELY TURNING THE HANDLE.

MADE ON THE PRINCIPLE OF A FRICTION CLUTCH.

SIMPLE IN DESIGN.

Saves Room, Adds to Available Braking Power, and Gives the Driver the Best Possible Control over the Car.

**Mordecai M. Wilson, Agent.**  
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F. M. DELANO. PHILIP RICHARDSON.  
47 Broadway, New York.

## Organizers, Promoters & Builders OF STREET RAILROADS.

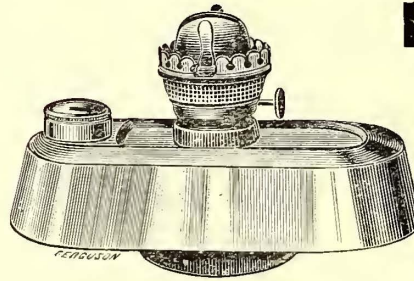
Dealers in Street Railroad Securities. Correspondence invited.

### STEEL STREET RAILS.

CARNEGIE, PHIPPS & CO., LIMITED  
48 Fifth Ave., Pittsburgh, PA.

Section No. 17  
46 lbs. per Yard

## Clute's Patent Double Bottomed Street Car LAMP,



Is one that assures safety, durability, and is perfect in regard to leakage.

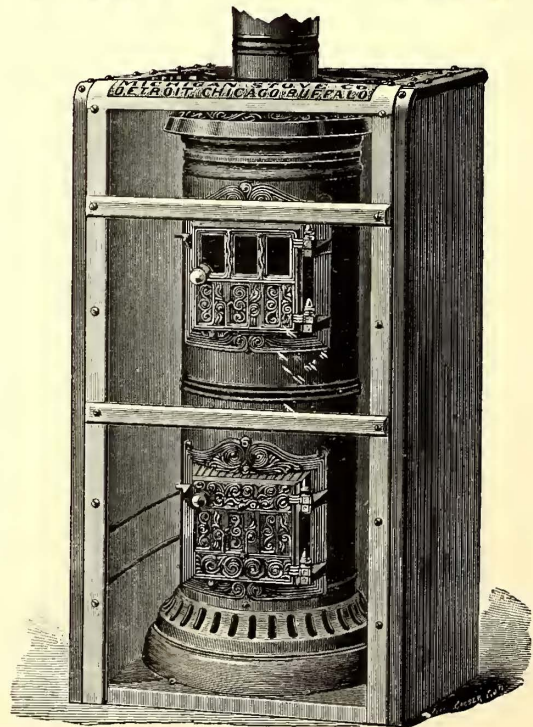
GEORGE M. CLUTE, Sole Manufacturer;

Also Dealer in Car Reflectors, Chimneys, Burners, Etc.

WEST TROY, N. Y.

## Garland Car Heater

They are in use upon all of the Street Car lines in Detroit, Mich., at an expense of not over 10 cents per day.



This is the most attractive as well as the most efficient Car Heater ever made.

**The Michigan Stove Company,**  
SOLE MAKERS.

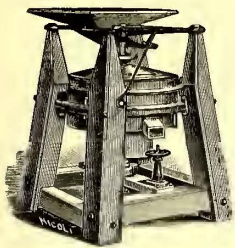
Detroit, Mich.

Chicago, Ill.

Buffalo, N. Y.

# Portable Grinding Mill Manufactory.

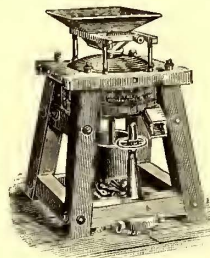
Established 1851.



Mills expressly adapted for use in  
**STREET CAR STABLES.**

41 different sizes and styles.

Portable Engines  
AND BOILER,  
TREAD AND  
SWEEP HORSE POWERS.

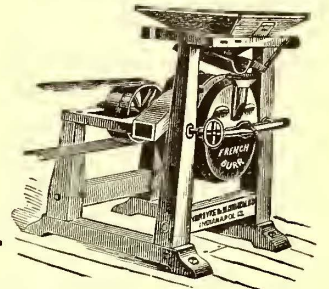


Feed Cutters,  
Corn and Cob Crushers,  
Corn Shellers,  
Roller Mills.

## Complete Outfits a Specialty.

Describe Wants and send for Illustrated

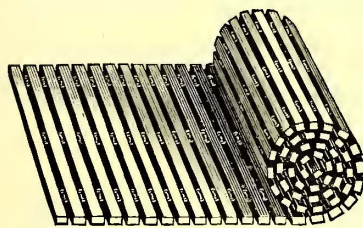
Price List and Circulars.



### Nordyke & Marmon Co., INDIANAPOLIS, IND.

**RUFUS MARTIN & CO.,**  
13 & 15 PARK ROW, N. Y.  
Street Railway Construction, Equipment and Supplies.  
MARTIN'S IMPROVED CHANGE BELT.  
MARTIN'S STANDARD **JP** AXLE OIL.

Also Harness, Bells, Wood and Cocoa Mats, Change Envelopes & Ry. Stationery. *Correspondence solicited.*



**WARNECK & TOFFLER,**  
211 East 22d St., New York,  
Sole Manufacturers and Patentees  
of the only

**"ROLLING WOOD MAT"**

in the market. This matting, either in round, square or flat slats, is the most convenient one for horse-cars, as it is a self cleaner and can easily be repaired.

Price, a running foot, 3 feet wide, only 70c. Orders respectfully solicited.

**EDWARD BEADLE.**

Sole Manufacturer of the

**"EUREKA FOLDING MAT."**

The most durable, easiest cleaned and repaired wood mat ever made. We would respectfully call the attention of Managers of Street Railways to our latest improved Reversible Folding Mat, made to fit any size car. Sample order solicited.

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FACTORY, Cranford, N. J.

**EUREKA COLOR WORKS.**

Established for the Manufacture of Pure Colors.

**EDW. E. JILLARD,**

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Specialty in Strictly Pure Tinting Colors for Car, Carriage, Ship and House Painters' use.

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and Dealer in Supplies.

Office 95 Liberty St., N. Y.

GROOVE RAIL FOR CURVE constantly on hand, Straight or Curved to any radius or length, at short notice.

CURVING MACHINES of Best Style and Make.

SPECIAL RATES given on AUTOMATIC SWITCHES, TURNABLES, TRACK CASTINGS, KNEES, JOINT PLATES, SPIKES and all other material for Railway Construction.

Having had over 25 years' practical experience in Street Railway Construction feel confident in saying to parties who contemplate building will find it to their interest to correspond with me before making contracts or ordering material.

Established 1856.

Incorporated 1883.

## The Feigel Car Co.,

BUILDERS OF

# Cars for Street Railways.

FACTORY

OFFICE

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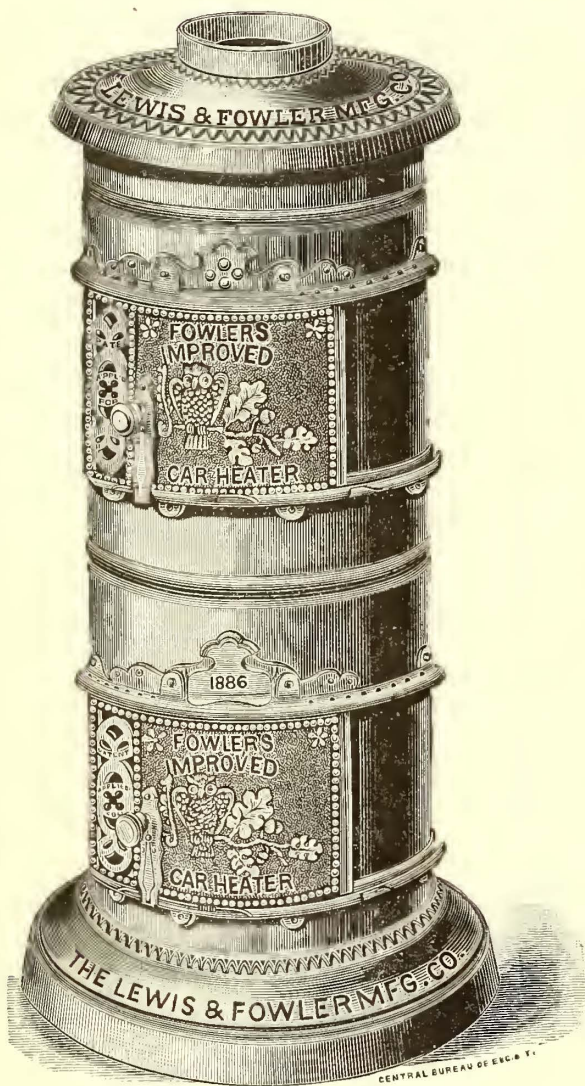
No. 108 Wall Street, N.Y.

# THE LEWIS AND

27, 29, 31, 33 and 35

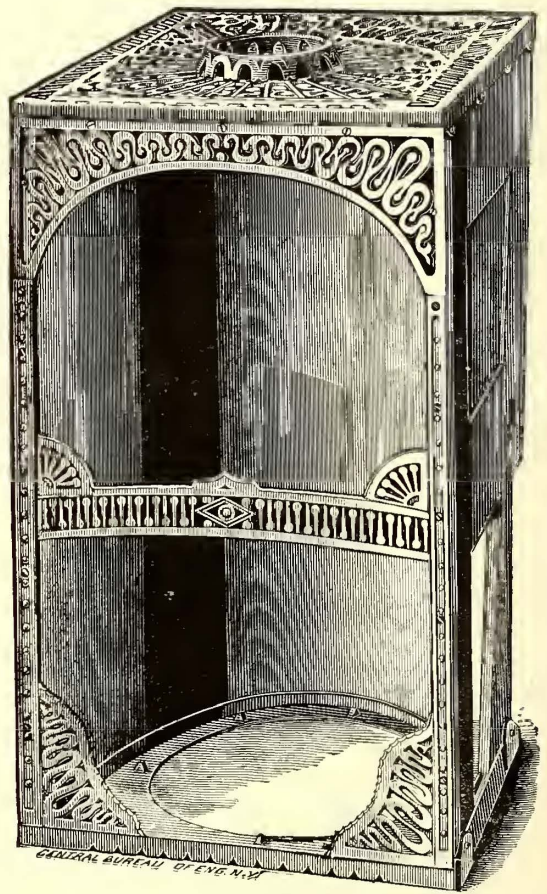
MANUFACTURERS OF

## Street Railway Supplies.



**Imp'd Car Stoves, Stove Boxes, & C.**

Of Our Own Manufacture.



PATENTEES AND MANUFACTURERS OF THE

### Improved "Alarm" Passenger Register.

USED BY RAILWAY COMPANIES IN ALL PARTS OF THE COUNTRY.

KEPT IN REPAIR ONE YEAR FREE OF CHARGE.

Guaranteed the most Complete Machine in the U. S. for the purpose.

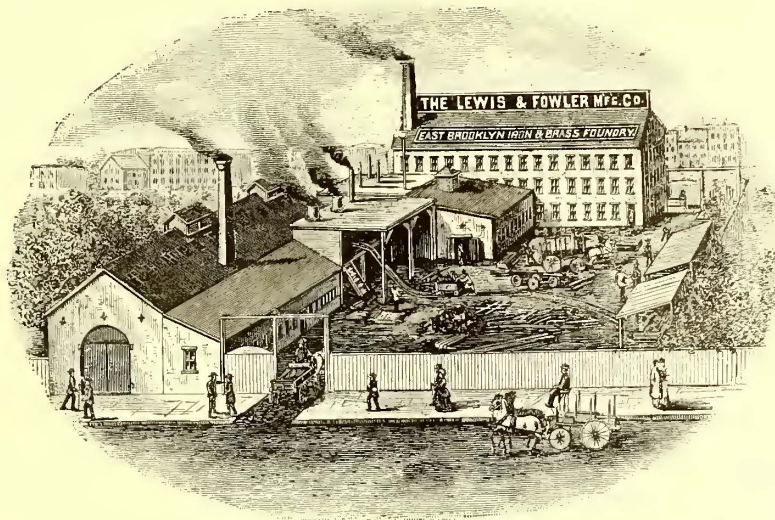
# FOWLER MFG Co.

Walworth St., Brooklyn, N.Y.

MANUFACTURERS OF MATERIALS FOR

## Street and Cable Railway Construction

KNEES  
 SPIKES  
 CHANNEL PLATES  
 FROGS  
 POINTS  
 TONGUE SWITCHES  
 GROOVED RAILS  
 FOR CURVES  
 BENT ANY DESIR-  
 ED RADIUS



PEDESTALS  
 OIL BOXES  
 BRAKE SHOES  
 WHEELS & AXLES  
 BRASS BEARINGS  
 TURNABLES  
 SNOW SWEEPERS  
 PLOWS  
 ETC. ETC. ETC.

### AUTOMATIC SWITCHES

AND

### RAILROAD CASTINGS

OF EVERY DESCRIPTION AND MOST APPROVED PATTERNS.

### FOWLER'S IMPROVED

### RANDALL BOX & RUNNING GEAR.

CATALOGUE FREE TO RAILROAD COMPANIES.

# THE PUTNAM NAIL CO.

## LOOK WELL

TO YOUR

Highest  
Award at the

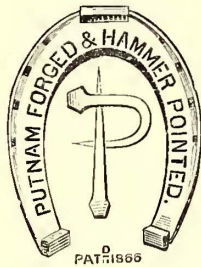


Fig. 1.

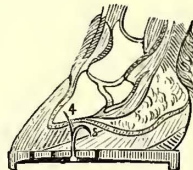
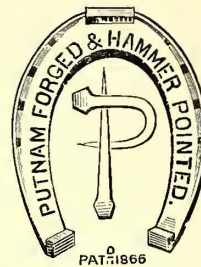


Fig. 2.



Centennial  
Exhibition.

# HORSES FEET.

These drawings show how many horses are made lame and permanently injured by the use of the COLD CUT and SHEARED-POINTED Nails. This process of manufacture produces lamination, causing the iron to form in layers, and when driven into the foot, the horny fibers of which the hoof is composed cause the nail to separate at the point, and one portion passes into the foot.

No. 4 represents one of these nails which was driven into the hoof and SLIVERED in driving, one THIN blade passing into the quick or sensitive sole; No. 5 the THICK blade of the nail passed out of the wall of the hoof for clinching. After a few days the horse was returned lame, and upon the removal of the shoe, a nail similar to the above was broken off, leaving the sliver in the foot: LOCK-JAW ensued, from which the horse died. Upon dissecting the foot a portion of the nail was found to have penetrated through the coffin bone, as seen in Fig. 2, letter A, thus sacrificing the life of a valuable animal.

It requires but little observation and reflection, one would think, to arrive at the conclusion as to the kind of nails to be used in the horse's foot, whether a mangled piece of iron rendered DANGEROUS by the COLD ROLLING AND SHEARING process, or one made from the rod at a welding heat, where all the fibers remain intact and a perfect ONENESS maintained and being pointed by the hammer, rendering such an accident as slivering utterly impossible.

The foot is the MOST IMPORTANT member of the animal's body, to which the greatest care and attention should be directed; for when it becomes injured or

diseased, no matter how perfect the other parts may be, the horse's services are diminished or altogether lost. Hence the value of a horse depends upon the condition of his feet.

The horse at every step brings an immense power and weight to bear upon the foot. The hoof is a *thing of life* and yields to the pressure. The PUTNAM NAIL, being *forged* accommodates itself to the pressure of the hoof. It is far otherwise, however, with stiff rolled and cut nails. They remain rigid and their sheared edges are therefore pressed like sharp knives against the horny fiber. This is what causes the broken and rotten appearance so frequently seen in horses shod with cheap cut nails. Can a horse owner afford to attempt to save a few cents in price of nails and ruin his horse? Surely not, for the old adage is true as ever

**"NO FOOT, NO HORSE."**

As the remedy lies with the owner of the horse, it is for him to prohibit any cold-rolled or sheared nails being used in his horse's feet.

The only Hot-Forged and Hammer-Pointed Horse-Shoe Nail in the World

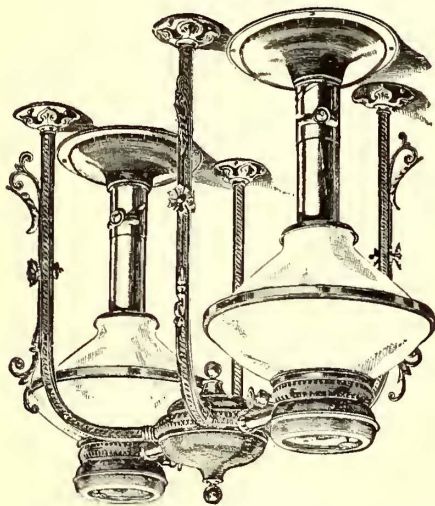
that is not cut, clipped or sheared upon the point, and will not split in driving, is THE PUTNAM NAIL.

Address for Circulars, etc.,

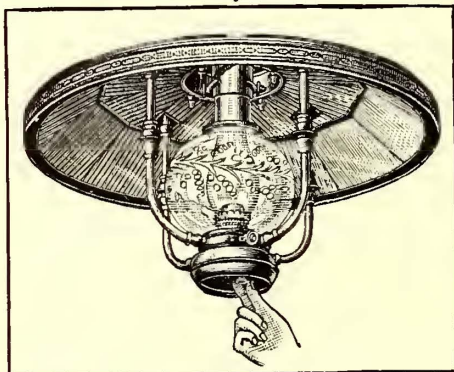
THE PUTNAM NAIL CO., NEPONSET P. O., BOSTON, MASS.

JOSEPHINE D. SMITH, Successor to the late WILLARD H. SMITH,

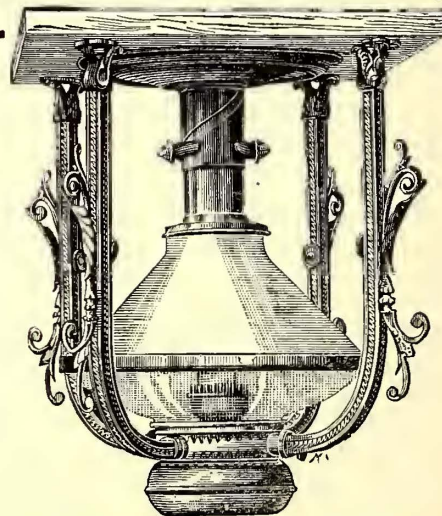
350 & 352 Pearl Street, New York.



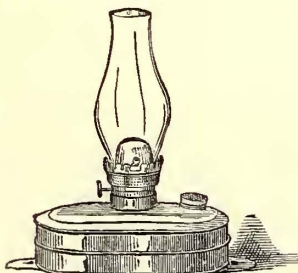
No. 12.—Two light Car Lamp as used on Tenth Avenue (N.Y.) Cable road.



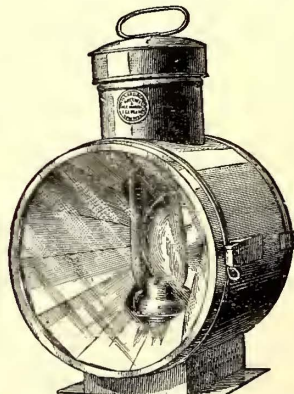
No. 14.—Center Car Lamp.



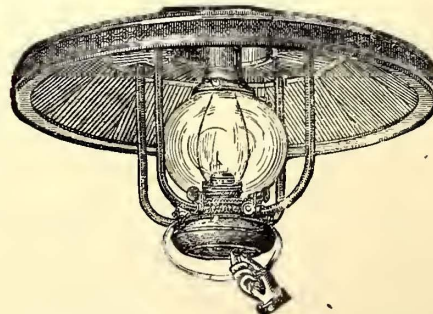
No. 8.—Center Car Lamp as used on Tenth Avenue (N. Y.) Cable road.



No. 3.—Box Lamp with drip cup.



Small Head Light for Grip Cars and Stages.



No. 1.—Center Car Lamp in general use throughout the United States and Canada.

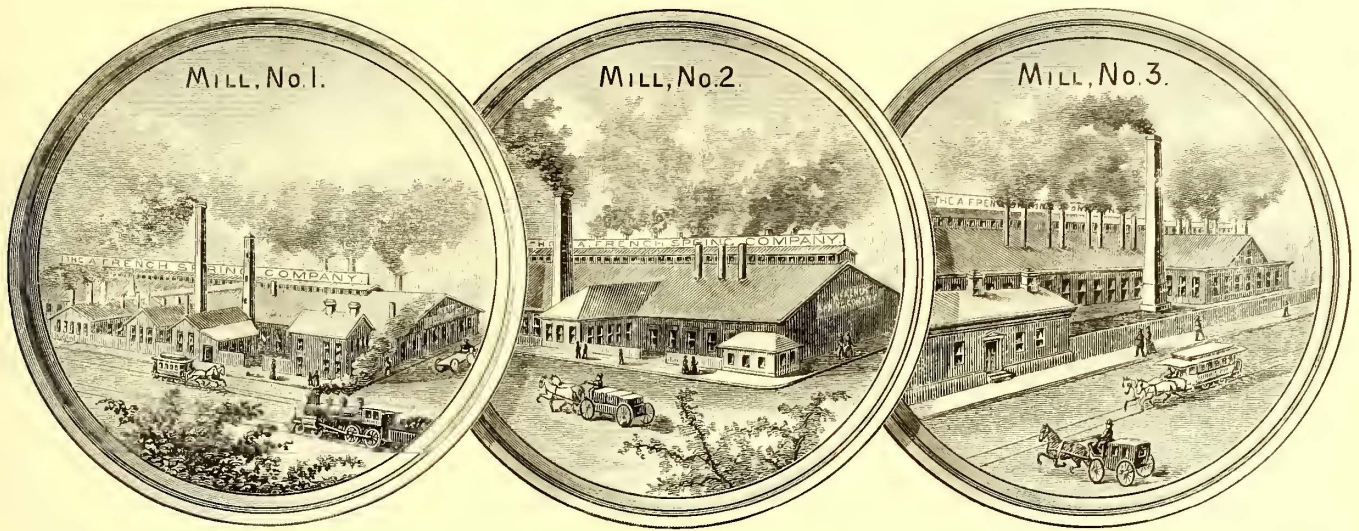
All kinds of trimmings pertaining to car lamps.

MANUFACTURER OF W. H. SMITH'S PATENT RAILROAD CENTER LAMPS AND REFLECTORS.

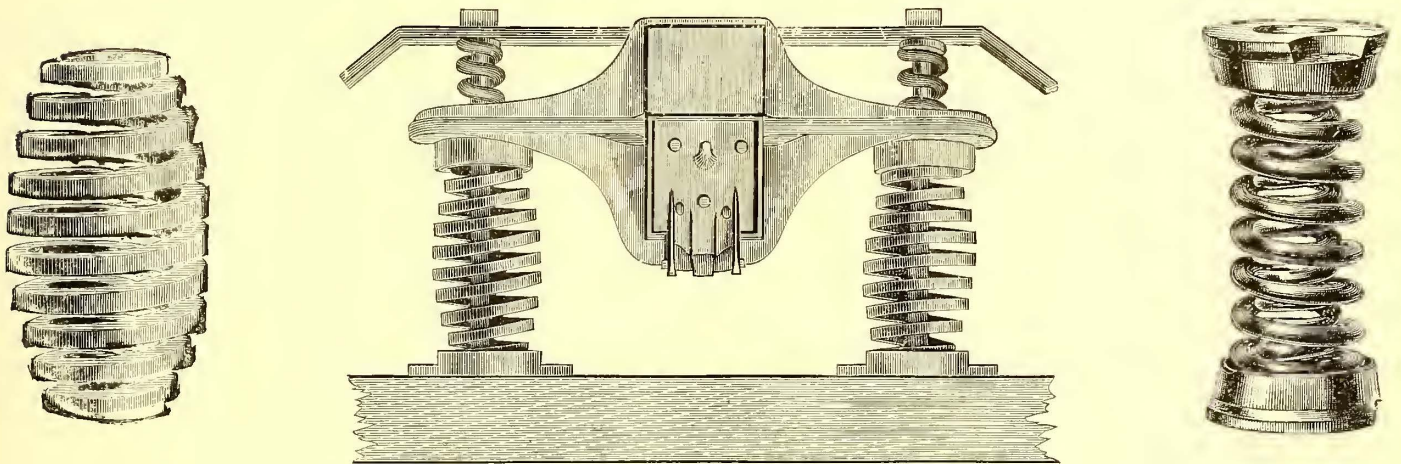


A. FRENCH, Chairman. J. E. FRENCH, Vice-Chairman. GEO. W. MORRIS, Gen. Man. D. C. NOBLE, Sec. & Treas.

# The A. French Spring Company, Limited,



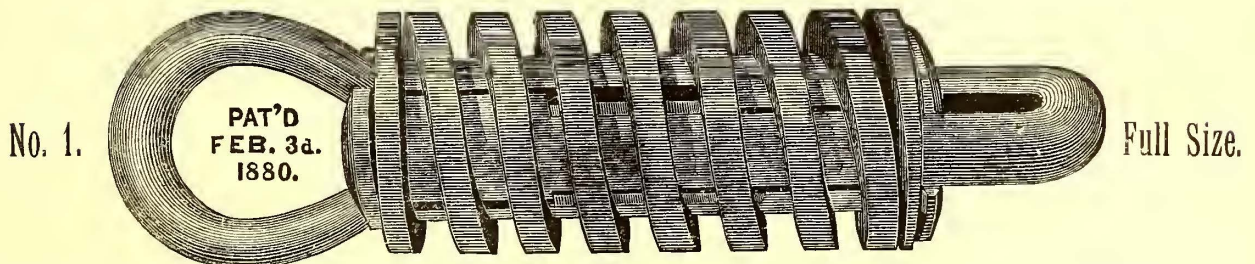
## PITTSBURG, PENNA.



Pat. Oct. 3, 1876; April 1, 1879.

SOLE MANUFACTURERS OF

## I. X. L. SPRING DRAFT OR TUG LINK.



Elliptic and spiral springs of all descriptions a specialty; also sole manufacturers of patent keg shaped springs for

### STREET RAILWAYS.

### PUGH & RUSSELL, General Agents,

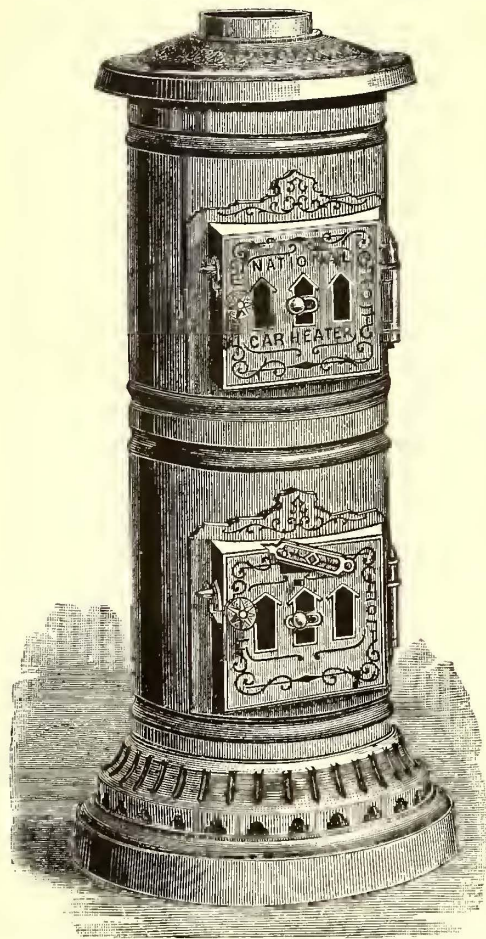
BRANCH OFFICES:

BOSTON, NEW YORK, CHICAGO.

STREET RAILWAY DEPT.,

NEW YORK & CHICAGO.

**THE NATIONAL CAR HEATER. EVERIT'S CAR FLOOR.**



**IMPROVED.**

FOR WARMING HORSE OR STREET RAILROAD CARS.

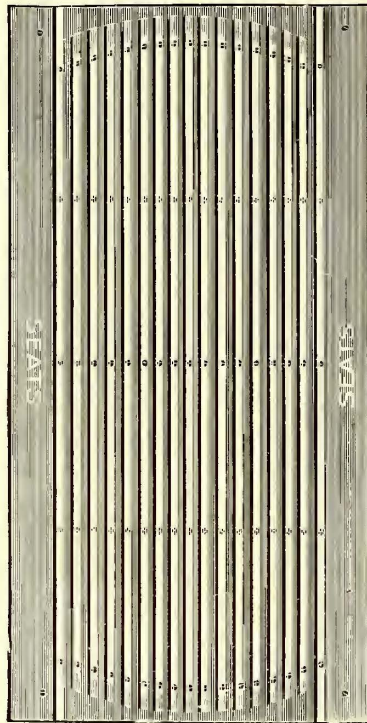
It is brick lined, has rotating and dumping grate, and safety door catch.

These car heaters are in successful operation on all of the street railway lines in the city of Brooklyn, New York, and on railroad lines in the United States and Canada, and give entire satisfaction.

It is neat in appearance, occupies but little space, is an ornament to a car, is not costly in price, nor expensive in its operation.

Sole Manufacturers,

**NATIONAL Stove Co.,**  
243 Water St.,  
New York City.



Dispenses with Mats of all kinds.

Easily Repaired.

Nothing to break or be stolen.

Most easily cleaned of any floor in use.

Can be swept or washed.

Does not hold the dirt.

Low in First Cost and High in Durability.

**W. L. EVERIT,**  
New Haven, Conn.

**JOHN A. ROEBLING'S SONS CO.,**

MANUFACTURERS OF

**Iron and Steel**

PLOUGH STEEL ROPES.

FLAT ROPE.



**WIRE ROPE FOR STREET CABLE RAILWAYS.**

SWITCH ROPES.

PLOUGH ROPES.

TELEGRAPH WIRE.

**JOHN A. ROEBLING'S SONS CO.,**

Works: Trenton, N. J.

BRANCH OFFICES:

215 Lake Street, Chicago, Ill.  
14 Drumm Street, San Francisco, Cal.

H. L. SHIPPY, Manager, New York Warehouse

117 and 119 Liberty Street, New York.

ESTABLISHED 1857.

INCORPORATED 1875.

# BROWNELL & WIGHT

## CAR COMPANY,

ST. LOUIS, MO.

BUILDERS OF

# Street Cars

OF EVERY STYLE AND SIZE,

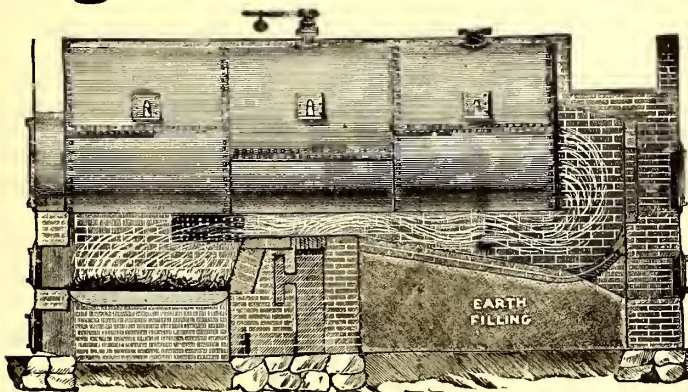
For Horse, Cable or Other Motive Power.

EXCLUSIVE MANUFACTURERS OF

## BROWNELL'S PATENT COMBINATION CARS

FOR SUMMER AND WINTER SERVICE.

## JARVIS ENGINEERING CO., Engineers & Contractors



FOR ERECTING STATIONS  
FOR  
ELECTRIC POWER AND CABLE RAILWAYS,  
USING

### Jarvis Patent Furnace

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

ALSO

### ARMINGTON AND SIMS ENGINES,

Belting direct to Power Dynamos without using Shafting.

NO. 61 OLIVER STREET, BOSTON, MASS.

SEND FOR CIRCULAR.

## J. M. JONES' SONS,

AGENTS,

# Street Railway Car Builders

## WEST TROY,

NEW YORK.

## PENNSYLVANIA STEEL COMPANY,

MANUFACTURERS OF

# STEEL RAILS

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.

WORKS AT

STEELTON, DAUPHIN CO., PENN.

NEW YORK OFFICE - 160 Broadway.

Philadelphia Office 208 South Fourth St.

# ANDERS' CABLE RAILWAY GRIP

**Simple, Durable, Efficient.**

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Cable may be dropped and picked up

**Without Leaving the Platform.**

The whole under the constant control of the gripman.

Most efficient device in existence for releasing and gripping cable in crossing other roads. Can be worked from either end of the car.

*Mechanism Simple and not liable to get out of order.*

The rope may be dropped at any time to a lower level than the path of the gripping device and again raised into the gripping jaws at the will of the gripman with perfect ease and safety.

**D. B. ANDERS,**

2313 Ridge Ave., - - - Philadelphia, Pa.

D. W. Pugh, J. S. Pugh, F. D. Russell.

# PUGH & RUSSELL, STREET CARS, RAILS, AND EVERY DESCRIPTION OF STREET RAILWAY SUPPLIES.

General Representatives of  
**THE JOHN STEPHENSON COMPANY, Limited,**  
NEW YORK.  
**STREET CARS.**

General Agents of  
**THE A. FRENCH SPRING COMPANY, Limited,**  
PITTSBURG, PA.  
**STREET CAR SPRINGS.**

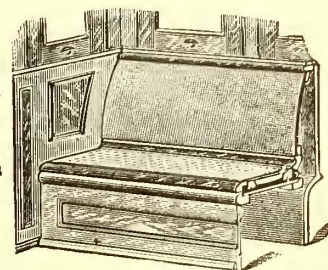
Agents for New York District, Indiana, Michigan and Ohio of  
**THE JOHNSON STEEL STREET RAIL COMPANY,**  
JOHNSTOWN, PA.

**NEW YORK,** CHICAGO,  
**STEWART BUILDING,** ADAMS EXPRESS BUILDING,  
Broadway, Reade and Chambers Sts. No. 185 Dearborn Street,  
P. O. Box 3524. Rooms 13 and 14.

## THE HALE & KILBURN MANFG. CO.,

Extensive makers of Patented  
**Street Car Seats**  
of every description.

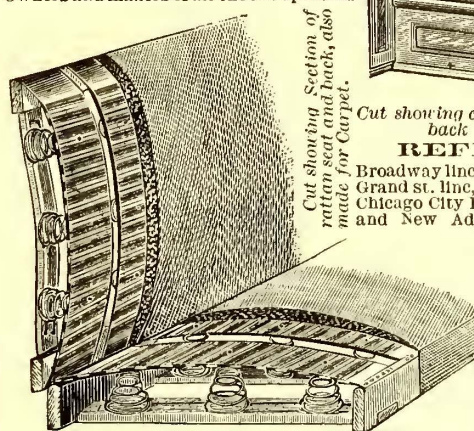
Our Patent Spring Seats covered with Rattan or Carpet are fast being adopted by the best railroads in the country. Seats for Steam Cars a Specialty. Owners and makers of all the Cobb patents



Cut showing car with rattan seat and back without springs.

**REFERENCES:**

Broadway line (Pullman cars) New York  
Grand st. line, 3d and 4th ave lines, NY  
Chicago City RR. Chicago W. Div. line,  
and New Adams street line, Chicago;  
East Cleveland R. R. Co.  
and Woodland Ave. and  
West Side R. R. Co.  
Cleveland; Union Line,  
St. Louis; 2d & 3d St. R.  
R. Co., Frankford and  
Southwark R. R. Co.,  
Union Line, Chestnut &  
Walnut R. R., Ridge Ave  
R. R., or any other road  
in Phila.; and 100 others  
elsewhere.



Cut showing Section of rattan seat and back, also made for Carpet.

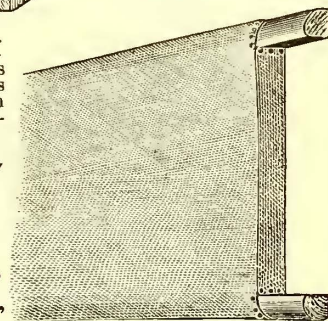
Many R. R. Co's use our Rattan Pat. Canvas Lined Seats for Summer and cover the same with carpet for Winter. This method of seating we recommend as durable and economical, for the reason both a Summer and Winter seat is obtained in one.

Estimates & Particulars cheerfully given (mention this paper), satisfaction guaranteed.

**A TRIAL SOLICITED.**

OFFICES: 48 & 50 NO. SIXTH ST.,  
FACTORIES: 615 to 621 Filbert St.,

**PHILADELPHIA, PA.** Cut of section of cross for summer car.



JOHN A. EMERICK, President,

EDWARD H. JOHNSTON, General Manager,

SAMUEL LEES, Treasurer.

# Johnston Railroad Frog & Switch Co.

MANUFACTURERS OF

## Railway Switches, Stands, Frogs and Crossings.

ALL SUPPLIES FURNISHED APPERTAINING TO

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# POST & CO., Cincinnati, O., U.S.A.

Manufacturers of and Dealers in

## Street Railway Supplies and Equipment.

MANUFACTURERS OF

Center Lamps, all sizes.  
Globe Brass End Lamps,  
Tin Box Lamps,  
Cable Car Head Lamps,  
Office Lamps.

### CAR TRIMMINGS.

ALL STYLES.

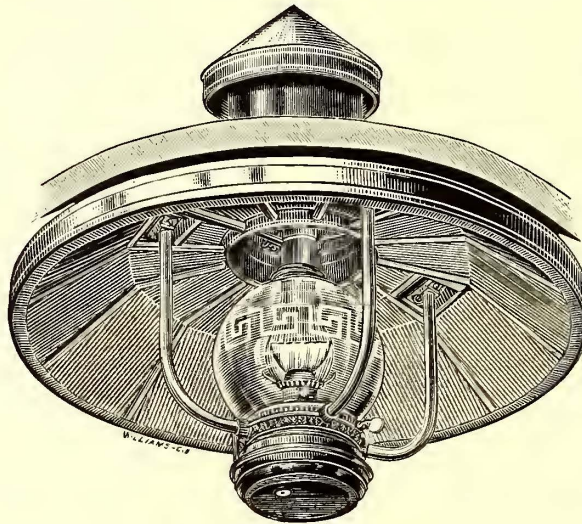
Street Car Gongs,  
Journal Bearings,  
Deck Lights.

DEALERS IN

Burners, Chimneys,  
Wicks, Lenses,  
Globes, Etc.

### TRACK MATERIALS.

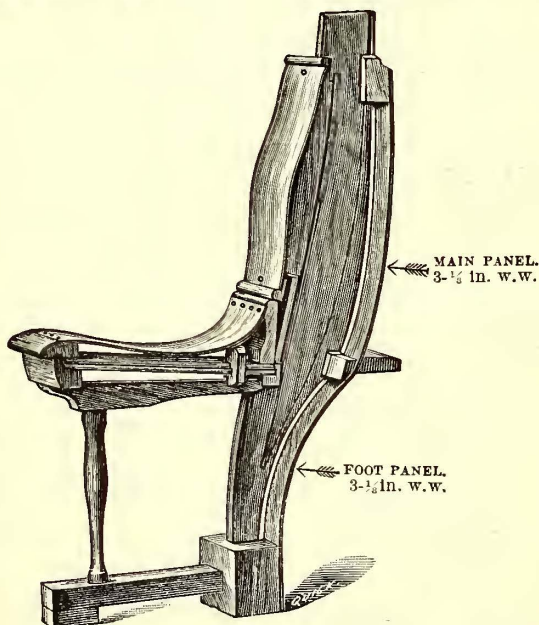
Spikes, Bolts,  
Rails, Shovels,  
Picks, etc., etc.



Center Car Lamp.

SPECIAL TRIMMINGS MADE TO ANY ORDER TO ANY DESIGN. ESTIMATES FURNISHED.  
SEND FOR ILLUSTRATED CATALOGUE AND PRICES.

# STREET CAR SEATS & BACKS.



### THREE-PLY CAR SIDES.

Having given our three ply white wood car sides a thorough trial for a number of years in our city street and railway lines, which test has left them as firm and good as the day they were put in, we unhesitatingly place these sides in the market as a superior article. They are composed of three white wood (or poplar) veneers, each 1/4 inch thick, the grain of the center layer running at right angles with the two outside layers. Hence they derive all the special and well-known advantages of glued up wood over single ply, namely:

- 1st. They are fully 75 per cent stronger, for they brace and stiffen the car.
- 2nd. They are lighter, being only 3-8 inch thick, and so do not add so much dead weight to the car.
- 3rd. They will not check or split by change of atmosphere.
- 4th. They will not split or crack when nailing into place, even though the nail be placed near the edge.
- 5th. Being laid over a form to suit the shape of the car frame or post they cannot buckle or twist, a feature which also adds strength to the car.

For repairing cars these sides have no equal. Our Three Ply Car Seats and Backs, so well known all over the world, are now the most popular seat and back in the market, and recommend themselves especially for their *Lightness, Cleanliness, Healthfulness and Beauty*, as also their *Cheapness and Durability*. For they are indestructible by moths (the great enemy of upholstery), and will not harbor vermin or insects, or carry or communicate contagion or disease. Our trade in this line has grown in thirteen years to vast proportions, which in itself is a sufficient guarantee of their merits. They are made either perforated or plain to suit customers. Birch is the wood most generally used. Today fully one-half the railroads in the country are using these seats and backs. We would also call attention to our *Veneer Ceiling* for cars. They are made either plain, perforated or decorated, and greatly add to the beauty of the car. For repairing cars they have no equal; for they are placed over the carlines and cover all the old paint and wood work. The woods generally used are *Birch, Birdseye Maple, Oak and Mahogany*.

## GARDNER & CO.

Manufacturers of Car Seats and Ceilings and Depot Seating,

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

Sample and Salesroom: 206 Canal St., cor. Mulberry.

Send for Catalogue.

Address all Communications to Office.

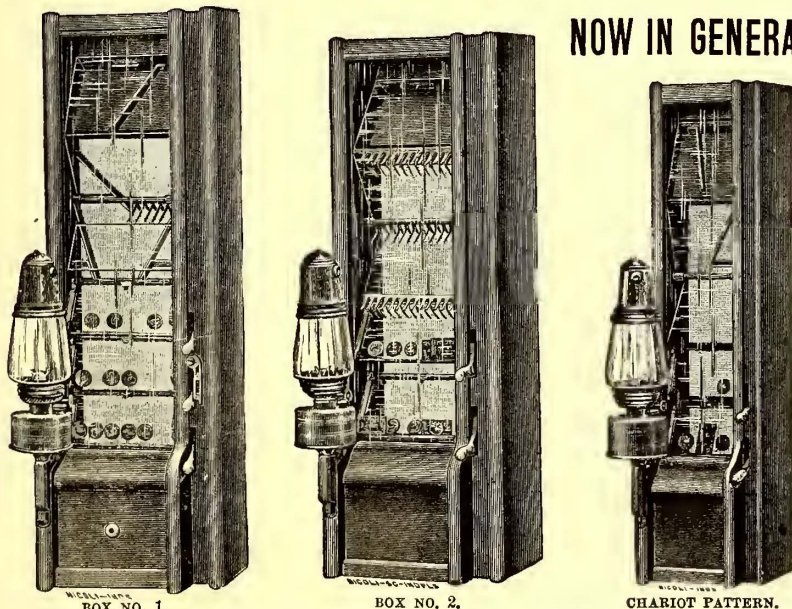
**C**astings for Crossings, Frogs, Switches, Curves, Turnouts, &c. Joint Plates, all sizes of Knees, and Standard Castings always on hand.

H. B. WAY.  
WM. S. RHODES.  
J. B. BLANKLEY.

City Passenger Railway Iron Foundry,  
**THE WAY FOUNDRY COMPANY.**  
Twenty-Third and Wood Streets,  
Philadelphia, Pa.

**C**ontracts taken and Estimates given for Construction of Street Railways and Supplying of all Materials used. Steel Grooved and Tram Rails Furnished at Special Rates.

# TOM. L. JOHNSON'S IMPROVED FARE BOX.



NOW IN GENERAL USE IN CITIES THROUGHOUT THE U. S.

Ornamental to any Car.

REDUCTION IN PRICE WHERE TWO  
BOXES ARE PLACED IN ONE CAR.

Roads Equipped with Boxes on Trial, and if not Satisfactory, Returned Without Any Expense to the Company trying them.

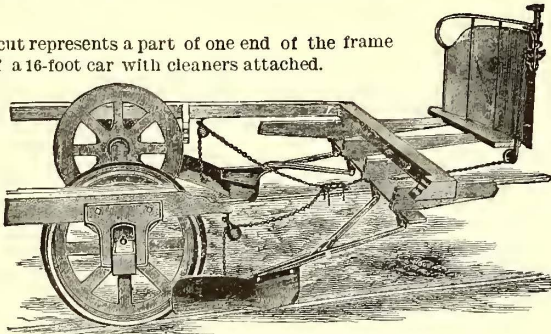
Patented Oct. 14, 1873.

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 fares 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, whereas 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 almost 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, Ind.

# DAY'S IMPROVED STREET RAILWAY TRACK CLEANERS.

The cut represents a part of one end of the frame work of a 16-foot car with cleaners attached.

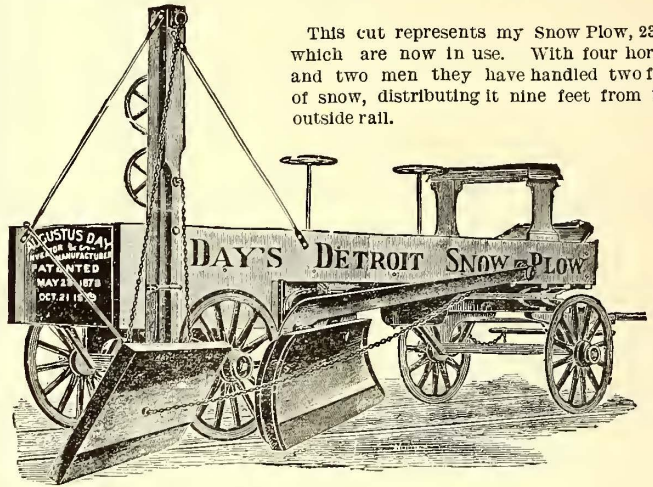


These Track Cleaners need no extended statement of their great superiority over all others invented. The fact of over three thousand pairs being now in use is sufficient evidence of their necessity and utility. Are adaptable to all kinds of rails and styles of cars. Clean Snow, Ice, Mud and Stones from the rail. The driver can raise or lower them instantly with one hand. To secure the largest benefit they should be attached to every car.

No estimate can be made of their advantage in saving of horseflesh hand labor, salt, and the making of time in stormy weather. Since their introduction new and valuable improvements have been made in their construction, mode of attachment, and convenience of handling. They are finished in a thorough, workmanlike manner of the best material obtainable, the design being to manufacture the most efficient article in preference to other considerations. Price includes right of use and is less than heretofore.

Reference is made to a few of the roads using these Cleaners.

Detroit City Ry., Detroit, Mich.	154	Pair
Chicago City Ry., Chicago, Ill.	400	"
Rochester City & Brighton R. R. Rochester, N. Y.	100	"
Albany I. Y., Albany, N. Y.	75	"
Lynn & Boston R. R., Boston, Mass.	68	"
Boston Highland Ry., Boston, Mass.	46	"
Grand Rapids Street Ry.	48	"
Nantucket Street Ry., Nantucket, Mass.	69	"
Bridgeport Horse Ry., Bridgeport, Conn.	40	"
Cream City Ry., Milwaukee, Wis.	40	"
Milwaukee City Ry., Milwaukee, Wis.	50	"
Buffalo Street Ry., Buffalo, N. Y.	32	"



This cut represents my Snow Plow, 23 of which are now in use. With four horses and two men they have handled two feet of snow, distributing it nine feet from the outside rail.

It is adapted to single or double track roads, adjustable where necessary; built in the most thorough and substantial manner of the best material. The Plow is not intended to supply the place of the small Track Cleaners, but be auxiliary to them. For execution in deep snow, ease, and convenience in handling, it surpasses all others in use. Orders should be given three months in advance.

Reference is made to the following roads that use them:—Detroit City Ry., Detroit, Mich. (Two plows.) Rochester City & Brighton R.R., Rochester, N. Y. (Two plows.) Cream City Ry., Milwaukee, Wis. West Side Street Ry., Milwaukee, Wis. Chicago City Ry., Chicago, Ill. (Three plows.) Grand Rapids Street Ry., Grand Rapids, Mich. Highland St. Ry., Boston, Mass. Buffalo St. Ry., Buffalo, N. Y. (Two plows.) Johnstown Pass. Ry., Johnstown, Pa. Minneapolis St. Ry., Minneapolis, Minn. (Two plows.) St. Paul St. Ry., St. Paul, Minn. (Two plows.) Kalamazoo St. Ry., Kalamazoo, Mich. Worcester St. Ry., Worcester, Mass. South Bend Ry., South Bend, Ind. Milwaukee City Ry., Milwaukee, Wis.

For Further Information and Price, Address:

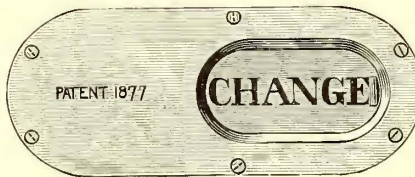
AUGUSTUS DAY, 76 State Street, cor. Park Place, - - - - Detroit, Michigan, U. S. A.

# SLAWSON'S PATENT FARE BOXES

These Boxes are of the latest and most approved pattern, and contain a front door, by opening which all of the glass inside can be conveniently cleaned. This is a late patent, and is a very valuable improvement over the old method of taking the boxes apart for that purpose. They are well made and not liable to get out of order, cannot possibly be picked, and even if all the glass is broken no fare can be extracted from the drawer.

The late J. B. Slawson originated the "FARE BOX SYSTEM," and all of his Boxes, Change Gates and Drivers' Change Box are protected by several patents, and parties using them are not liable to claims for infringements, as may be the case with some boxes which are now being offered for sale.

These Boxes, etc., are now in use not only in the United States and Canada, but in Mexico, South America, Europe, Asia, Africa and Australia—in fact, nearly all places where street cars are used.

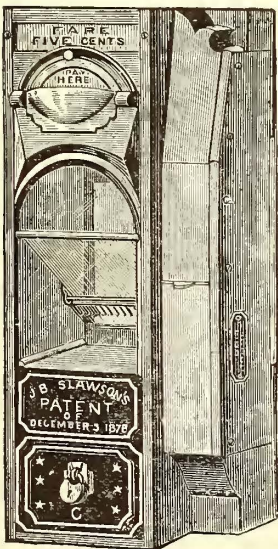


Change Slide. Outside View.

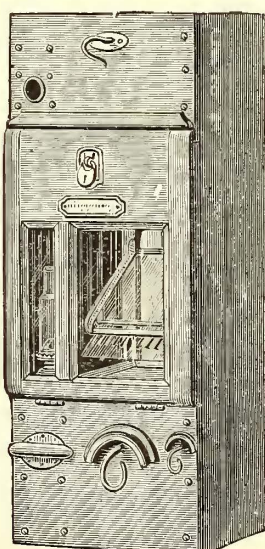


Change Gate. Outside View.

The prices have been greatly reduced, and are made to fit the times. Orders will be promptly filled by addressing,



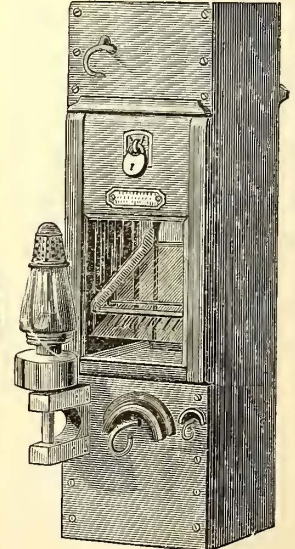
C. Front View.



C. Back View.



D Front View.



D Rear View.

MILTON I. MASSON, Agent, 365 AVENUE A, NEW YORK.  
or the JOHN STEPHENSON COMPANY, Limited, 47 EAST TWENTY-SEVENTH STREET, New York.

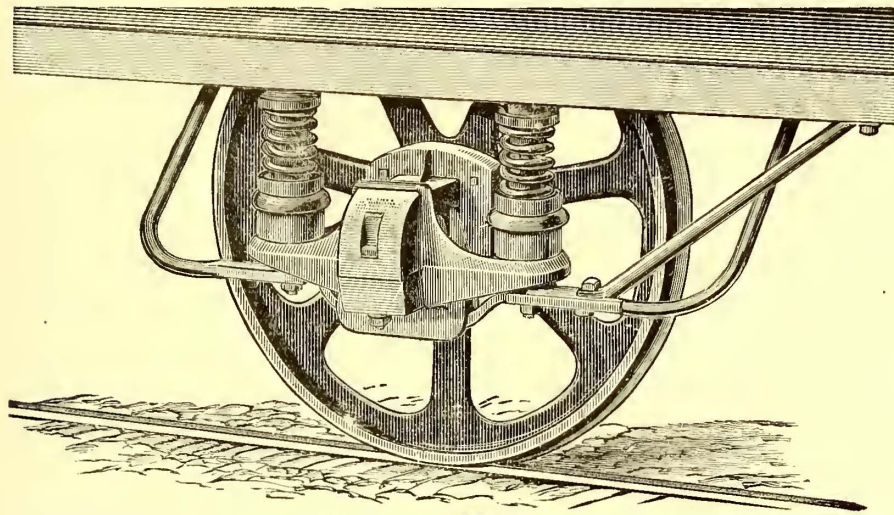


# THE BEMIS CAR BOX COMPANY,

MANUFACTURERS OF

## The Bemis Patent

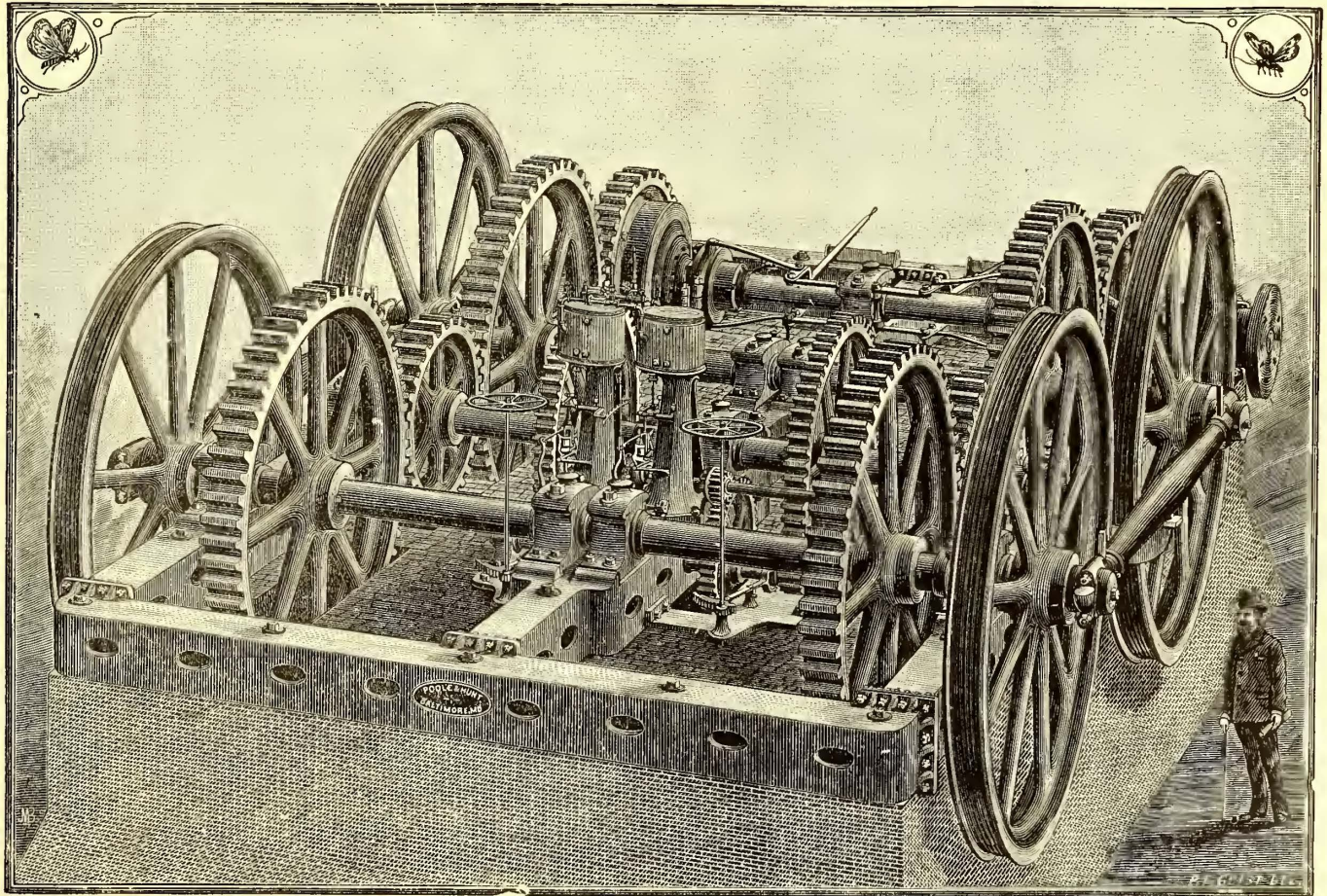
## Journal Box.



Light Draft, Easy Riding, Durable, Economical. Brasses are warranted for 10 years, and Journal for 20 years. Requires oiling or inspecting but once in 12 months. Boxes are positively dust proof.

227 Main St., Springfield, Mass.  
Opp. Depot,

**POOLE AND HUNT**  
Baltimore, Md.



Manufacturers of Cable Railway Plant.  
Machine Moulded Gearing for Mills and Factories.

CORRESPONDENCE SOLICITED.

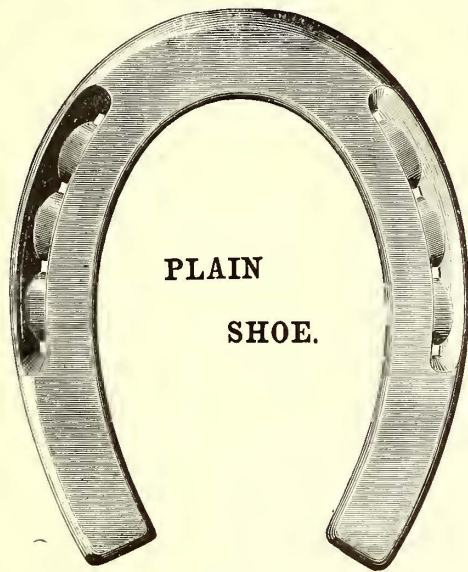
# THE BRYDEN FORGED HORSESHOE WORKS, Limited CATASAUQUA, PENN.

MANUFACTURERS OF

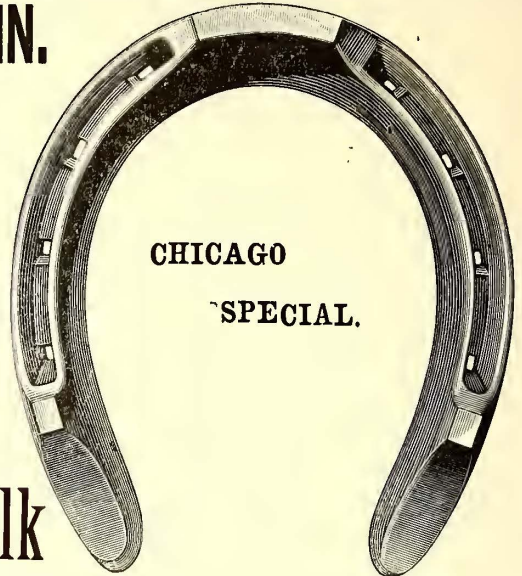
## THE BRYDEN

Forged Solid Calk

**HORSE & MULE SHOE.**



PLAIN  
SHOE.



CHICAGO  
SPECIAL.

These shoes are forged into shape under heavy drop hammers, greatly condensing the iron and adding very much to wearing qualities, making it nearly equal to steel in durability.

The distinctive feature of our system of manufacture is, that it produces a *finished* shoe, calked, or plain, ready for attaching to the hoof.

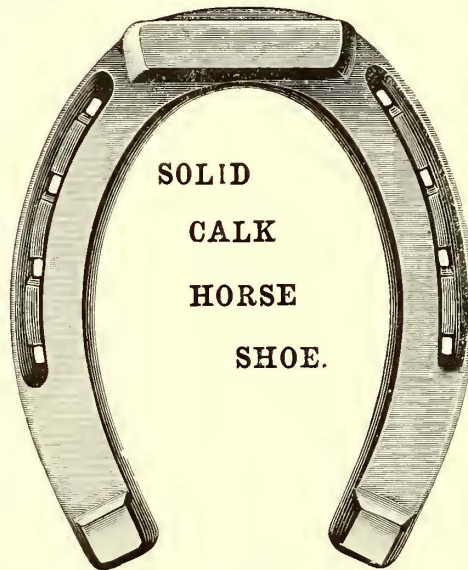
The crease is made low and the nail holes are punched well in and beveled to permit the nailhead to be well driven in, reducing the strain on the nails and insuring a firmly fastened shoe.

The foot bearing of the shoe is level, thus materially aiding in the preservation of the hoof.

It is not necessary to heat the shoe in order to fit it.

There are no welds in the shoe to break, the calks being solid forged up from the web.

OUR CALKED SHOE. A good, strong, reliable shoe to have on hand. The calks will not come off. Always ready to nail on. A handy shoe for the Winter, easily sharpened, and, as the calks will not break, will give as much service as steel. Made in sizes No. 1 to No. 6. Front and hind of steel or iron.

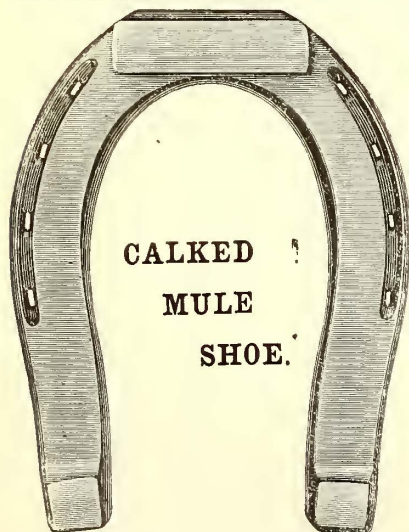


SOLID  
CALK  
HORSE  
SHOE.

The shoes have a good substantial clip drawn up from metal driven outside the regular outlines of the shoe for that purpose. The outer edge of the clip, when drawn up, coinciding with the outlines of the shoe, requires no robbing of the hoof wall to let in the clip.

Among the street railways using our shoes are, the Third Avenue R. R. Co., Eighth Avenue R. R. Co., Broadway & Seventh Avenue R. R. Co. of New York city; Bushwick R. R. Co., Brooklyn City and Newtown R. R. Co. of Brooklyn; Philadelphia Traction Co., Citizen's Passenger R. R. Co., Second & Third Street R. R. Co. of Philadelphia; Metropolitan R. R. Co. of Washington, D. C.; North Chicago R. R. Co., Chicago City R. R. Co., West Division R. R. Co. of Chicago, Ill.; New Orleans City & Lake R. R. Co. of New Orleans, La.

We present illustrations of some of the many designs of shoes manufactured by us.

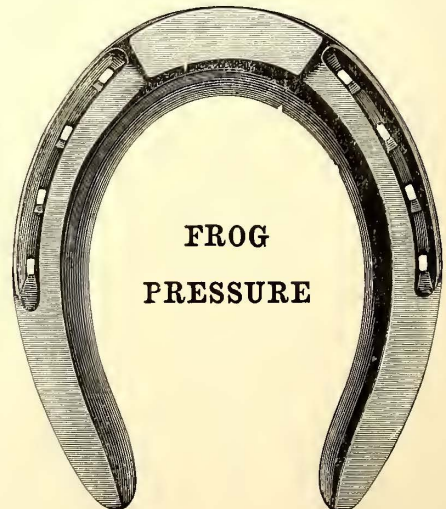


CALKED  
MULE  
SHOE.

OUR FROG PRESSURE SHOE. The advocates of the frog pressure system of horseshoeing have in this shoe the very thing they want. The best shoe made for curing corns or contracted feet. Made in sizes No. 1 to No. 6. Front and hind, iron, or steel.

OUR PLAIN SHOE. "The best railroad shoe made," so says one of the largest consumers of horseshoes in New York city. This shoe is used by the largest street railroads in New York city and Philadelphia. Made in sizes No. 1 to 6. Front and hind.

OUR CHICAGO SPECIAL. Designed to meet the wants of many of our western customers. Extensively used in Chicago, on the principal railroads and for custom work. A light calked shoe for shoeing trotting and driving horses. Made in sizes No. 1 to No 4 of iron or steel.



FROG  
PRESSURE

OUR CALKED MULE SHOE. Just the thing for street railway and coal mining work; solid calks. Made in sizes No. 1 to No. 5 in iron or steel.

**J. B. WHITE, Manager Sales Department.**

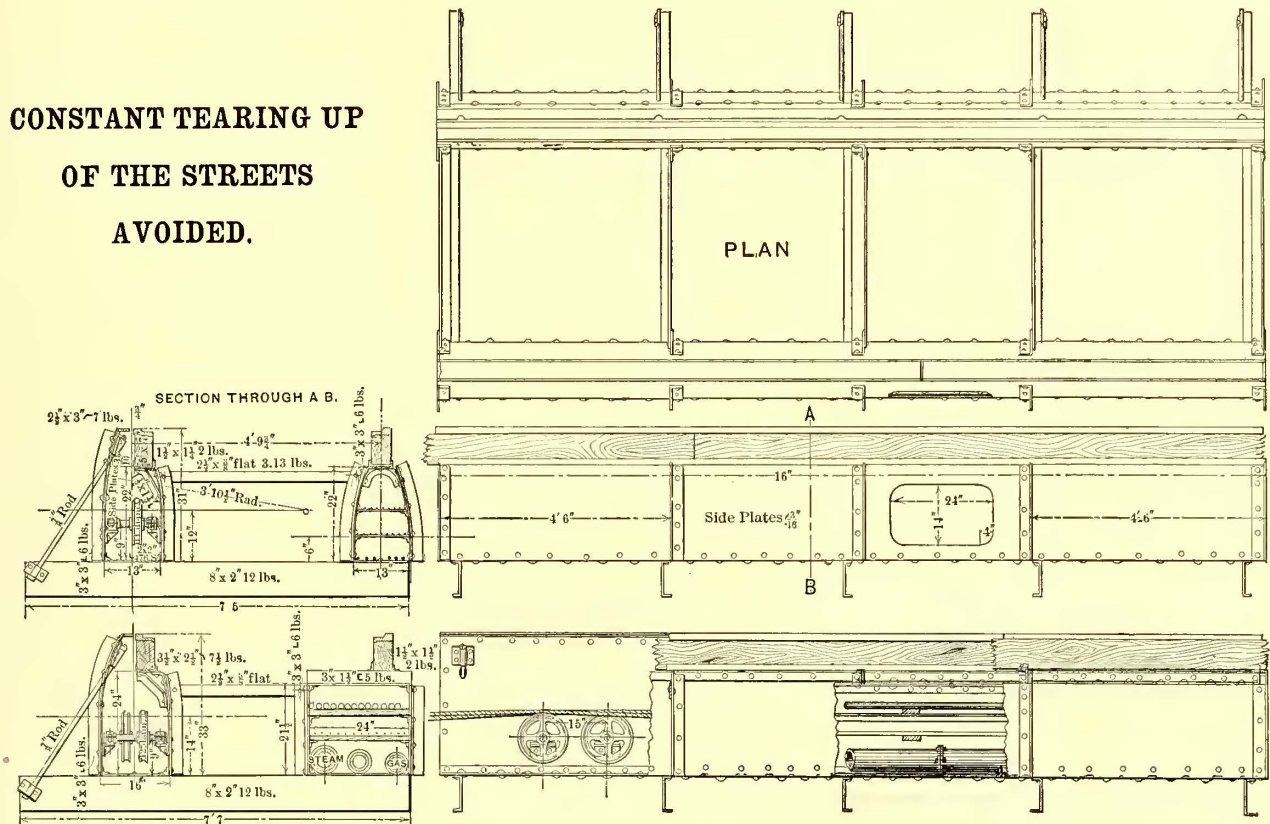
# The Gould Table System

OF

## STREET RAILWAY CONSTRUCTION.

Fully covered by patents in the United States and England. Patents applied for in other European countries.

**CONSTANT TEARING UP  
OF THE STREETS  
AVOIDED.**



The conduit is placed at the side, doing away with the central conduit entirely. A conduit is supplied for natural gas, steam, electric and telephone wires, etc.

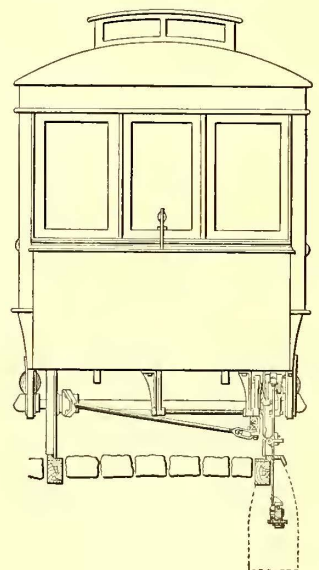
**THE RAILS ARE TIED TOGETHER AT THE SURFACE.**

The construction of the grip is the simplest known.

The slot which admits the grip is placed outside the rails.

The inventor will make favorable terms with parties desiring to put this system into operation.

A capital chance for the right man to organize a company.



**N. B.—Parties Infringing on this Grip will be Prosecuted to the full Extent of the Law.**

Address all communications to

**J. H. GOULD, Ninth and Market Streets, Philadelphia, Pa.**

S. M. CARPENTER, Prop.

C. J. LANGDON, Sec'y.

# FULTON FOUNDRY,

MANUFACTURERS OF

## STREET RAILWAY SUPPLIES, Carpenter's Patent Turn-tables and Transfer-tables,

Open Wheels of all sizes and weights. Wheels and Axles of all sizes fitted on short notice.

Chilled curve rail, Turnouts, Switches, etc., etc. Blue prints and Bills Furnished on Application.

Send for Illustrated Catalogue. Address,

### FULTON FOUNDRY,

202 MERWIN ST.

CLEVELAND, OHIO.

## WM. WHARTON Jr. & CO. Limited,

Engineers, Manufacturers & Contractors,

Twenty-Fifth Street and Washington Avenue,

PHILADELPHIA, PA.

## CABLE RAILWAYS, GRIPS,

And All Appurtenances.

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.

# Pullman's Palace Car Co.,

Manufacturers  
of

Make a Specialty of

RAIL-  
ROAD

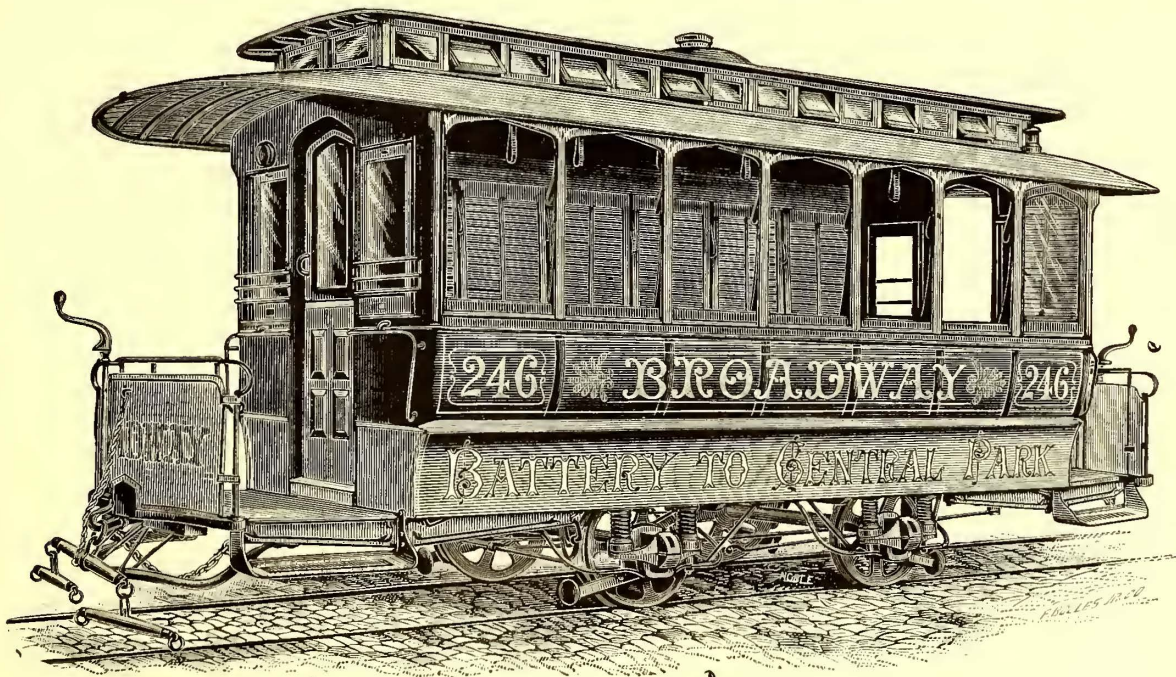
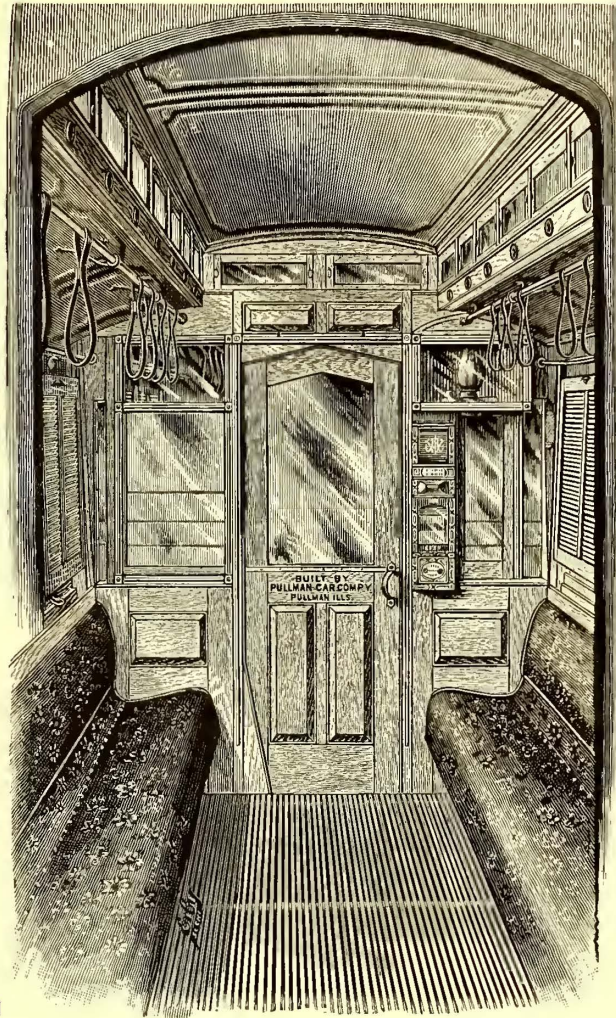
Street, Cable Grip  
& Electric Motor

CARS.

CARS.

Pullman, Illinois.

Detroit, Michigan.



Address all correspondence

**PULLMAN'S PALACE CAR CO., Chicago, Ill.**

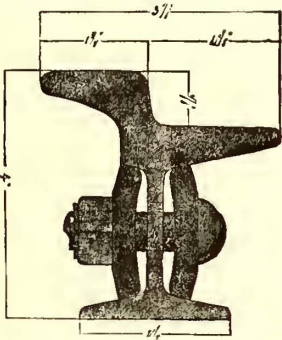
THE GIRDER SYSTEM OUR SPECIALTY.

THE

# Johnson Steel Street Rail Company,

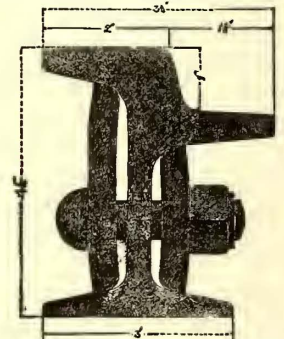
JOHNSTOWN, PA.

Section C. 88, No. 111.



Patented February 20, 1883.

Section D. 45, No. 11.

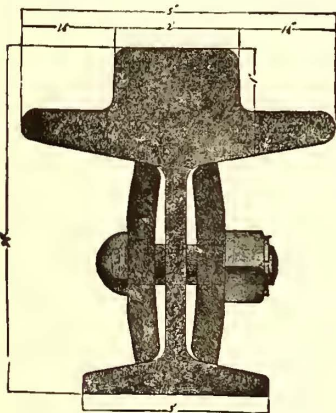


Patented November 27, 1883.

## SIDE BEARING GIRDER RAILS

OR

Section E. 76, No. 117.

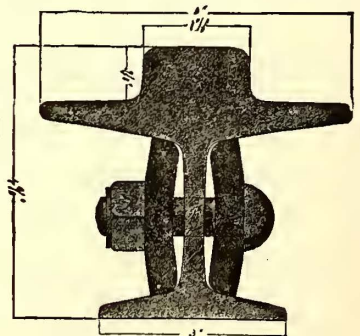


Patented January 29, 1884.

## CENTER BEARING GIRDER RAILS.

Large Assortment of different Weights and Sections.

Section G. 58, No. 120.



Patented January 29, 1884.

# Rolled Steel Switches, Frogs, Curve Crosses, Etc.

We Furnish Every Detail Wanted in Track Work.

Our customers are guaranteed against all suits for infringements on goods purchased from us and we further undertake to defend the patents covering the details of our Girder System.

To those contemplating the use of the Girder System, we offer, FREE OF COST, to survey their routes, and after consultation as to the best and most economical construction, to furnish full and complete estimates of cost of the completed work. Send for Illustrated Catalogues.

ELI BALDWIN, President.

WALTER S. BALDWIN, Secy. &amp; Treas.

# THE STANDARD INDEX AND REGISTER COMPANY,

138 FULTON STREET, NEW YORK,

SOLE LICENSEES AND MANUFACTURERS OF THE

SIMPLE.

IMPROVED

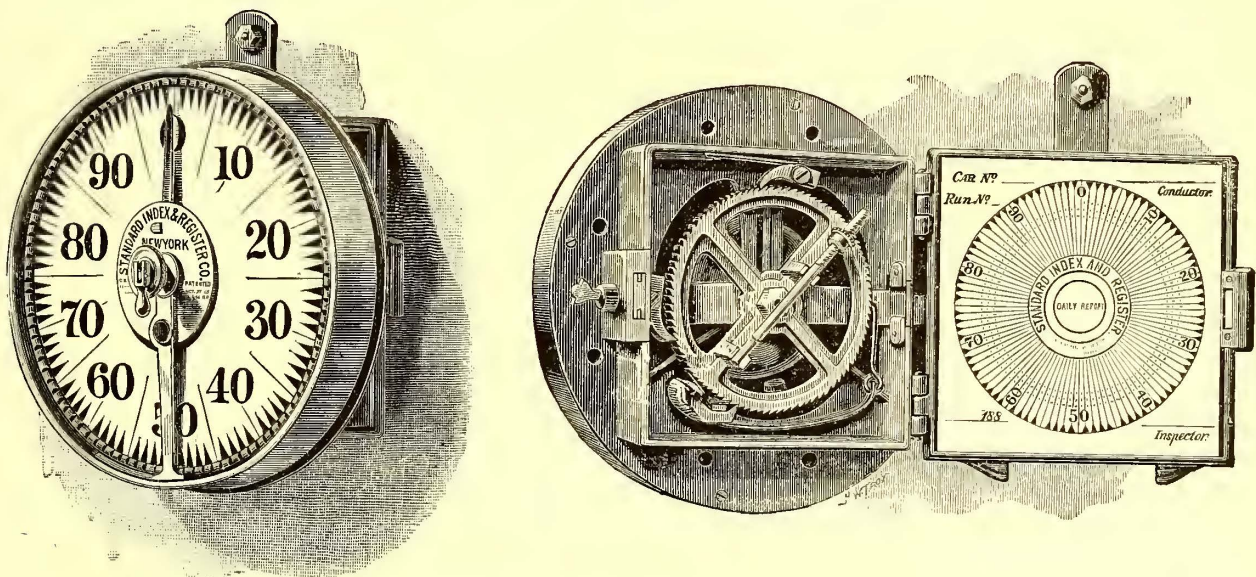
DURABLE.

# STANDARD

INFALLIBLE.

INDEX &amp; REGISTER.

ECONOMICAL.



ADOPTED BY THE LEADING RAILROADS IN THE UNITED STATES.

Besides indicating upon its face, the fares as the alarm is rung, this register indelibly records them as well as the trips made upon a paper dial inside. This paper dial is removed at the end of the day and is a correct report of the fares registered each trip and the number of trips made, which cannot be altered or obliterated.

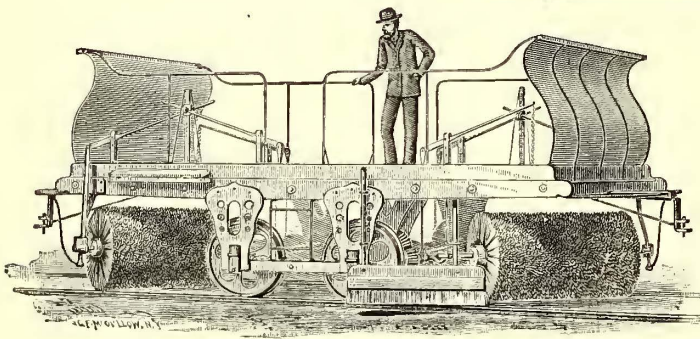
We therefore claim our system of registering fares to be the simplest and best, and it positively stops any collusion between employees.

Testimonials confirming this statement from roads on which the "Standard" has been used for the past five years will be furnished upon application.

# THE BROOKLYN RAILWAY SUPPLY COMPANY,

37, 39 and 44 Walworth St., Brooklyn, N. Y.

U. S. A.



## RAILWAY SUPPLIES.

AGENTS FOR

### Carpenter's Patent Turn-tables and Transfer-tables.

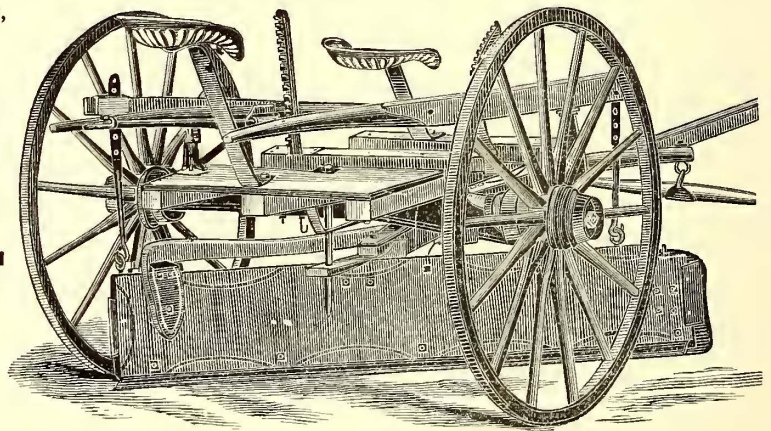
Simplest, Cheapest and Best in the World. Each Exhibited in Practical Operation.  
Write for Prices.

Agents for Maine, New Hampshire, Vermont,  
Massachusetts, Rhode Island and  
Connecticut of the

### BOSS & WALKAWAY Snow Scrapers.

Price, \$100 & \$150.

Only Two Horse Power. Cheapest Practical  
Horse Power in the World.



All kinds Track and Stable Tools: Picks, Shovels, Rammers, Bars, Mauls,  
Tongs, Bending Machines at the Lowest Prices.

### Latest Improved Snow Sweepers of our Own Manufacture.

Cylinder Brooms and many other improvements are patented. Rattan for refilling. Snow Plows. Sand  
Cars Exchanged. Sweepers of other makers refitted and sold cheap.

37, 39 and 44 Walworth St., Brooklyn, N. Y.



# RAILWAY REGISTER

## MANUFACTURING

MANUFACTURERS AND OWNERS OF THE Latest Designs, Improvements and Inventions in Registers, Indicators, Classifiers and Punches, for the Recording of Fares Collected on Street and Steam Railroads.



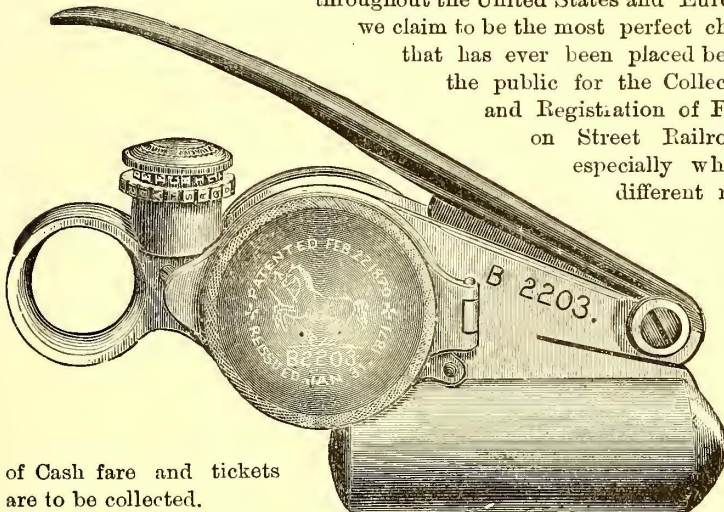
## COMPANY.

This company owns over 100 Patents embracing all the Valuable Features of Fare Registers, Indicators, etc., and was awarded three Medals at the Chicago Exposition of Railway Appliances.

JAMES McCREDIE, Pres., Buffalo, N. Y.

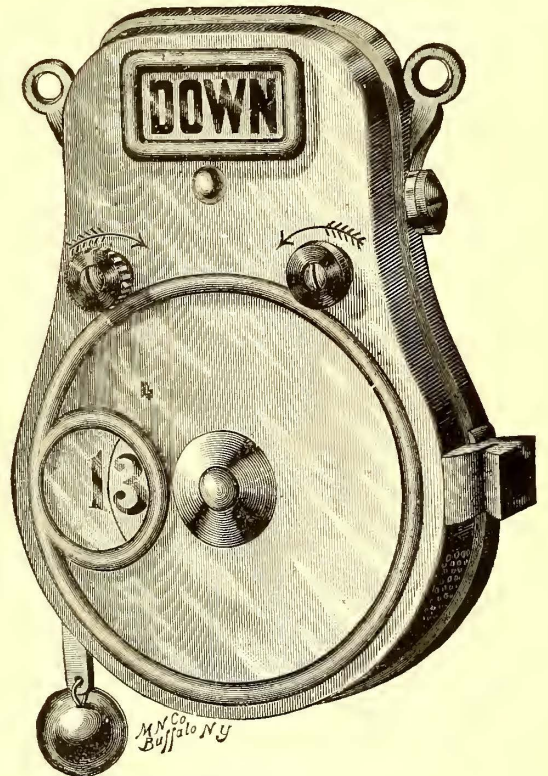
### The Alarm Registering Punch.

This Register, which is so generally used throughout the United States and Europe, we claim to be the most perfect check that has ever been placed before the public for the Collection and Registration of Fares on Street Railroads, especially where different rates

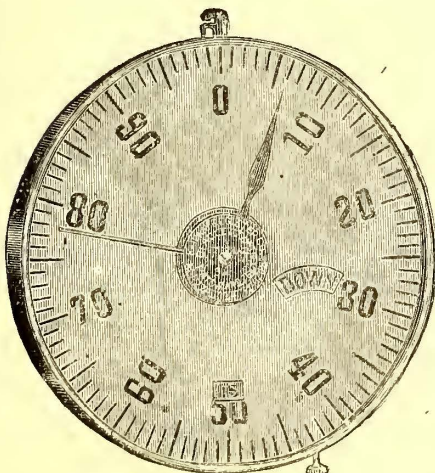


of Cash fare and tickets are to be collected.

### Benton Register.

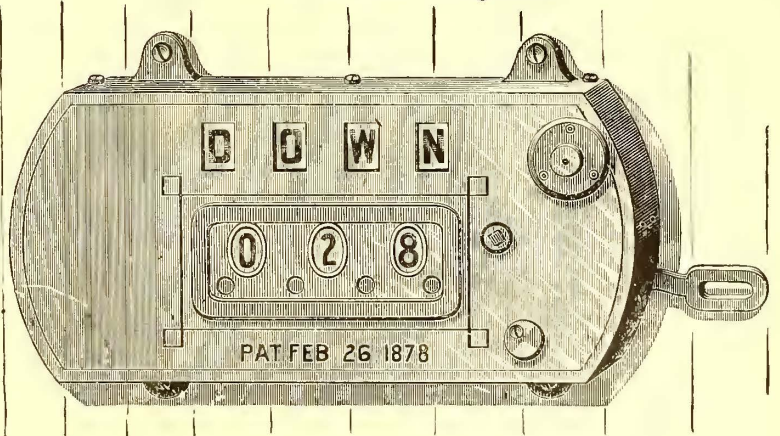


### The Monitor Register.



Railway companies desiring to use a Stationary Register will consult their own interest by examining this Register before adopting any of the cheap devices now offered as it is the most Reliable Register of its kind. For further particulars address

### The Pond Register.



BEADLE & COURTNEY, Gen'l Agents, 1193 BROADWAY, NEW YORK. Branch Office, 423 Walnut St, Ph'a

# FRANK H. ANDREWS,

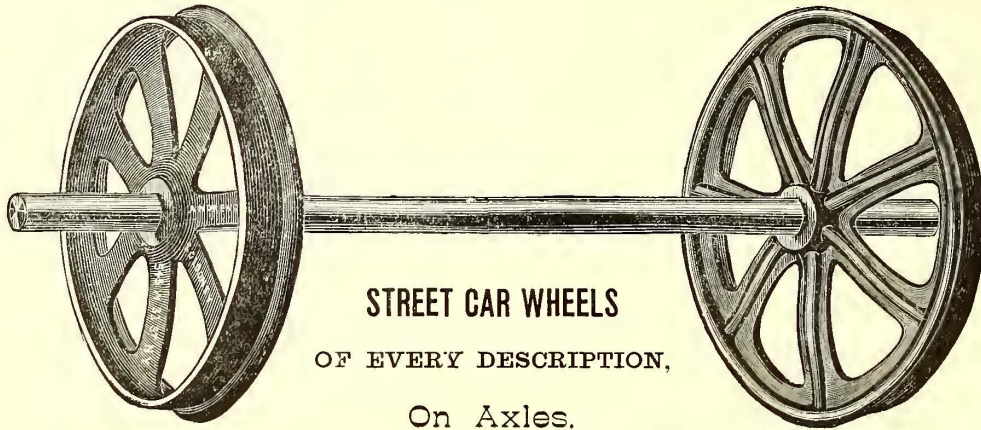
## F. T. LERNED, Gen'l Agent.

OFFICE :

545

W. 33d St.,

NEW YORK.



STREET CAR WHEELS  
OF EVERY DESCRIPTION,  
On Axles.

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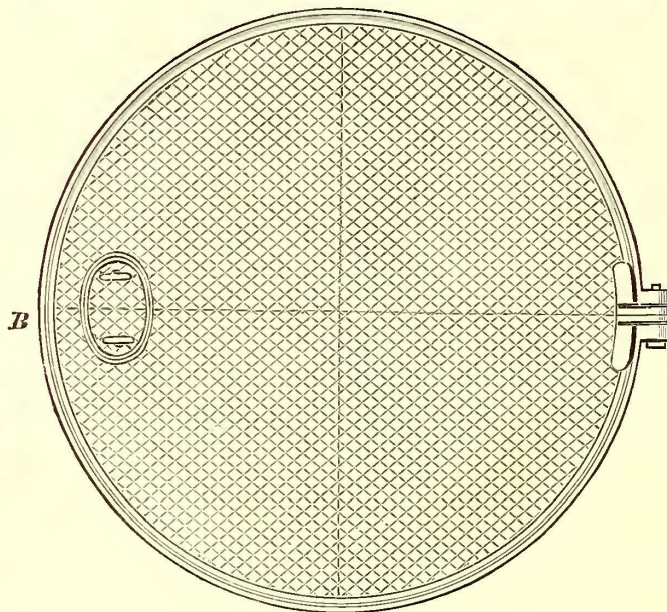
Elliptic, Spiral,

Volute, Car and

Engine

# SPRINGS

Of Every Description.



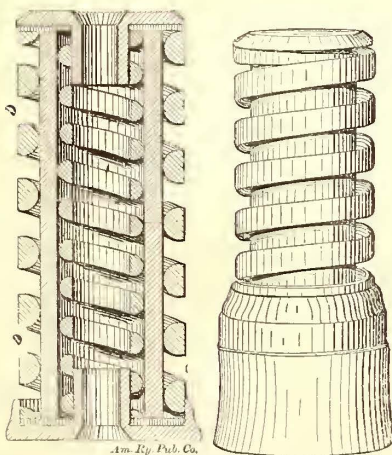
Street Railway Turn-table.

Car Wheels,  
Axles,  
Brake Shoes,  
Pedestals,  
Boxes,  
Brass Bearings  
AND  
Castings

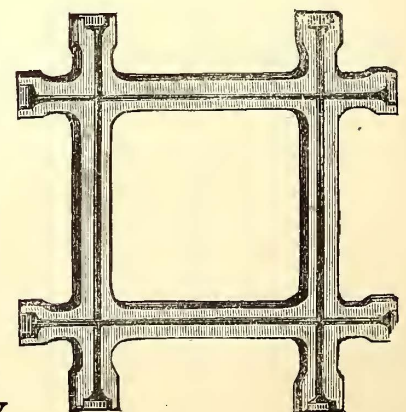
of all Descriptions where great  
Strength is Required.

ALSO

Sweepers, Snow Plows,  
Turn-Tables,  
Track Work, Automatic  
Switches, Etc.



Improved Springs.



Street Railway Crossings.

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Manufacturers and Contractors for Constructing Street Railways.

THE BUILDING OF

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Straight or Bent to any Radius.

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## MACHINERY:

## Wheel Presses, Wheel Borers, Axle Lathes, Drills, &c.,

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Promptness and Reasonable Prices.

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# RICHARD VOSE,

13 Barclay Street, . New York,

PATENTEE AND MANUFACTURER OF

## Graduated Street Car Springs.

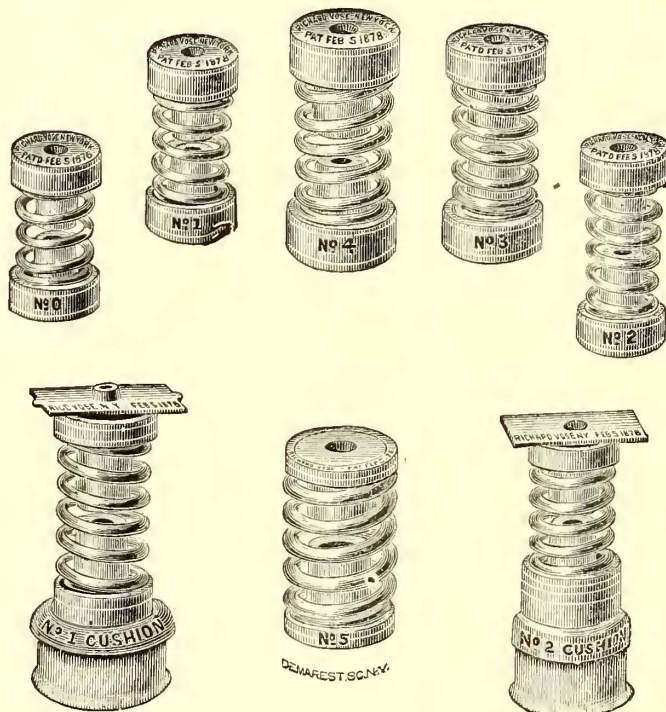
### RUBBER CONE.

Patented, April 15th, 1879.

ADAPTED TO THE

**STEPHENSON,**  
**BEMIS,**  
**RANDALL,**  
**HIGLEY,**  
**BRILL,**  
**JONES,**  
**BALTIMORE,**  
**VOLK,**  
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No. 0, for 10-ft. Light Cars.  
 No. 1, for 10-ft. Cars.  
 No. 2, for 12-ft. Cars.  
 No. 3, for 14-ft. Cars.  
 No. 4, for 16-ft. Cars.  
 No. 5, for 16-ft. Cars.  
 (Single Pedestal.)  
 No. 1, Cushion, for 16-ft. Cars.  
 No. 2, Cushion, for 12 and 14-ft. Cars.

## TESTIMONIAL.

MIDDLESEX RAILROAD CO., BOSTON, MASS.  
 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 Respty,  
 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.

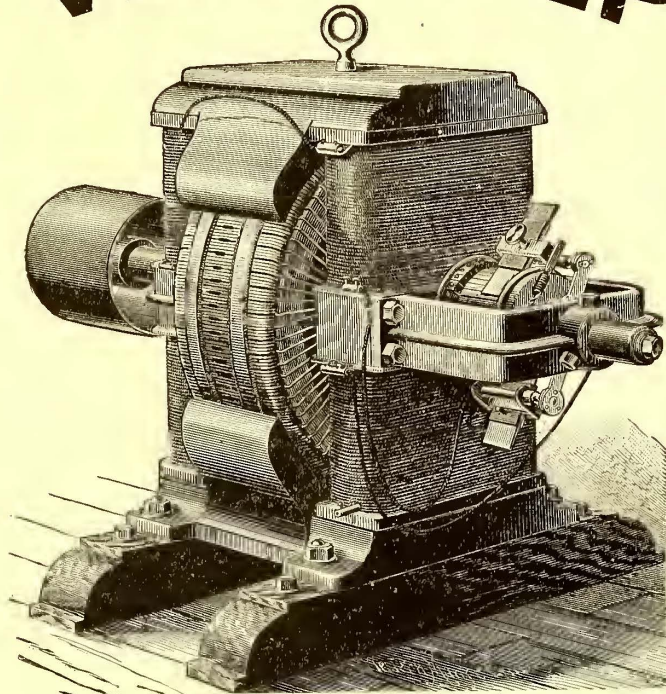
LOWELL HORSE R.R. CO., LOWELL, MASS.  
 TO WHOM IT MAY CONCERN: We have used the Richard Vose Graduated Car Springs for several years, and are well pleased with the same. Should be unwilling to change them for any other. All of our cars use these springs. Yours Respectfully,  
 J. A. CHASE, Treas.

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 20th 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.

**THE VAN DEPOELE**



**RAILWAY ELECTRIC SYSTEM.**

**The Van Depoele Electric Manufacturing Company**

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Owning the Van Depoele Patents for Electric Railways and for Van Depoele Motors, are prepared to equip railways with their Electric System.

We claim to have the best and most economical Electric Motor in the World.

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**We are not Selling Stock, but Doing Business.**

Would be pleased to furnish estimates to new companies or those desiring to extend lines or wanting more rapid transit.

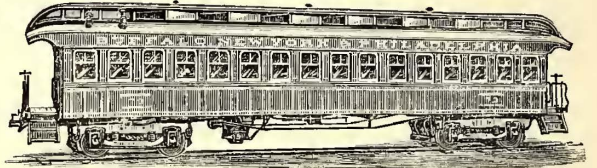
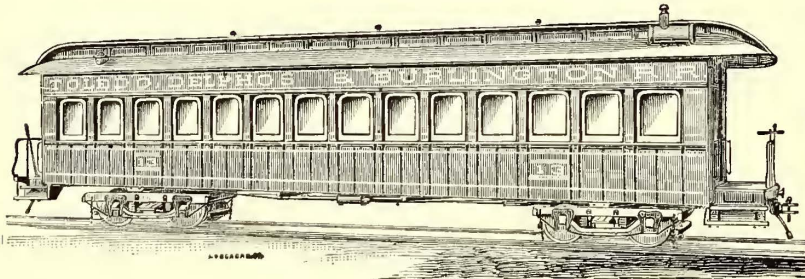
**Van Depoele Electric Manufg. Co.**

# J. G. BRILL & CO.,

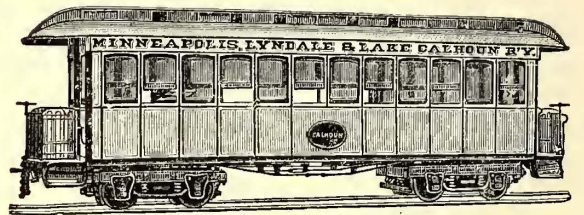
## PHILADELPHIA,

BUILDERS OF

# RAILWAY & TRAMWAY CARS

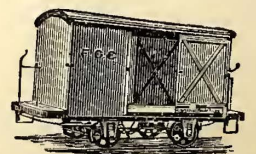
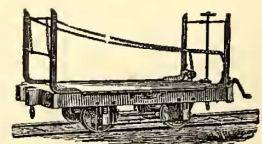
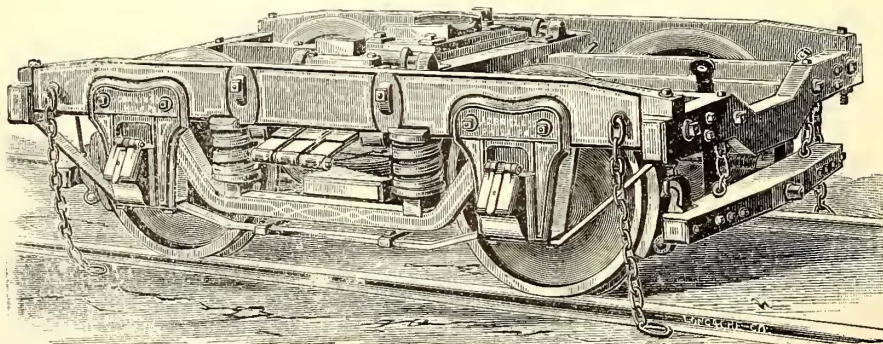
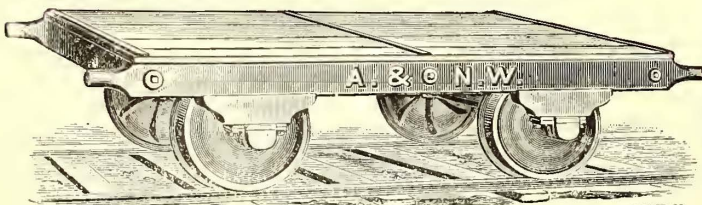
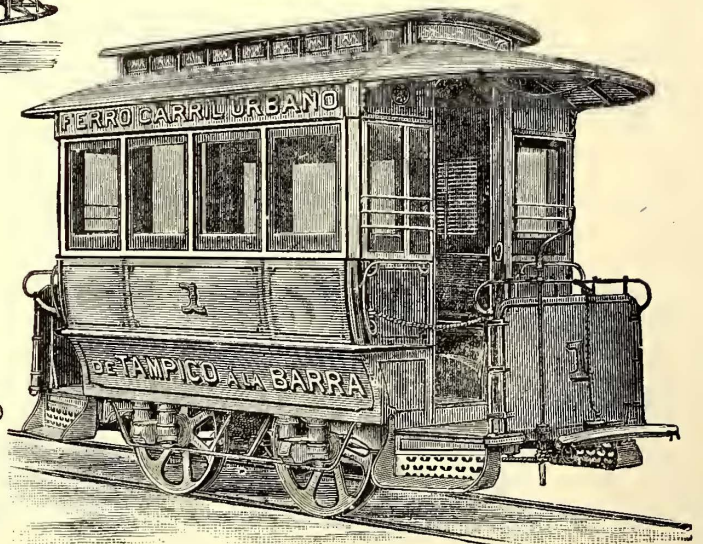


Passenger Cars of all kinds,



Light Cars for  
Suburban Roads,

Construction Cars, Power Hand  
Cars, Small Merchandise  
Cars, Cane Cars.

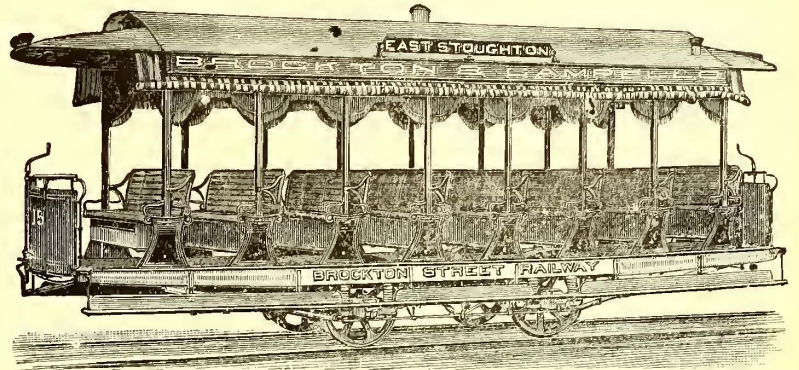
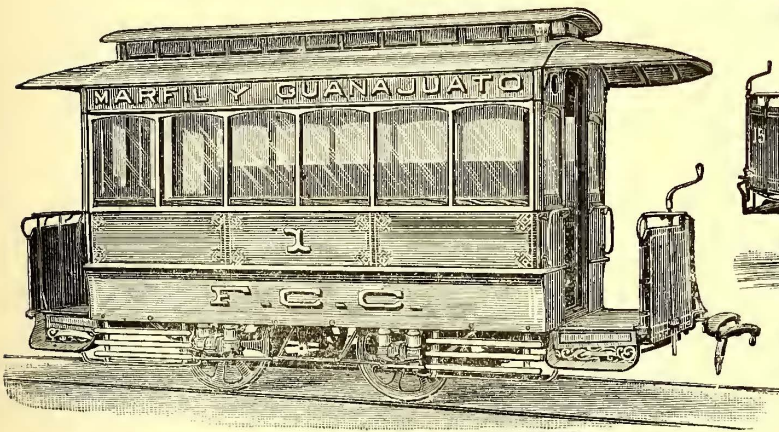


# J. G. BRILL & CO.,

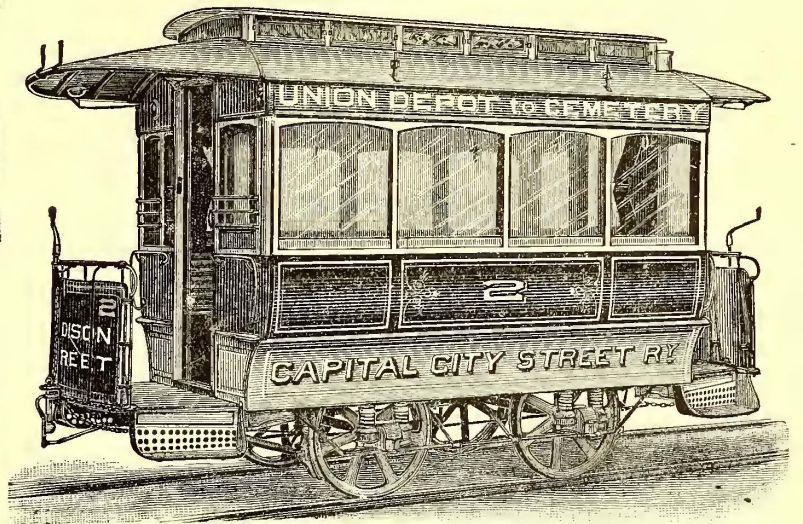
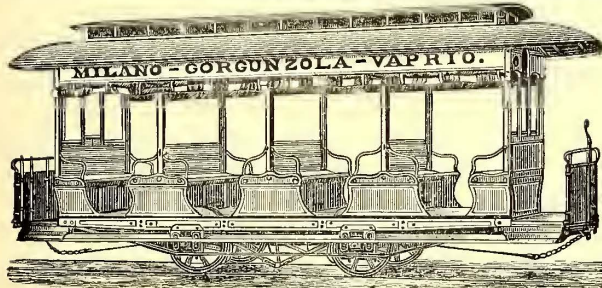
## PHILADELPHIA,

BUILDERS OF

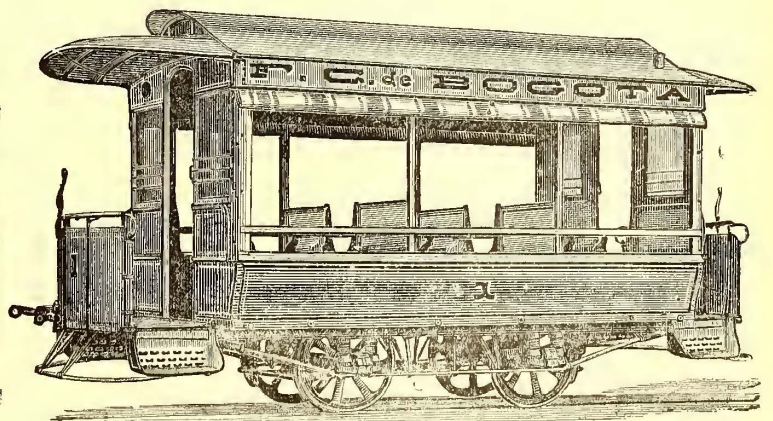
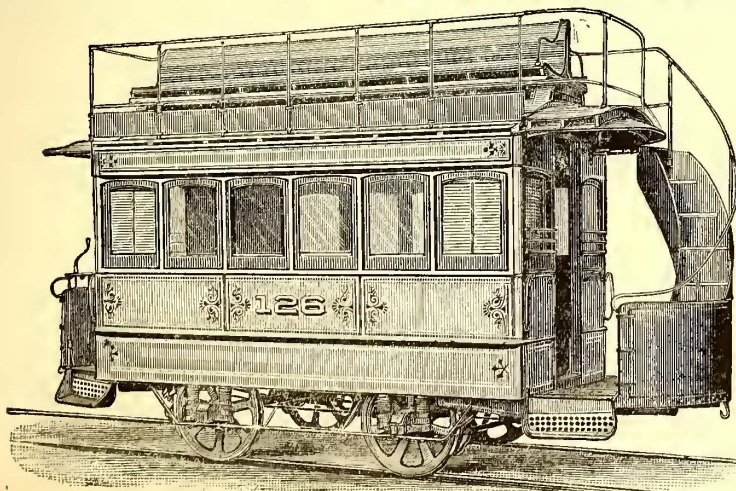
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Gold Medal at Chicago Exhibition  
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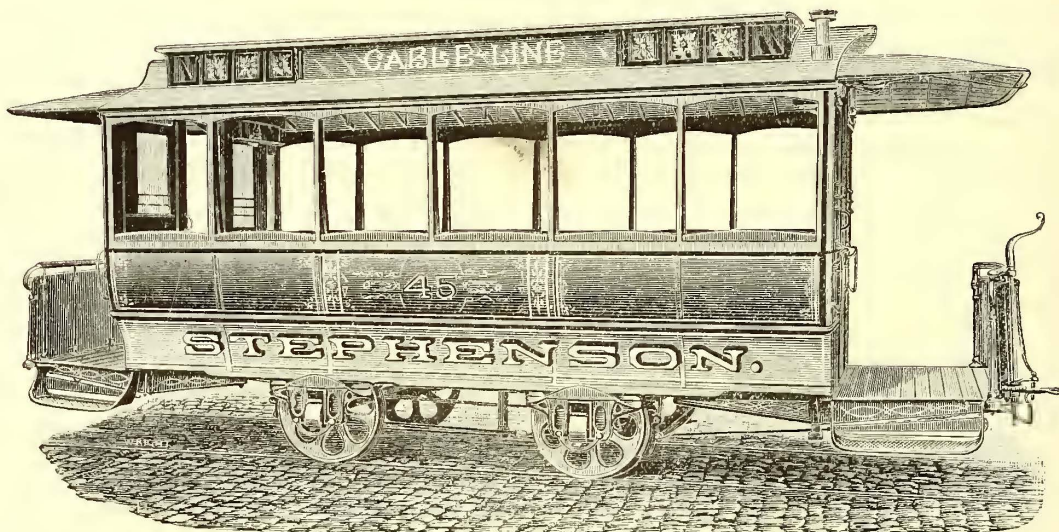
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**New York.**

## TRAMWAY CARS

MEDAL OF FIRST CLASS, WORLD'S INDUSTRIAL COTTON EXPOSITION, NEW ORLEANS, 1885.



**LIGHT ELEGANT, DURABLE.**

*Every Description.*

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