



De Grange and Green's Car-Axle Box.

The object of this invention is to provide simple and effective means for excluding dust and grit from the interior of the box, thereby preserving the oil or lubricant in a free and clear condition, so that there will be no appreciable wear of journal and the brass or bearing; to prevent the loss of oil at the front of the box where, as in ordinary boxes heretofore devised, the oil is liable to escape through the joints between the cover and the box.

It consists in fitting a cup shaped annular flange on the axle of the wheel and providing the rear end of the axle-box with a boss carrying a collar, which fits into or is inclosed by the flange. The collar bears a packing ring upon its outer face, which rests against the bottom of the flange, thus effectually preventing the entrance of dust or grit into the oil or journal chamber.

A vertical divisional plate 20 at the front of the oil chamber of the axle box, extending from near the floor of the chamber up to the under side of the journal, is to arrest the outward flow of the oil caused by jolts or concussions when the car is turning curves, preventing the oil from being thrown against the axle-box cover and leaking out through the joints. The stop-plate does not extend to the bottom of the oil-

chamber, allowing the oil to flow under the plate.

Figure 1 is a longitudinal section of a car axle box embodying these improvements.

made of cast iron. A bearing or box 2, of brass, phosphor bronze or other composition metal, fits the journal 3 of the axle 4, and is provided on its back with a transverse groove to engage with a rib, 5, on the under surface of the top of the box, so as to prevent said bearing from moving in the direction of the length of the axle. In front of the box is an opening which is closed by a lid or cover, 6, that can be removed or lifted to renew the oil or lubricant and the cotton waste, tow, or other medium for holding the oil and feeding it to the journal.

The upper edge of the cover engages with a recess, 8, formed near the top of the box 1, and its lower edge has an apertured lug, 9, through which is passed a pin or screw, 10, that enters a seat or socket, 11, on the box, and holds the cover in position.

At the sides of the opening or mouth of the box are formed guideways for the reception of the detachable plate 12, which, when in position, bears against the front end of the axle journal, so to prevent the longitudinal movement thereof.

At the front of the oil chamber a transverse plate 14, rises from near the bottom. When oil is poured into the space 20, it flows under the plate 14 into the lubricating chamber. For a dirt or grit proof joint at the

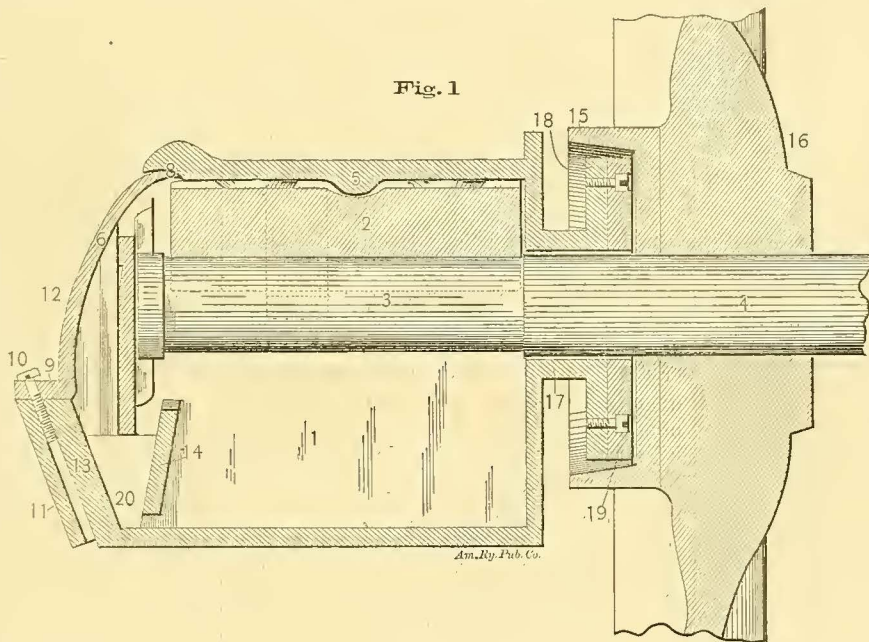


Fig. 1

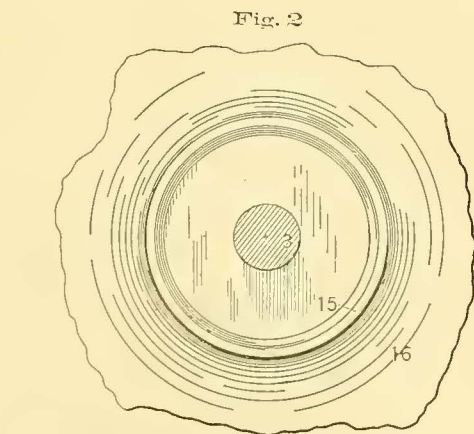


Fig. 2

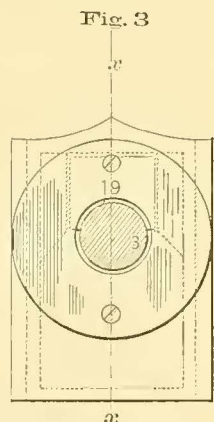


Fig. 3

DE GRANGE AND GREEN'S CAR-AXLE BOX.

Fig. 2 is a detail view of the wheel, axle, and cup shaped flange. Fig. 3 is a rear view of the axle and packing ring, representing the collar and packing ring applied thereto.

The reference numeral 1 is the axle-box,

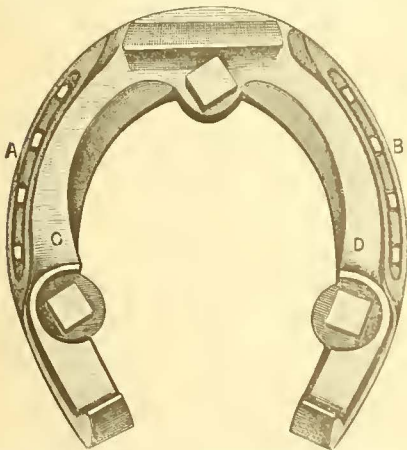
rear of the axle box, a cup shaped flange and plate, 15, are fitted on the axle, so as to move therewith. On the rear face or wall of the axle-box is formed a hub or boss 17, which has outer collar or ring plate, 18, made to fit into the cup shaped flange and plate on the axle, but smaller than the seat space in the flange; so that the latter can revolve around the ring plate 18 without friction. The inner face of the ring plate or collar 18 carries an elastic packing disk, 19, which prevents access of dirt and grit to the axle.

Economy in oil consumption, perfect lubrication and cleanliness are the claims of the inventors;* these attained mean a saving in motive power and rolling stock.

* De Grange & Green, New Orleans, La.

Hawes' Adjustable Shoe.

Herewith we illustrate an "Adjustable Shoe,"* especially adapted for winter use, or whenever the frequent removal of calks is required. It is claimed that shoes with smooth or sharpened calks may be quickly adjusted without drawing a nail, scraping a hoof, or heating an iron. The shoe is in two distinct parts. The first, a thin but strengthened plate, numbered in reference to size, is nailed to the hoof in the usual manner. This forms a base-plate, to which "Adjustable Shoes," corresponding in size and number, are accurately fitted. These are screwed to the base-plate by small square-headed screws. This "adjustable" portion of the shoe is held strongly and



firmly to the base-plate. The strain is so evenly divided that the complete shoe is as rigid as though made in one piece; while the two parts thus combined are no heavier than an ordinary shoe of corresponding size-number.

This shoe has been in constant use during the two past winters, with a view to thoroughly testing and perfecting its practical efficiency, before presenting it to the general public, and the manufacturers claim an assured success.

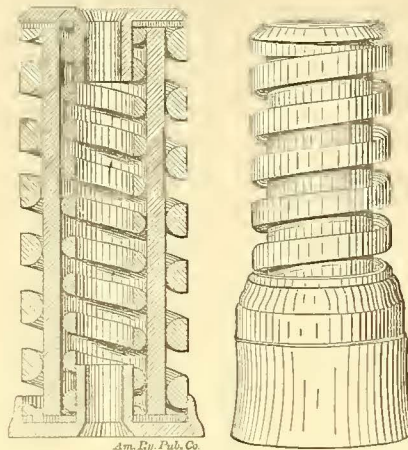
* Dr. A. C. Hawes, Noroton, Conn.

Andrews & Clooney's New Car Spring.

We show in cuts a new Street Car Spring,* which, after years of experimenting and experience, the makers claim to have brought to perfection, or as near it as is possible to

* Andrews & Clooney, 531 to 551 West 33d Street, and 535 to 552 West 34th Street, New York.

arrive. The great aim has been to get a spring that would carry the car as well when empty as with the heaviest load, and ride equally as well under all the varying loads street cars are subjected to.



It is a combination of rubber and steel, which is thought by many railway men to be the best way to hang a car to accomplish easy riding and quiet; springs of this style and make have run ten years and longer.

Progress in Running Street Cars by Electricity.

The Van Depoele Electric Manufacturing Co., of Chicago, are steadily making progress in running street cars by electricity. The South Bend Railway Co., of South Bend, Ind., is equipping all its cars to run by this new power. The electrical generators are run by water power, consequently the expense of running cars is nominal.

The Minneapolis, Lyndale & Minnetonka Ry. Co., of Minneapolis, Minn., is putting in the Van Depoele system; the electricity being generated at one of the large Pillsbury flour mills. It is to be running before the first of January, when it is expected that electricity will take the place of steam on that road.

An extensive plant is also being put in at Detroit, Mich.

We copy the following from *South Bend Tribune* of November 16th:—

"Michigan street was thronged yesterday by waiting, inquisitive, doubting, and curious folk, watching the second experiment of the South Bend Railway Company, to adapt to its uses the Van Depoele electric system. Mr. Van Depoele, the inventor of the system, and Mr. Lucius Clark, Manager of the railway, had control of this second trial, and to say that it was eminently successful is to award to the projectors and managers faint praise. We are proud of the success achieved. It is an honor to the inventor, the manager and the city alike.

"Carrying on each trip from seventy to one hundred passengers, five trips, going and returning from Washington street to the southern city limits, one and one-quarter miles (single trip in each direction) the car was moved, without jar or difficulty, over an uncleaned track and with heretofore untried appliances.

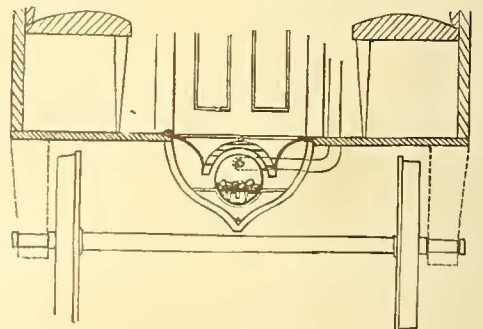
"Practical mechanics, who appreciate the difficulties of the adjustment and smooth running of a new machine (and there were not a few of them present) joined in the verdict of an assured success. Messrs. Van Depoele and Clark deserve and receive the thanks of this community. Mr. Van Depoele for his invention, his perseverance in making it perfect, and Mr. Clark for his abiding faith in the success of the system, his fearlessness in accepting the risk of an innovation, and his energy in placing the same beyond cavil or doubt as to its utility.

"Having a pride in the achievement of that which has been deemed impossible, we invite those interested in street railways to visit our city and see for themselves what enterprise and skill can develop even in a suburban town.

"Motors are being placed on three cars for the Michigan street and Chapin place route, and it is expected that cars on this route will be running by electric power by the middle of next week."

Hunter's Car Heater.

This device* is intended for the use of charcoal or coke as a fuel, and the cut requires no special description. It is intended that in all short cars one drum, and in long cars two drums be used. Where it is desirable to use two drums in short cars, the cast frame holding the journal-boxes can be made longer, or lowered by blocks and bolts, thereby making greater space for



drums between the axle and floor. These heaters can be used on cable railways. The degree of temperature can be regulated as desired. By the use of the kind of fuel that the device is intended for, the residents along the line are not annoyed by smoke. By slow combustion the moderate heat desired is produced. The heater is made of sheet iron, except where coke is used; when the drum should be of cast iron. A wire screen covers the pipe—protecting passengers from burning in passing. Fuel can be carried under the seats. The device is entirely out of the way, winter and summer.

* F. S. Hunter, Fort Ritner, Ind.

The National Car Heater.

The heating of street or horse cars, has within a few years made rapid progress and is now becoming general. It commends itself to popular favor and is the result of agitation and earnest effort on the part of the patrons of street railways.

For a long time the people and the press

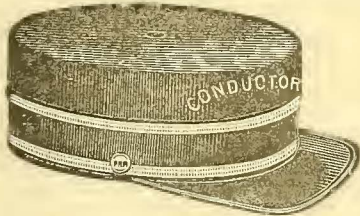
clamored for heated cars as essential to health and comfort in travel. Many roads have made the experiment of heating their cars, and have found it to result in increase of their revenue as well as the comfort of their patrons.

The National Stove Company of No. 243 Water street, New York city, are the manufacturers of a car heater that is especially adapted for warming horse or street railroad cars. It is brick lined, has rotating and dumping grate, and safety door catch. It is neat in appearance, occupies but little space, is an ornament to a car, is not costly in price nor expensive in operation. It is reported to be in successful operation on railroad lines in different cities and towns of the United States and Canada, and is said to give entire satisfaction.

This efficient heater is 3' in height, 10" in diameter and measures 14" at the base. It occupies the space usually allowed to one passenger. Three fares, at five cents, will pay the daily expense of running it.

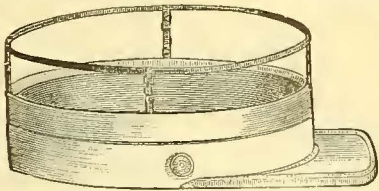
Goldmann's Uniform Caps.

This cap* has the advantage of keeping its shape in all kinds of weather, and is thoroughly waterproof, and will stand very

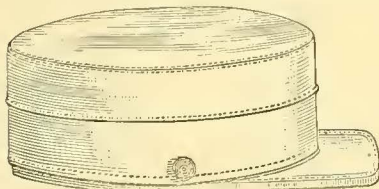


rough usage. It is claimed that they will long as new and alike after six or twelve months wear as they did when purchased, and they are in use on many if not most of the street railway companies using uniforms in the United States and Canada.

They are in use on railroads, steamboats and street companies, and by messenger



Patent Steel Frame Cap, as it appears without Adjustable Linen Cover.



Patent Steel Frame Cap, with Adjustable Cover ready for wear.

boys, letter carriers, policemen, firemen, military, &c., and are manufactured in all different shapes and styles, with gold or silver letters, and lace trimmings.

The cap is made of full indigo blue cloth and fine gros grain silk for winter use; and of brown, white, gray, and all shades of linen, duck, or light material for summer use. The white caps are arranged

*P. Goldmann, 123 Grand Street, and 19 & 21 Crosby street, New York.

with a patent frame and have two covers, so that while one is being washed, the other can be used.

[FOR THE STREET RAILWAY JOURNAL.]

Electric Railways.

BY JOHN N. BRUNS.

Within the past month science has demonstrated that nature has many things in store for us. It has shown that ere long the railroads of the present time will abandon the faithful locomotive and the slow-paced horse or mule, and accept the mysterious agent electricity.

Many experiments in electric railroading have been made, some dating back in the thirties, when Henry Pinkus produced a motor composed of magnets to be operated by electricity, and Mr. Cook of Saratoga made his interesting exhibition of an electrical magnetic machine in Barclay street, New York. This latter apparatus was of the most simple construction, consisting of two sets of magnets, one revolving in the other. The magnets were excited by the action of a galvanic battery. This machine was thirty inches in diameter and contained seventy-eight magnets, each weighing four pounds. The machine made about eighty revolutions per minute and was considered more powerful than the force of one man; but what work it actually did is not recorded.

In 1850, Professor Page made the memorable trip from Baltimore to Washington, a distance of fifty miles. His motor was operated by battery power. The whole apparatus was built under the direction of Co. gress.

Electricians at that time considered it the most important event in the history of science; they claimed that the time was near at hand when they would create a revolution in railroading.

From that time the matter has received due attention from all prominent electricians, and improvements have been brought forth by many, among whom can be mentioned Professors Jacobi, Davidson, Griel, Davenport, Little, Siemens, Daft, Gentry, Halske, and others.

The Daft Electric Light Company, of New York has, however, accomplished very fluttering results in this direction; and notwithstanding the many obstacles encountered in experimenting and otherwise, and the expenditure of vast sums of money, this company held firm to the ship and saved her from sinking.

Less than three years ago, the writer had the extreme pleasure of riding upon one of the first electric motors ever run in this country by dynamo current. It was built by the Daft Co. Its length measured less than four feet, its width twenty-four inches and its weight about 450 pounds. It had a seating capacity for two persons. This miniature contrivance hauled such heavy loads (over two tons), and ascended such heavy gradients (2900 feet per mile), that those immediately interested saw the feasibility of applying electricity to railroads.

The experiments were made on an ex-

ceedingly crude and clumsy track of about a quarter of a mile long, having a curve of forty-five degrees, on a gradient of eighty-five feet. The most marvellous incident connected with these experiments and one which many electricians failed to believe, was, that no difficulty was experienced in running on rainy or snowy days, in fact the writer saw the rails covered with snow and slush to such a height that the flanges of the wheels made a deep imprint in the snow, yet no difficulty in running presented itself.

These facts caused financiers to come forth and give their aid to the inventor, Leo Daft, to further his experiments; and the result was that in November, 1883, a motor was produced weighing two tons, and was put on the Saratoga & Mt. McGregor Railroad, since made memorable through the death of Gen. Grant. The motor was named after a famous French electrician "Ampere", and somehow or other, it had the appearance of an electric motor; it was not by any means handsome, neither was it constructed or shaped to catch the eye; but for continuous hard solid work, it certainly took the lead; it hauled an ordinary railroad car, in which were seventy-five people, up a gradient of ninety-three feet to the mile on very sharp curves, without any difficulty whatever. No other road in the country is constructed with so many sharp curves at such short distances apart; and while it is considered the most crooked road in existence the electric motor made its way in a manner satisfactory to all. The car hauled was of the ordinary type weighing ten tons, and the people within, six tons, aggregating sixteen tons in all. The speed attained up the gradient was about eight miles an hour, and down the gradient about twenty miles an hour, while the power consumed was estimated at less than fifteen horse power. This trial demonstrated beyond cavil, that nothing could compete with electricity in the matter of speed and economy.

Not fully satisfied with this magnificent demonstration, which showed that they had secured the proper apparatus for converting electricity into power, the Daft company began operations at once to elaborate upon this experiment. With this plan in view they secured the right of way on the Brooklyn Bridge in 1884. They went so far as to secure a suitable situation for their stationary engine and dynamos, and had the rails for conducting the current placed along the structure. They made great preparations and had almost designated the day of trial when a change in the Board of Trustees of the Bridge occurred, caused by the death of President Kingsley. This change was disastrous for the time being to the Daft company. They were reluctantly compelled to remove their rails and seek another place for their experiments.

About this time the most prominent electrical companies of this country came together and suggested the uniting of their interests and creating a great monopoly in electrical railroading. Among them were Cyrus W. Field, David Dudley Field,

Stephen D. Field, Edison Electric Light Company, Siemens Electric Railway, the Knight-Bentley Electric Railway, Brush Electric Company, Col. Hain, representing the Elevated railways, and others. A number of meetings were held at the residence of Cyrus W. Field, and some discussion took place as to which was the most feasible plan of organization. They agreed that all parties who were to come into the scheme must agree to transfer to the corporation to be organized, all their patents and inventions for electrical propulsion on railways in the United States as a condition precedent to participating in the advantages of this arrangement, they to be compensated by participation in the stock reserved for patents in the proportion fixed by arbitrators. The scheme was called the American Electric Railway Company. The arbitrators, five in number, were appointed by resolution.

The Daft company declined to submit to the plan proposed, claiming that they had a complete system of their own.

The time for entering the scheme was extended several times, ostensibly for outsiders to come in but in reality in the hope of persuading the Daft company to reconsider their previous declination. Finally a

To return to the advancements made by the Daft company. Their non-success on the Bridge brought forth many offers from railroad syndicates of their roads for experimenting, among them the Manhattan Elevated Railroad of New York. This latter offer was at once accepted, and the Ninth avenue branch selected. Work was immediately commenced to run a third rail in the center of the two ordinary rails. In the meantime the motor was progressing with all due speed. The third rail was laid on top of a Daft patent insulator whereby the rail was insulated absolutely from the structure proper.

It took some time to surmount the minor difficulties of laying this rail and much time was consumed in setting the engine and dynamos at the primary station. Finally, however, on the 21st of August, the motor "Benjamin Franklin," so named after the famous electrical kite flyer, was placed on the track, but owing to various delays it was not started until the twenty-sixth, when the first electric motor ever run in New York City—the largest ever built in the world—made its first trip from Fourteenth street to Fifty-third street, a distance of two miles, over gradients of 90', 105' and 110' to the mile. After acquiring

Robert L. Belknap, Robert W. Hawkesworth, Col. A. D. Palmer, and a large number of railroad engineers, etc.

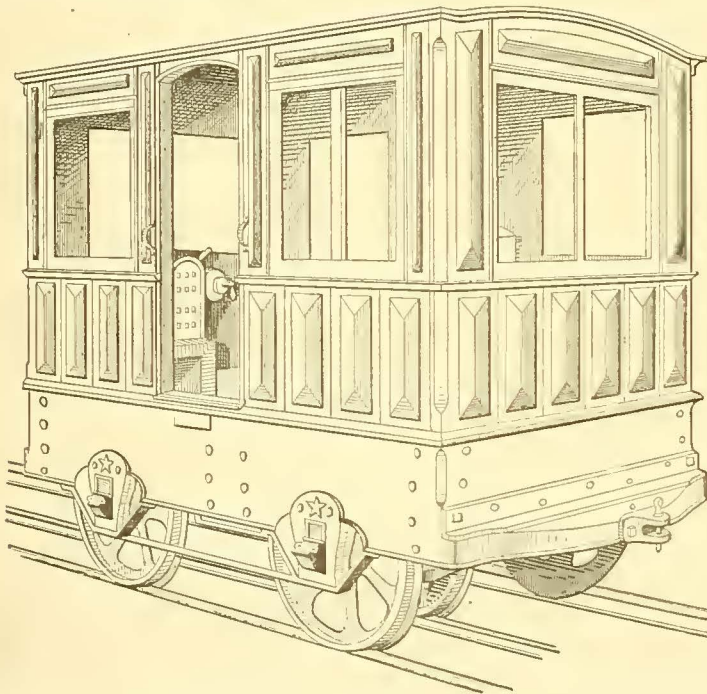
The "Benjamin Franklin" had the appearance of a half size railroad car, save that it was finished after the latest designs; it was 15' long and 7' wide and about 8' high, weighing nearly nine tons. It was calculated that four loaded cars could be hauled which would aggregate about seventy tons, including the motor, but this weight was more than tripled when ascending the enormous grades here mentioned.

The manner of operation was very simple. At the primary station in West 15th street was placed a Wm. Wright engine of 150 H. P. Three dynamo electric machines were operated by this engine by means of a countershaft and belting. From these machines wires were led to the center or third rail. When the machines were in operation, generating electricity, the current was led through the wires to the track, thereby charging it. On the motor was another dynamo machine with all the necessary regulating appliances. Under the motor and resting lightly on the third rail was a contact or pick-up wheel which conveyed the electricity from the rail to the machine on the motor. No electricity could, however, enter the machine without the attendant first turned a switch lever at the front of the car. The speed was also regulated by this switch. The reversing of the motor was accomplished by an ingenious device which controlled two sets of copper brushes resting diametrically opposite one another on the commutator of the rotating magnet called the armature. The stopping was done by an electric brake composed simply of a pair of powerful magnets having the wheels of the motor for armatures; thus, when the current was allowed to circulate through them they would attract the wheel and hold it. A mechanical brake was also on the motor in case of accident to the electric brake.

When the switch at the front of the motor was turned on, the current was allowed to circulate through the dynamo machine on the car, thus rotating the armature, and then passing down through the wheels and the outer rails and back to the primary machines. The gearing from the armature was by means of V-shaped friction wheels on both sides of the axle and friction wheels on the armature of a half round design, thereby preventing great loss due to the friction of all the parts.

When the Daft company commenced building this large motor, they received a *bona fide* commercial order to equip a two-mile street railroad in Baltimore with two ten horse power electric motors, each to haul two heavy street cars filled with passengers up the marvellous gradient of 350' to the mile, at a speed of about five miles per hour.

When they began the equipment of this road last spring, mules were hauling the cars. Six mules exerted themselves to their utmost when ascending the grade with one car filled with passengers, at the rate of about three miles per hour. When the



THE DAFT ELECTRIC MOTOR "OHM," BALTIMORE UNION PASSENGER CO.

committee was especially appointed to wait upon the Daft company but with no apparent success. Everything was done to induce the Daft company to enter except that their inventions must be forfeited.

It is a peculiar fact that while the American Electric Railway Company is yet in existence and occasionally heard from, the arbitrators have not, and probably never will meet—although twelve months have elapsed since their appointment. The announcement at that time to put an electric motor on the Elevated road in ninety days has not been fulfilled, and the claim that they had a complete system without the Daft company was simply absurd—in fact the whole scheme was based upon a series of fallacies.

speed it was calculated that it reached thirty miles an hour.

On this trip the following persons were on the motor:—The inventor, Leo Daft, Henry M. Hawkesworth, James K. Wright, George W. Mansfield, John Riddell, George N. Moore, Frank B. Aspinwall, F. Holley Reed, Charles E. Barrett, Joseph Wetzler, and the writer.

The first public trial of the "Benjamin Franklin" was made a few weeks ago with the cars loaded to their utmost capacity. It went over the entire line without the least difficulty, making stops and starts with the greatest facility. Among the more prominent on the train were Sidney Dillon, Cyrus W. Field, Jay Gould, Russell Sage,

motors were ready and everything in place, the mules were taken off, the electric motor substituted, and the road opened on schedule time. From the beginning the traffic increased two-fold, and the motors, instead of exerting ten horse power, were and are actually doing the work of fourteen, calculated according to Haswell and Molesworth.

The average speed of the motors with two cars filled with passengers is ten miles per hour, although five miles is all that was contracted for. The increased traffic is not due to the novelty only, but business men and others who utilized carriages rather than ride in cars going at such a slow rate of speed prefer the electric motor on account of its rapidity, &c.

In fact, the residents at the extreme end of the road petitioned the company to extend the track one mile, agreeing to pay all the charges of material, laying, &c., provided the company would equip the road with two more motors. This offer was accepted, the road extended and two new motors of larger capacity ordered, one of which, the "Ohm," was shipped on the 10th of November, and is running very successfully. A grade of 275' to the mile on a curve of 40° radius has been included in the extension. The fourth motor, the "J. L. Keck," will arrive in Baltimore the first week in December. All the motors are built like the illustration presented herewith. Mr. T. C. Robbins, Superintendent of this road, the Baltimore Union Passenger Company, informed the writer that it had cost them eighteen dollars per day to maintain the mules, and it is costing them now for coal, engineer, &c., with double the traffic, about seven dollars per day; at the same time he was not now fretting lest one of the motors should die. What better results could any syndicate of men desire?

It is to be hoped that the time is near at hand when hot cinders, dirt, noise, puffing and liability of explosion on the elevated railroads will be superseded by this noiseless, inexpensive agent.

For the benefit of those who might question the economy of electricity applied in this way, I submit herewith an estimate of the relative cost of equipping a ten-mile section of street railroad by electricity and horses.

DAFT SYSTEM.

(The assumption being that fifty cars are to be run and 150 H. P. ready for delivery on track at all times.)

250 H. P. engine and boiler, set up.....	\$10,000
Generators.....	12,000
50 motors, including cost of attachment.....	40,000
	\$62,000

for machinery to operate a line of ten miles with fifty loaded cars, which may all be moving at the same time.

Assuming a run of sixteen hours per day per car, the running expenses would be about as follows per diem:

Coal, 4 tons.....	\$15 00
Engineers.....	6 00
Firemen.....	4 00
Machine men.....	6 00
Oil, waste, etc.....	3 00
Depreciation.....	15 00
	\$49 00

or less than \$1.00 per car running sixteen hours.

HORSES.

400 horses at \$125 each.....	\$50,000
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RUNNING EXPENSES PER DAY.

Maintenance of 400 horses, at 50c. each.....	\$200 00
24 stablemen, at \$1.50 each.....	36 00
12 other stable employees, at \$1.50 each.....	18 00
Depreciation.....	32 87

Making a total per diem of.....\$286 87

Something less than \$6.00 per car for the same run.

The cost of rolling stock, conductors, etc., being subject to local conditions, the foregoing comparison is simply that of electricity *versus* horse flesh as a motive power.

Mules in Northern Minnesota.

We recently asked numerous street railway managers some questions relative to the use of mules on surface roads, climates, medical treatment, etc. The following replies will be found of interest.

EDITOR STREET RAILWAY JOURNAL:—In Minneapolis and St Paul we have about 560 head of stock. They are about 14½ hands high; weigh from 800 to 900 lbs. We have worked them for about four years. The following are the points for the mule:

1. It does not cost any more to keep two mules than a horse, and they will do a third more work.
2. They stand the cold fully as well as the horse and do not feel the heat like the horse.
3. As yet we can not notice any breaking down, but seem to be improving on the work.

Our objections to the mule are:

1. That our business is getting too heavy and rapidly increasing. They can carry loads on a business of \$15 or \$16 per day, per car, but when they do heavier work they can not make time.
2. There is no market for the mules when they break down. As for our horses we can get about three-fourths what they cost.

So you see we think for a place that is settled and not growing like our two towns they would be all we could ask for, but not growing towns like Minneapolis and St. Paul.

C. G. GOODRICH,

Secy. Minn. Street Railway Co.

Minneapolis, Minn.

EDITOR STREET RAILWAY JOURNAL:—In answer to your letter of enquiry as to how we find mules to stand the climate in Northern Michigan, will say that we put our mules on last Spring, after the snow went off; we have had a very cool summer and they seem to stand it well so far. We are very much pleased with them in every respect, and should they prove to stand the cold winter that we expect will soon be here, we shall purchase more this coming spring.

C. N. NEWELL,

Supt. Muskegon Railway Co.

Muskegon, Mich.

EDITOR STREET RAILWAY JOURNAL:—In answer to your letter enquiring about medicines used for ailments of mules, I

would say that we keep on hand at each stable a small stock of remedies for the most common troubles, all ready for use, viz: Colic draughts, fever mixtures, washes for greasy and cracked heels, collar and harness abrasions, liniments for sprains of muscles and joints—these are used according to directions on bottles. For injuries to the body and feet we find it necessary to give them personal attention until out of danger, as they need special or surgical treatment. ALEXANDER HARTILL, V. S.,

Louisville City Railway Co.

Louisville, Ky.

Cost of Street Railways for Small Towns.

EDITOR STREET RAILWAY JOURNAL:

Please give me the cost of construction of a street railway and the maintenance of the same for a small town. If you have a work on the subject let me know price.

S. R. FERGUSON.

Bristol, Tenn.

We handed the above communication to Mr. Wm. J. Richardson, Sec. of the A. S. R. Ass., for his suggestions, thinking that he might know of some work. Following is his reply:

EDITOR STREET RAILWAY JOURNAL:

In reply to yours of 10th inst., with letter enclosed, would say that my recommendation to you is to call the attention of Mr. Ferguson to the list of street railways, as published in the STREET RAILWAY JOURNAL. There is enough that is descriptive regarding each road to suggest to Mr. F. what the size of the road would be in his town.

I would recommend that he write a half dozen or so letters to the managers of these different roads. They will, undoubtedly, be glad to give to him the information he seeks. I know of no publication in which the same can be found.

There are English works on "tramways," one costing \$1.50, the other \$12.00, in two large volumes, which can be purchased from Theodore Audel & Co., at 32 Liberty street, New York.

WM. J. RICHARDSON.

Brooklyn, N. Y.

Will some general managers of street railways in our smaller towns send us the information Mr. Richardson refers to? There being no work containing this practical knowledge, its publication in our columns will be of great convenience to many who, like our correspondent, are just entering on street railway enterprises.

Medicine in the Stable.

Supt. Lake, of the Chicago West Division Railway, says:

I do not employ a farrier except in desperate cases; when these occur the doctor is called. I have a practical druggist and laboratory. We have many compounds and preparations that have been suggested by many years' experience. My stable foremen are entrusted to give or apply these remedies.



Weekly, \$2.00 per Year. \$1.00 for Six Months.

E. P. HARRIS, General Manager.

American Railway Publishing Co.,

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J. H. MCGRAW, Manager Subscription Department.

Notice.

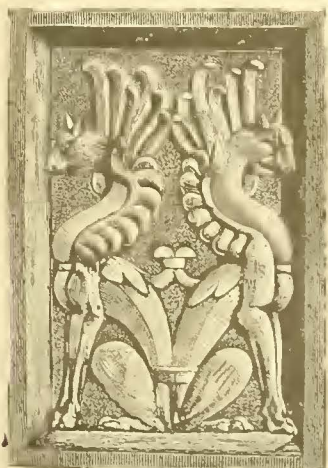
We are glad to announce the engagement of Mr. G. W. Paine as Western Manager of this paper. He assumes the duties of the office at once, with headquarters at 44 Lakeside Building, Chicago.

Seats on Top.

We clip the following from a live New York daily:—

TO THE EDITOR OF THE MORNING JOURNAL: It seems to me that a Broadway car with seats on top—London style—would take. All the Angle-manias would ride that way. Try it, Mr. Sharp. STAR AND GARTER.

[Seats on top are less common in London than in Paris, where the climate is less changeable, and riding on top more pleasant. The experience of those who have tried the seats on the "Imperial" on the Paris tram-cars, (where the fare is six cents below, inside, and three cents on top, outside,) is that, when the weather is pleasant, it is better worth six cents on top than three cents "regular." The French cars seat twenty-six inside and twenty-four on top, and ladies (particularly Americans) ride on top as well as inside. But for our New York severe and changeable climate we fear that the upper story would not be very largely patronized.—ED. STREET RAILWAY JOURNAL.]



Grotesques.

The grotesque is an essential part of Italian art; though it appears in the Renaissance style. It adds piquancy and character

to Gothic design. Humor and satire there find in it an instrument. But in the Italian style it is more serious; more a part of the design than an addition thereto.

The grotesque in art comes in between imitation and conventionality.

We give here three examples of the grotesque. In the first, there is no motive



the design—two monsters—merely filling a space.

The second example is from Siena; and the design is essentially floral or leafy, breaking out into creatures but never losing



sight of the fact that the grotesque features are the accidentals, and the scroll the primary idea.

The third has neither homogeneity nor motive, being a mere inconsequent haphazard combination of creatures.

Subscribe for STREET RAILWAY JOURNAL.

Conductors' Hours in Brooklyn.

EDITOR STREET RAILWAY JOURNAL: I have had a dispute with a friend of mine from Brooklyn, N. Y., concerning the number of hours the horse car conductors of that city work daily. I say that fifteen hours is the longest; and that the night lines have different men for night work and that the conductor last on at night takes the last car out next A. M. Whereas my friend says they all have to work eighteen hours, from 6 A. M. to 11 P. M.

Will you please enlighten us if not too much trouble; also at what time the last conductor at night generally turns out next day? S. W. BUGBEE.

San Francisco.

The following from Sec. Richardson fully answers our correspondent's queries:—

EDITOR STREET RAILWAY JOURNAL: In reply to your favor of the 9th inst., enclosing letter from S. W. Bugbee, of San Francisco, would say, first, that I neither know of, nor believe there is a Brooklyn street-railroad company that works its conductors fifteen hours daily. Second, the men who work at night do not work in the day, unless having "swing" cars, and they work for a short period only in the day-time, having the intervening time in which to rest, before beginning to do their night work at the time of the "rush trips." Third, the conductor last out at night takes the same car the next day.

His "friend," to say the least, is very foolish when he says, "All Brooklyn conductors have to work eighteen hours daily, from 6 A. M. to 11 P. M." His friend is not nearly as correct as his arithmetic, and that is manifestly poor enough.

On a prominent line in Brooklyn, the conductor of the last car out at night gets through at 12.52 A. M. He goes out in the morning at 7.44, and "swings in" from 9.30 A. M. to 4.24 P. M. It will, therefore, be seen that he has the intervening time in which to rest, which, as will be seen, is about seven hours.

WM. J. RICHARDSON,
Sec. Atlantic Ave. R.R.

Brooklyn, N. Y.

The Duplex Register.

The following letters have been handed us for publication:

STREET RAILROAD CO.

The letter of Mr. Reuben M. Rose to C. Densmore Wyman, Vice-President Central Park, North and East River R.R. Co., speaks for itself. All persons using the "Duplex Register" will be indemnified in its use. W. JENNINGS DEMOREST.

MY DEAR MR. WYMAN—Referring to your question about John H. Rose, of Lima, Ohio, will say: He was discharged by the manufacturer of the "Duplex Register" for appropriating parts of my invention to his own name without my consent. I am contesting his pretended rights, and will send you a copy of my improved invention in a few days. W. Jennings Demorest is the only person whom I recognize to sell or use any of my inventions relating to regis-

tering upon a paper dial. While you are aware that the Demorest Duplex Register Co. is perfectly responsible in every way, I don't think any more can be said on the subject.

R. M. ROSE.

To Dr. Mary Walker, et al.

"White pinafores and Panama straw hats form the distinguishing uniform of the street-car conductors in the Chilian towns. Women monopolized the business during the war with Peru, and they have retained it."

Here is a field ripe for the sickle of the "advanced" females of the United States. Go to Chili, dear, good ladies, and there, untrammelled by the degrading bondage imposed by an effete civilization, exercise your inherent rights: be women of the "coming order;" cultivate whiskers, if you can; "wear the breeches," and guide the flying fortunes of the ambulatory "bob-tail" car.

Labor-Saving Office Devices.

In offices of corporations doing an extensive business, especially in railway enterprises, where so much correspondence is necessary, it is absolutely essential that every appliance shall be had in the interest of economic and systematic management of the same. The Shannon Filing Cabinet and U. S. Document Cabinet* are claimed to be among the best. They are manufactured in a variety of styles of wood and finish, and are a handsome piece of office furniture. Says a correspondent: "A place for everything and everything in its place," becomes an easy and pleasant office rule, and the confusion and clutter of hunting up that 'letter of Brown's' when Brown comes in to see you about it, is entirely done away with. Papers are kept flat, clean and whole, and when needed are in perfect order."

* Schlicht & Field, Rochester, N. Y., 27 Lakeside Building, Chicago, Ill., 339 Broadway, N. Y. City.

Notes and Items.

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

Atlanta, Ga.

The Atlanta Street Railway Co. comprises seven lines, with thirteen miles of track. The Superintendent and Purchasing Agent is E. C. Peters, Esq.; office, 49 Line street.

Binghamton, N. Y.

The street car line extension to the State Insane Asylum, in this city, was opened Nov. 6th. The cars are drawn up a steep bluff by a cable, and a speed of twelve miles an hour was obtained.

Birmingham, Ala.

The following changes have been made in the officers of the Birmingham Street Railway Co.: Geo. L. Morris elected President, vice B. F. Roden, resigned; W. H. Morris elected Superintendent, Secretary and Treasurer, vice J. H. McWilliams, Secretary and Treasurer, resigned. The

road now has five and one-half miles road, thirteen cars, and forty mules.

Boston, Mass.

The street railway traffic of this city is rapidly assuming immense proportions. The three companies whose business is confined within the limits of the city last year carried nearly 58,000,000 passengers, an increase of over 3,250,000 on the previous year. There are four others entering the city, the great majority of the 30,000,000 carried by them being carried through the streets of Boston. The cars of all these seven companies made 2,254,962 round trips, and the average number of passengers carried on each trip was 40. The average gross income per round trip was \$2.03, the average expense was \$1.71, and the average net income was 32 cents. The Middlesex road made the largest net income per trip, the Cambridge road came next, the Lynn & Boston was third, the Metropolitan was fourth, the South Boston fifth, the Highland sixth, and the Charles River had the smallest net profit. The Metropolitan road carried the largest number of passengers, but it was next to the lowest in the number per round trip, the Charles River only carrying a less number. Evidently the management of the Metropolitan has realized fully the force of the motto which hangs in the office of the President: "Eternal vigilance is the price of a dividend," as is shown by the fact that its average expense per round trip is the second lowest.

The annual report of the directors of the South Boston Street Railway says:—"Since the last annual report the extensions of car houses and stables at the North Point, commenced during the last fiscal year, have been entirely completed. The route of the depot cars has been changed, and now starts from Dorchester street, South Boston, instead of from southern to northern depots as formerly, thereby doing away with a stable on Dorchester avenue, stations and starters at Beach and Brattle streets, which will afford a saving during the coming fiscal year. The Post office square line has been run regularly during the past year, but as yet is not a profitable line, although affording a very convenient route to passengers desirous of reaching that locality. A reduction of cash fare from six to five cents was made during the past year, affecting our income to some extent. The buildings, roadbed and equipment are in excellent condition, and equal to any emergency they may be required to meet."

The New England Institute Fair building was transferred at private sale to the Metropolitan Railroad Company for \$300,000, Nov. 18th. The building was erected and utilized for several years for exhibition purposes at a cost of about \$400,000. It covers about five acres of land, with about eight acres of floor space.

Burlington, Vt.

The opening of the first street-car line ever built in Vermont occurred in this city, November 12th.

Brooklyn, N. Y.

The N. Y. & Brooklyn Bridge Railway are to try half-a-dozen cars with side doors.

The Lewis & Fowler Manufacturing Co. of Brooklyn, N. Y., has received orders from the Minneapolis and St. Paul Street Railway Companies for fare collectors, and to equip the cars of the entire lines. This is after a trial for fifteen months on seventy-five 14 and 16 feet cars, of automatic fare collectors. The company has also orders from the Monnd City, Jefferson ave., Union depot, People's and Union R. R. Companies of St. Louis. The City Railway Company of Louisville has also decided, after a trial of two years, to adopt the Lewis & Fowler automatic fare collector, on all its money box cars. There is evidently a tendency in the West, to popularize the bob-tail car. The works of the above named manufacturers are running to their fullest capacity.

The Brooklyn Railway Supply Co. is making some of its improved snow sweepers and plows for different roads, among which are the Second avenue, New York, and the Greenpoint & Lorimer street railroads. The company has also recently shipped sweepers to the N. Chicago City R. R., and N. Hudson County R. R., and is now constructing some of its specialties for the Baltimore Union R. R. Co., and Chicago Passenger R. R. Co.

This company is now constructing a sweeper of new design for the Kansas City Cable Railway Co. They have recently built a number of sweepers adapted especially for cable roads.

Chicago, Ill.

The Adams street viaduct, spanning the new Central Depot railway tracks, is almost completed, and will be formally opened to the public in a few days. The viaduct, which reaches from Canal street to the Adams street bridge, will afford the needed crossing for the horse railway, and be of great convenience to the traveling public. The viaduct consists of a through truss span of 154 feet with wrought iron superstructure, and a deck-plate girder span of fifty-five feet. The entire width of the structure is fifty-eight feet, and it comprises two seven-foot sidewalks, and two distinct roadways each twenty feet wide. Cast-iron name-plates bearing the names of the bridge company, Mayor Harrison, Commissioner Cregier, and Civil Engineer Artingstall are placed over the roadways at either end. The contract for the iron work is understood to amount to \$27,993, while the masonry, etc., is estimated at about \$15,000.

Superintendent Holmes, of the South-Side Railway Co., thinks that at last they have arrived at something practicable in car heating. The chief fault with most of the patents was the lack of due attention to ventilation. The new heating apparatus is placed under the car, and consists of a brass cylinder four inches in diameter by two and a half feet in length, within which is a piston which is drawn into the cylinder by means of a spring, the tension of which can be regulated by turning a thumb-screw at the end. This cylinder's capacity is two

gallons, is filled with gasoline, one filling lasting sixteen hours. The piston forces the gasoline into a small copper tube connecting with the heater. There is a generator at the end of this tube by which the gasoline is converted into gas, which, on being lighted, gives a flame of great heat. The heater, which is of cast-iron, is partitioned into small compartments of fire-brick, and thus allows the flame to play freely over a considerable surface. Pipes leading under the car carry off the gas fumes, fresh air is introduced into the car by similar methods, and the heat is admitted into the car through a register in the center of the floor. A car fitted with this apparatus is now on trial, and if successful all cars will be furnished with the same apparatus. It is anticipated that an average temperature of at least 50° can be kept up on the very coldest days.

Superintendent James K. Lake has completed his experiments with a new heating device for his street cars. The appliance was tried on a Madison street car, which made two trips with one charge, and it is believed that after a few improvements one charge will last the entire day and night, or as long as each car is in service during the twenty-four hours. Mr. Lake believes this is the most feasible plan yet introduced, but is going to give it a very severe test before it is placed upon any more cars.

At the corner of Van Buren and Franklin, from the rear window of one of the upper windows of the Van Depoele Company's establishment, two mysterious wires run to a sort of derrick on Franklin street, where they are attached to a couple of aerial cables about 500 feet long, terminating on Market street. Midway between the terminals a third frame is erected, so that the length of the cables is formed of two catenary curves of about 500 feet. Upon these is suspended a small car which contains a motor, and by means of its wheels forms contact with the generator used for running the machinery of the company. Two stops on the cable serve as pole changers for the little car, and the astonishment of the audience which gathers when it moves, is complete and striking. There is a mystery about it which makes the ignorant bate their breath, as they endeavor fruitlessly to discover the motive power. To see it climb and pass down the incline at the center of the line, stop and reverse at the end of the route, and do all this without any apparent cause, is a series of effects which, in the blue Puritanic days of Salem, would have cost the inventor his life. Yet the whole to-day is simple enough to all the better-read citizens of the world.—*Exchange.*

Jersey City, N. J.

The marked progress made in street railway transportation in this city in the past four years, is noted in a local paper to the length of a column and a half. We would like to republish it entire, but space will not permit. The main spirit of this improvement is Mr. Charles B. Thurston, who was elected to the Presidency of the

Jersey City & Bergen Point Horse Railroad Company in 1882. The improvements have been most radical, including double tracking and extending the line, laying new rails, building new stable, car houses, &c. A larger and much improved quality of stock, new cars, and in fact all that was required to make a road, very nearly run out, that in the nineteen years of its existence had never paid a dividend to its stockholders, one of the finest and best equipped and best managed corporations in the country. Jersey-men owe much to the progressive men who with Mr. Thurston's leadership have given them these excellent street railway facilities.

Jones Car Works.

Walter Jones, of the Jones Car Works, West Troy, N. Y., has returned from an extended European trip, much improved in health.

Lawrence, Kan.

The Lawrence Transportation Co. has just finished one mile of track, making four and one-half miles of track.

Lynchburg, Va.

The street railway in Lynchburg, Va., is to be extended.

Lynn, Mass.

The hearing of the remonstrants to the petition of the Nahant Street Railway Company for a location of its tracks to Nahant, was held in the Town Hall Nov. 19. Josiah T. Wilson, Chairman of the Selectmen, called the meeting to order. Mr. George H. Towle, counsel for the railway company, stated its plan, which was to lay a track outside of the highway along the land to the Bass Neck Road, and then crossing private property to the road along the side of the ocean at Dnrham's Corner. Henry Cabot Lodge vigorously opposed the road as a blow to the prosperity of the town and tending to make the town a picnic ground. It would destroy the highway. Wm. C. Otis believed in the road; there hadn't been a terrible rise in property in Nahant by locking it up. The people were intimidated by the summer residents now. They wanted quick transit to Lynn. Mr. Towle said that it wasn't intended to destroy the highway or the streets. The highway was laid out seventy feet wide, but there was but fifty feet of the width traveled. The track would be laid outside of this. Mr. Lodge said the idea that Nahant was locked up was nonsense. Everybody knew that his place was open to the public and always had been. He advocated a boat. Edward Johnson opposed the road on account of Sunday travel. The hearing then closed.

Macon, Ga.

The officers of the Macon City and Suburban Street Railroad Company are: President, Jno. S. Bransford; Sec'y and Supt., Jno. T. Voss. The company has five miles of railroad which it is extending, twelve cars and sixty horses and mules.

Maysville, Ky.

This place has a street railway three miles long. L. W. Robertson, President, and W. J. Frank, Secretary and Treasurer.

Muscatine, Ia.

The officers of the Muscatine City Railway Company are Peter Musser, President; George W. Dillway, Vice-President; T. R. Fitzgerald, Secretary, and O. J. Chapman, Superintendent and Treasurer.

New Bedford, Mass.

The Union street extension of the Acushnet Street Railway Company, which has been idle since building, has been put in operation.

The Board of Aldermen, Nov. 18, granted the New Bedford & Fairhaven Street Railway Company leave to withdraw on its petition to extend its tracks in Cedar street, from Parker to Durfee street, and regranted leave the Acushnet Street Railway Company to extend its tracks through Ash, Morgan and Cedar to Durfee streets, that section on Cedar, between Parker and Durfee, to be completed in a month.

New York City.

The Twenty-third Street Railway Co. on Nov. 7, put down the new railway curves in Tryon row connecting the two tracks of the Bleecker street road. The cars on this branch of the road now make this their southern terminus instead of running to Fulton Ferry as formerly.

The following directors were elected for the Third avenue surface road: Henry Hart, William Remsen, Lewis Lyon, R. G. Remsen, M. C. Lane, W. M. Pritchard, Samuel Hall, Silvanus S. Riker, R. W. Tauler, J. B. Hobby, Robert Willets, John E. Parsons and Edward Lauterbach. President Lyons made a report on the Tenth avenue cable road, which is working so satisfactorily that it will be put on Third avenue as soon as possible.

The officers of the Forty-second Street, Manhattanville and St. Nicholas Avenue Railway Company filed articles of extension with the Secretary of State, Nov. 5, extending their lines eleven miles, including five routes to King's Bridge.

The Fifth Avenue Railroad Company and the Fifth Avenue Transportation Company are in full tilt now with their subscription books. A. S. Hatch and I. B. Newcombe are receiving daily additions to their list of railroad subscribers, while the Knickerbocker Trust Company is disposing of subscribers for the omnibus enterprise of Mr. Ely-Goddard. Among the subscribers for omnibus stock are Levi P. Morton, Robert and Ogden Goelet, William H. Vanderbilt, Cornelius Vanderbilt and the proprietors of the Windsor Hotel. Three-fourths of the property-owners in the avenue have given their consents. The railroad men are pushing their project as vigorously as ever. Numerous meetings have been held in opposition to the road and its opponents have endorsed the omnibus scheme as a means to stop the road. The Aldermen have granted the railway company a hearing though, and it is probable, will grant them a franchise.

Messrs. Andrews & Clooney have just completed and delivered to the new Broadway road a snow sweeper embracing many new features. The improvement is that the

extra weight which is generally carried on the top of the sweeper in the shape of old iron, is put into the wheels, increasing their weight sufficiently to accomplish traction enough to drive the brooms easily, and making less dead weight for the horses to draw, after the sweeper is started. Another improvement is a cylinder broom, made after an improved pattern, and attached to a lever in such a way that it can be instantly raised or lowered; the broom can be allowed to run on the ground, or, by means of a chain or links, it can be raised to any desired height. By this means, it is claimed that there is no danger of breaking off the cane in the brooms when it is handled by incompetent men. They have also added to the front wheel on each side of the sweeper, a small scraper or plow attachment to scrape off the snow immediately in front of the sweeper wheels. This is attached to a lever and can be raised or lowered at will.

This firm are also shipping a car load of material, rails, boxes, turntables, &c., every other day to the Metallic St. Ry. Supply Co. of Albany, and have recently booked several foreign orders, among others, one for several hundred wheels for Australia. They are running to their fullest capacity in getting out turntables, switches and general track castings.

Oswego, N. Y.

The Oswego, N. Y., Street Railway commenced running cars on August 22, under very flattering prospects. They have two miles of road and are now running three cars built by J. M. Jones' Sons. The road is built and equipped with the best materials, and is under the thorough management of Mr. James O'Connor.

Portland, Oregon.

C. K. Harbaugh, Esq., Sec. and Supt. of the Portland Street Railway, kindly sends us the following street railway statistics, which were not reported in the directory, with the comment that "the village of Portland, Oregon, has evidently been overlooked."—Portland Street Railway Co., 1½ m.; 3' 6" gauge; 42 lb. rail; 9 cars and 35 horses; D. P. Thompson, Pres.; C. K. Harbaugh, Supt. Transcontinental Street Railway Co., 3 miles double; 3' 6" gauge; 15 cars and 63 horses; D. W. Wakefield, Sec.; Tyler Woodward, Supt. Multnomah Street Railway Co., 2¾ miles; 3' 6" gauge; 19 cars; 6 horses. A. V. King, Pres.; E. A. King, Sec.

San Francisco, Cal.

The Haight and McAllister Street Cable road is interested in Ocean Beach and Golden Gate Park, and provides novel and pleasing entertainment for the public in those resorts; thus largely and profitably increasing its business. This feature of street railway enterprise is by no means confined to Eastern roads.

The *San Francisco Call*, of the 5th, has the following under the heading: "Beating the Bell Punch—W. W. Dorsey Punished for Having Done It Effectively." W. W. Dorsey, the individual who for ten months prior to the 22d of last September was em-

ployed by the Market Street Railway Company "to punch the faire in the presence of the passengaire," while giving testimony in his own behalf, when on trial before a jury in Judge Rix's Court last Friday upon a charge of having embezzled a five-cent fare collected by him, illustrated to the jury how he could manipulate a bell punch so that the sound of the bell could be made clear or dull at will, and proved himself very expert. He also admitted that when he made an application to the company for the position he set forth in his letter that he had never worked on any other road in this city, which statement was untrue. Yesterday the defendant appeared for sentence, when Judge Rix said that while the complaint charged only the embezzlement of five cents, it appeared that on the trip at the end of which the accused had been arrested he had appropriated forty cents of the company's money, and that according to the defendant's testimony he had had the bogus bell for three weeks. The judge said that the amount charged in the complaint was very small, but the crime called for severe punishment, for a man has no right to betray the trust placed in him by his employers and appropriate any collections he may make, no matter how small they may be. He then made an order that Dorsey be imprisoned in the House of Correction for six months.

This is the third conductor taken in three months, but the only one prosecuted.

Springfield, Mass.

The Springfield, Mass., Car Co. has erected a new and commodious car house. The ground floor to be used for housing cars, and the upper floors for living rooms for conductors and drivers.

Toledo, Ohio.

The Central Passenger R. R. Co., Toledo, O., F. E. Seagraves, Prest., are having built five new cars by Brownell & Wight Company, and are rebuilding the twelve cars now in use by them.

Wichita, Kas.

The Wichita City Railway Company have extended their lines one and one-half miles. They now have eleven cars, sixty head of mules and four horses. They now reach the depot of the St. L., Fort Scott & Wichita R. R., and have other extensions under consideration.

Worcester, Mass.

The stockholders of the Worcester Street Railway Company have voted to apply to the railroad commissioners for leave to increase their capital stock from \$40,000 to \$250,000. The managers of the company claim that the latter sum is not in excess of the value of their property. It will also petition the board of aldermen for leave to extend the tracks of the company through Leicester street from New Worcester to the Leicester town line.

Vicksburg, Miss.

Some four years ago a charter was obtained from the Legislature of the State for the organization of a company to run street cars on the streets of the city. During the last month the matter has been

agitated, and stock to the amount of \$11,000 subscribed, which it is desired to increase to \$25,000. The company propose to put down about five miles of track, and put on the latest improved horse cars. It is expected to commence work not later than the first of next March.

St. Louis, Mo.

The gang of dynamiters who attempted to blow up several street cars during the first week in November were arrested Nov. 5th. They are street car strikers and members of Cleveland Assembly, Knights of Labor. Alonzo Pinkerton, Master Workman of the Assembly; David Keenan, the Treasurer, and William P. Sears, the Judge-Advocate, are among the prisoners, together with four other members of the Assembly—George B. Withrow, Philip Burns, John Shaughnessy and M. Weathers.

A detective attended the meetings of the strikers, dogged some of them after meetings and on one occasion saw one of them place an explosive on a street car track. The detective scented the explosive. Finally one of the gang was quietly arrested. He was subjected to a rigid examination and he told the whole story. Another was quietly taken into custody and a few questions put to him, and he too wilted. Before daybreak on the 4th of Nov. Sergt. McNamee, Sergt. Tracy, who went to New Zealand after Maxwell, and Officer Lewis, of the Police Department, went to Uhrig Stanton's private boarding house, at No. 2119 Lucas avenue, and arrested four more, leaving but one to be arrested on the 5th, and he was taken in the afternoon. They have all confessed, and each is trying to make his part in the conspiracy as light as possible and blaming the others for dragging him into it.

The dynamite was purchased in Louisville by Weathers, who was sent there for it. Master Workman Pinkerton signed a warrant on Treasurer Keenan for \$20 out of the lodge treasury ostensibly to buy food for the families of the striking conductors and drivers. The money was given Weathers to buy dynamite with, and he went to Louisville and bought it. The plans were formulated in one of the ante-rooms at Central Turn Hall before the strikers removed their headquarters from that hall to Lighthouse Hall. One of the men rented a room at Uhrig Stanton's boarding house on Lucas ave. and would invite the others to see him. Weathers on his return from Louisville stored his dynamite and caps there and the infernal machines were fixed up there. They all swore secrecy, and to make it more binding each was to take a direct and active part in blowing up a car. A street car line was assigned to each of the seven, and each was to do his work alone, so that if he was caught no one else would be implicated. He was to let his hat fall off in crossing a track, and in stooping down to pick it up, was to quickly lay the explosive on the rail. Detection would be almost impossible. The lines selected were the Fifth street and Washington ave., Bellefontaine, Mound City, Jefferson ave-

nue, Cass avenue, and People's lines. Explosions occurred on four of these lines—Broadway, Washington avenue, Mound City and Jefferson avenue lines—a wheel being broken in each case, the bottom of the car torn up, and in one case the car was thrown from the track. There were ladies among the passengers aboard in every instance, the Jefferson avenue cars being crowded with women and children. Not a single passenger was seriously injured, though several were slightly bruised and two ladies fainted.

After the fourth explosion a reward of \$2,000 was offered by the Chief of Police for information leading to the conviction of the guilty ones, and a morning paper published the same day a notice purporting to have been issued from a meeting of eighteen French Socialists, but which was merely a joke, threatening to blow up the strikers' headquarters and particularly Casper Heep, who was at that time their leader, in case another street-car explosion occurred or in case the lives of innocent women and children were in any way endangered by the strikers. The owners of Lightstone Hall, where the strikers were then meeting, to protect their property from the dynamite of the French Socialists, compelled the strikers to vacate and they removed to a negro hall across the street. The striking conspirators got frightened also and the rest of their explosion programme was not carried out. The men arrested have families. Pinkerton was a Fifth street conductor, as was also Keenan. Sears was on the Washington avenue line and Burns on the Bellefontaine line. Several letters were also found at the boarding house implicating the men. Mr. Stauton, the proprietor of the house, is innocent and has not been arrested. None of the strikers or members of the Knights of Labor are implicated except those arrested.

A New Letter-Copying Process.

It would seem that the possibilities of letter copying and duplicating had been exhausted long ago, but every now and then some good new device convinces us that perfection has not yet been reached. One of the neatest and handiest novelties we have yet come across in this line is "Bushnell's Perfect Letter Copying Book,"* which we have in constant use on a certain kind of work, and which we pronounce, from experience, to work excellently.

It consists of a number of ordinary letter book sheets bound in thin, flexible cloth covers, and fastened at the back to a round billet of wood, in such a manner that the entire book can be tightly rolled around the wooden roller, in the hands. Two sheets of manilla paper and a sheet of white muslin, all cut to fit the pages of the book, complete the outfit. When it is desired to copy a letter, one of the manilla sheets is laid in the book, and over it the letter, face upwards. Over this the

*Alvah Bushnell, Manufacturers' Agent, 105 So. 4th street, Philadelphia, Pa.

page of the copying book is turned, and the cloth, after being wet and wrung dry, is laid evenly above it. The second manilla sheet is placed over the cloth, to preserve the remainder of the book from the moisture; and then, the book being closed, it is rolled tightly in the hands, over the roller to which it is bound. The copies are clear and clean, and this book will give good impressions with ink on which the copying press utterly fails. The book can be rolled up and carried in a satchel, and is an excellent companion for business men and others, when traveling.

G. B. H.

Streets and Roads.

In the matter of their public streets and roads the old Romans were, and the modern nations of Europe are, far ahead of us. Many of our principal streets, cobble-paved and noisy, dirty and uneven, resemble relief-maps of the Himalayas. The great trouble is, with American roads and streets, that they have no road-bed made. The road surface is laid right on the mud or whatever the top of the ground happens to be in that district. Naturally, the stones sink furthest where the ground is the softest and the weight and travel on them the greatest; and the small stones sink further than the large ones right along-side of them. The road-bed should have a certain amount of "crown" to it, to shed water; and should be solid enough to keep the road surface from sinking in; and the road "material" should be hard and uniform.

OFFICIAL LIST OF THE STREET RAILWAYS IN THE UNITED STATES & CANADA.

Compiled from data furnished the editors of "The Street Railway Journal," by the officers of the various roads.

[The following is a complete list of the Street Railways of the United States and Canada, so far as we have received the official returns from the various roads. Will those roads not reported kindly fill out the blanks sent them and mail to us without delay, so that they may be properly represented in the STREET RAILWAY JOURNAL?]

ABBREVIATIONS—m, miles; g, gauge; lb r, pounds rail to the yard; c, cars; h, horses; mu, mules. Officers' addresses are the same postoffice as the company unless otherwise specified.

AKRON, O.—Akron St. Ry. & Herdic Co. 2½ m, 6c, 31 h. Pres. Ira M. Miller, V. Pres. James Christy, Treas. B. L. Dodge, Sec. F. M. Atterholt, Supt. John T. Metlin.

ALBANY, N. Y.—Watervliet Turnpike R.R. Co. 7½ m, 26-45 lb r, 27 c, 143 h. Pres. Chas. Newman, Sec. & Treas. P. Way, Supt. M. C. Foster. The Albany Ry. 10 m, 4-8½ g, 33-47 lb r, 51 c, 194 h. Pres. Supt. and Treas. John W. McNamara, Sec. Jas. H. Manning. Offices 3 & 5 N. Pearl St.

ALLENTOWN, PA.—Allentown Pass. R.R. Co. 3½ m, 6 c, 23 h. Pres. Samuel Lewis, Treas. & Sec. Joseph E. Ballet, Supt. Russel A. Thayer.

ALTON, ILL.—Alton & Up. Alton Horse Ry. Co. 3 m, 4-8 g, 43 lb r, 17 c, 38 h. Pres. John P. Levan, Sec. & Treas. L. B. Reifsnider, Supt. John J. Buch.

AMSTERDAM, N. Y.—Amsterdam St. Ry. Co. 1½ m, 4-8 g, 25 lb r, 3 c, 10 h. Pres. Henry Herrick, Treas. David Cady, Sec. M. L. Stover. President's office 112 Front St., L. Island City, N. Y.

ANNISTON, ALA.—Ashtabula City Ry. Co. 4 m, 4-8½ g, 40 lb r, 6 c, 60 h. Owner & Prop. Jno. N. Stewart.

ATCHISON, KAN.—Atchison St. Ry. Co. 5½ m, 4-8½ g, 20-30 lb r, 19 c, 60 h. Pres. & Gen. Man. J. H. Beeson, Treas. H. M. Jackson, Sec. J. P. Adams. Gate City St. R.R. Co. 2½ m, 4-8½ g, 16 lb r, 7 c, 26 h. Pres. L. B. Nelson, V. Pres. L. DeGire, Sec. & Treas. John Stephens, Solicitor, A. Remharat. Metropolitan St. R.R. Co.

West End & Atlantic R.R. Co. 2m, 4-8½ g, 20 lb r, 6 c, 34 mu. Pres. J. D. Turner, V. Pres. T. L. Langston, Sec. & Treas. B. H. Brumhead, Man. & Pur. Agt. Jno. S. Brumhead.

ATLANTA, GA.—Atlanta St. Ry. Co. 13 m, 4-8½ g, 42 lb C. B. rail, 40 two h cars, 150 horses. North Atlanta Line 1 m. Decatur St. Line 1.50 m. Marietta St. Line 2.50 m. McDonough St. Line 1.50m. Peachtree St. Line 2.50 m. West End Line 2.50 m. Whitehall St. Line 1.50 m. Pres. Richard Peters, Sec. & Treas. J. W. Culpepper, Supt. & Purch. Agt. E. C. Peters. Office, 49 Line St.

ATLANTIC, N. J.—Atlantic City Ry. Co. **AUBURN, N. Y.**—Auburn & Owasco Lake R.R. Co. 1¼ m, 4-8½ g, 28-30 lb r, 3c, 12 h. Pres. D. M. Osborne, Sec. & Treas. C. B. Koster, Supt. B. F. Andrews.

East Genesee & Seward Ave. Ry. Co. 1¼ m, 4-8½ g, 30 lb r, 6 c, 25 h. Pres. David M. Osborne, Sec. & Treas. C. B. Fosters, Supt. B. F. Andrews.

AUGUSTA, GA.—Augusta & Somerville R.R. Co. **AURORA, ILL.**—Aurora City Ry. Co. 5 m, 4-8½ g, 28 lb r, 7 c, 10 h, 30 mu. Pres. H. H. Evans, V. Pres. S. W. Thatcher, Sec. A. J. Hopkins, Treas. E. W. Truth, Supt. J. B. Chattee.

BABYLON, N. Y.—Babylon Horse R.R. Co. 1¼ m, —g, —lb r, 2 c, 3 h. Pres. W. F. Norton.

BALTIMORE, MD.—Baltimore & Powhatan Ry. Co. 6 m, 5-4½ g, 4 c, 17 h. Pres. & Treas. E. D. Freeman, Sec. R. B. Clark, Supt. I. M. Ketricck. Baltimore City Pass. Ry. Co. 40 m, 5-4½ g, 46 lb r, 154 c, 1000 h. Pres. Oden Bowle, Treas. John Bolgian, Sec. S. L. Bridge.

Baltimore Union Pass. Ry. Co. Supt. T. C. Robbins. Baltimore & Catonsville Ry. Co. Baltimore & Halls Spring R.R. Co. Baltimore & Pimlico & Pikesville R.R. Co.

Central Ry. Co. 5½ m, 5-6 g, 40 lb r, 22c, 180 h. Pres. Peter Thompson, Sec. & Treas. Walter Blakstone.

Citizen's Ry. Co. 20 m, 5-4½ g, 46 lb r, 34 c, 360 h. Pres. Jos. S. Hagarty, Treas. Wm. S. Hammersley, Supt. C. C. Speed.

Monumental City Ry. Co. North Baltimore Passenger Ry. Co. People's Pass. Ry. Co. 6½ m, 5-4½ g, 42-45 lb r, 30 c, 200 h. Pres. R. E. Hamilton, Treas. Gustavus Ober, Sec. Supt. & Pur. Agt. Wm. A. House, Jr. Office, Fort Ave. & Johnson St. Soon move to Druid Hill Ave.

York Road R.R. Co. **BATTLE CREEK, MICH.**—Battle Creek Ry. Co. 5 m, 3-6 g, 28 lb r, 8 c, 18 h, 3 mu. Pres. Geo. Det. J. White, V. Pres. H. H. Brown, Sec. Chas. Thomas, Supt. John A. White, Gen. Man. J. W. Hahn.

BAY CITY, MICH.—Bay City St. Ry. Co. 7½ m, 4-8½ g, 18 lb r, 13 c, 35 h. Pres. James Clements, Treas. Wm. Clements, Sec. Edgar A. Cooley.

BEAVER FALLS, PA.—Beaver Valley St. Ry. Co. 3-1-10 m, 5 c, 21 h. Pres. M. L. Knight, Sec. & Treas. J. F. Merriman, Supt. of Construction, J. C. Whitla.

BELLEFAIRE, O.—Bellaire St. R.R. Co. **BELLEVILLE, ONT., CAN.**—Belleville St. R.R. Co.

BEREA, O.—Berea St. Ry. Co. 1¼ m, 3-6 g, 28 lb r, 2 c, 2 h. Pres. C. W. D. Miller, V. Pres. T. Clinchward, Sec. & Treas. A. H. Pomeroy, Supt. A. W. Bishop.

BINGHAMTON, N. Y.—Washington Street & State Asylum R.R. Co. 4½ m, 4 g, 16-25 lb r, 13 c, 23 h. Pres. B. H. Meagley, V. Pres. Geo. Whitney, Sec. C. O. Root, Treas. F. E. Ross.

Binghamton Central R.R. Co. 3½ m (2½ laid), 3 g, 28 lb r, 6 c (not in operation). Pres. Geo. L. Crandall, V. Pres. Nelson Stow, Sec. & Supt. Chas. O. Root, Treas. H. J. Kneeland. Offices 63 Court St.

Binghamton & Port Dickinson R.R. Co. 5 m, 4-8½ g, 20-30 lb r, —c, —h. Pres. Harvey Westcott, Sec. & Treas. G. M. Harris, Supt. N. L. Osborn. (Leased to Mr. Osborn). Offices 112 State St.

Main, Court & Chenango St. R.R. 5 m, 4-8 g, 40 lb r, 10 c, 25 h. Supt. & Lessee, N. L. Osborn. Offices 83 Washington St.

BIRMINGHAM, ALA.—Birmingham St. Ry. Co. 5½ m, 4-8 g, 16 lb r, 13 c, 40 m. Pres. Geo. L. Morris, Supt., Sec. & Treas. W. H. Morris.

BLOOMFIELD, N. J.—Newark & Bloomfield R. R.

BLOOMINGTON, ILL.—Bloomington & Normal Horse Ry. Co.

BOONE, IA.—Boone & Boonsboro St. Ry. Co. 1¼ m, 3 g, 20 lb r, 3 c, 10 h. Pres. L. W. Reynolds, Treas. J. B. Hodges, Supt. A. B. Hodges.

BOONSBORO, IA.—Twin City & Des Moines River Motor St. Ry. Co. 3 m, 3-6 g, 2 motors, 3 c. Pres. & Supt. J. B. Hodges, Treas. A. B. Hodges, Sec. S. K. Huntlinger.

BOSTON, MASS.—Highland St. Ry. Co. 19 m, 4-8½ g, 50 lb r, 187 c, 925 h. Pres. Moody Merrill, Clerk R. B. Fairbairn, Treas. Samuel Little, Supt. J. E. Rugg.

Lynn & Boston. 34½ m, 4-8½ g, 25-48 lb r, 114 c, 514 h. Pres. Amos F. Breed, Treas. & Sec. E. Francis Oliver, Supt. Edwin C. Foster.

Metropolitan R. R. Co. 80 m, 4-8 g, 50 lb r, 700 c, 3,600 h. Pres. C. A. Richards, Sec. H. R. Harding, Treas. Chas. Boardman. Office, 16 Kilby St.

Middlesex R.R. Co. 26 m, 4-8½ g, 50 lb r, 150 c, 700 h. Pres. Chas. E. Powers, Treas. & Supt. John H. Studley. Address, 27 Tremont Row, Boston.

So. Boston Ry. Co. 13 m, 4-8½ g, 42-50 lb r, 193 c, 900 h. Pres. Chas. H. Hersey, V. Pres. Jas. C. Davis, Sec. & Treas. Wm. Reed, Supt. Daniel Coollidge.

BRADFORD, PA.—Bradford & Kendall R.R. Co. 1¼ m, 4-8½ g, 38 lb r, 3 c, 4 h. Pres. James Brodey, Sec. N. B. Parsons, Gen. Man. & Supt. Enos Parsons.

BRIDGEPORT, CONN.—The Bridgeport Horse R.R. Co. 5 m, 4-8½ g, 42 lb r, 14 c, 70 h. Pres. Albert Eamer, Sec. & Treas. F. Hurd, Supt. B. F. Lashar.

BROCKTON, MASS.—Brockton St. Ry. Co. 3½ m, 24 c, 97 h. Pres. W. W. Cross, Treas. & Sec. Z. C. Keith, Supt. H. B. Rogers.

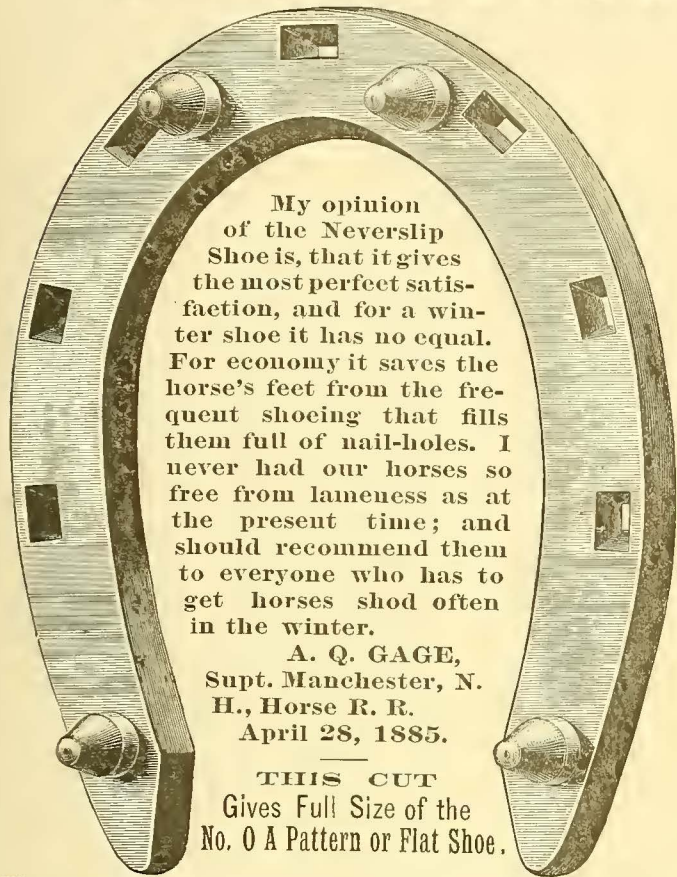
BROOKLYN, N. Y.—The Atlantic Avenue R. R. Co. of Brooklyn. 24½ m, 4-8 g, 60 lb r, 244 c, 882 h. Pres. William Richardson, Sec. W. J. Richardson, Treas. Newburg H. Frost. Office cor. Atlantic & Third Aves.

Houston, West Street & Pavonia Ferry R.R. Co. 5 m, 4-8 1/2 g, 60 lb r, 50 c, 400 b. Pres. Richard Kelly, Sec. & Treas. Daniel B. Hasbrook. Office, 415 E. 10 St.

r, - c, - h. Pres. Wm. W. Colket, Sec. & Treas. T. W. Pennypacker. Philadelphia Traction Co. 109 m, 5-2 1/2 g, 45-78 lb r, 595 c, 3,160 b. Pres. W. H. Kemble, V. Pres. P. A. B. Widener & W. L. Elkins, Sec. & Treas. D. W. Dickenson.

3 g, 25 lb r, 9 c, 30 h. Pres. J. Y. Miller, V. Pres. Joseph Hatliff, Treas. H. L. Miller, Supt. F. M. Francisco. RICHMOND, ILL.—Richmond St. R.R. Co.

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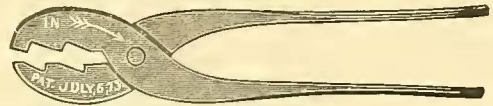
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For cutting threads for Neverslip Calks. The small end, A in cut, of tap indicates size of hole to be drilled in the shoe.

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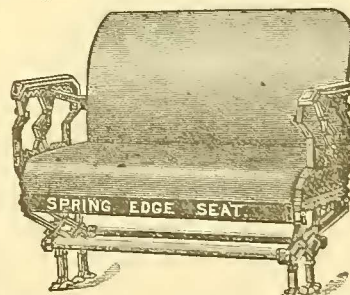
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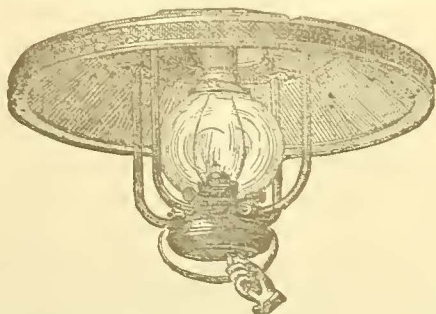
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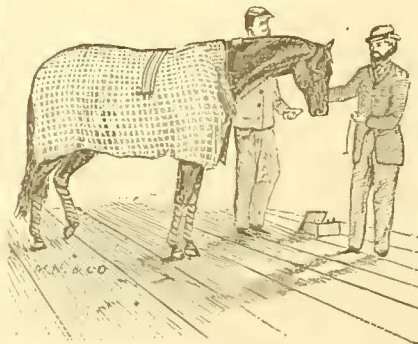
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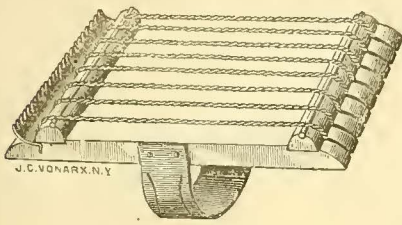
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- Brooklyn City and Newtown Railroad.
- Bushwick Railroad Co., Brooklyn, N. Y.
- Crosstown Railroad Co., Brooklyn, N. Y.
- Coney Island and Brooklyn Railroad Co., Brooklyn, N. Y.
- North Hudson County Railroad Co., Hoboken, N. J.
- Jersey City and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

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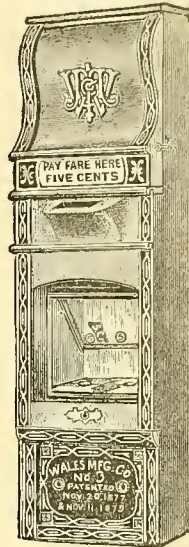
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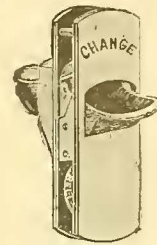
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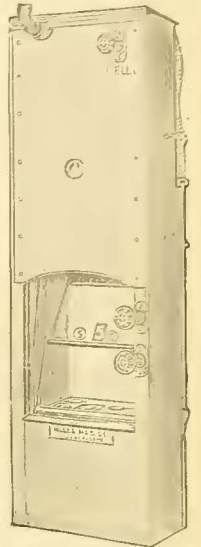
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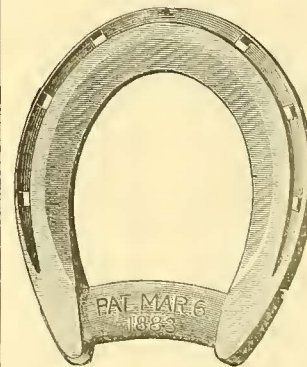
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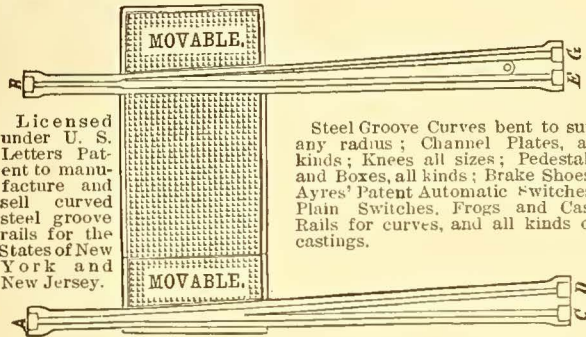
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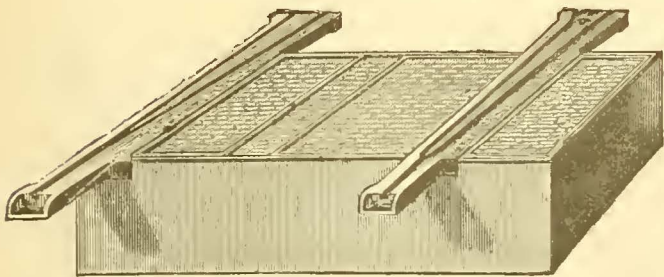
Licensed under U. S. Letters Patent to manufacture and sell curved steel groove rails for the States of New York and New Jersey.

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

M. M. White & Co.,

531 WEST 33d STREET,

NEW YORK.



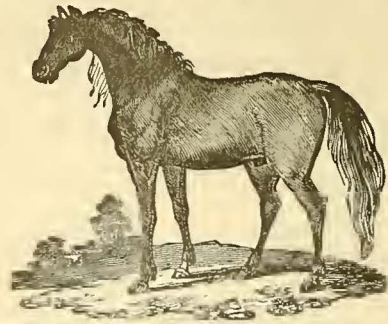
OWNERS AND BUILDERS OF

H. DOUGLASS'

Patent Automatic Switch

FOR STREET RAILROADS.

EUROPEAN COLIC CURE.



A speedy and sure cure for Colic--has saved hundreds of horses where all other remedies have failed. Horse need not be run or trotted around to start the wind. Let him stand or lie down as he feels inclined and he will be ready for work almost immediately after recovery. A cure guaranteed in ninety-nine cases in a hundred. Endorsed by the leading street railway companies of the country, some of which we append.

DECATUR, ILL., Oct. 2, 1884.
MESSRS. JONES & ROACH, Chicago, Ill.

I have used your Colic Cure for my horses and mules on my street car lines and found it the best and surest medicine I have ever used. I have not lost a horse since I commenced its use. It gives relief in a short time after it is taken. I can cheerfully recommend it as a sure relief if given in time. I keep it constantly on hand.

Truly yours,
FRANKLIN PRIEST,
President Decatur Street R. R.

MESSRS. JONES & ROACH:

Gentlemen: I cheerfully recommend your European Colic Cure for horses as being the best that I have ever used. When once introduced no horse owner can well afford to be with-

out it. I hope you will meet with the success your cure deserves.

Truly yours,
VALENTINE BLATZ,
Per H. Lieb, Manager.

OFFICE OF NORTH HUDSON COUNTY }
RAILWAY CO. }
HOBOKEN, N. J., Oct. 4, 1884. }

Gentlemen: It gives me pleasure to say that I can heartily recommend your European Colic Cure to all horse owners, from a personal knowledge of its curative qualities. I have used it in our stables, containing about six hundred horses, and have always found it to be beneficial. Yours very truly,

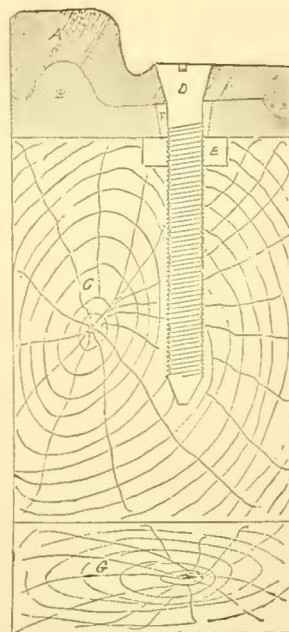
ALBERT SAILLET,
Foreman and Veterinary Surgeon
for the North Hudson County Ry. Co.

Sample Bottles Furnish'd Street Railway Companies Grat'is.

For further information, prices, etc., address

JONES & ROACH, 259 Fremont Street, Chicago.

WRIGHT'S
PATENT JOINT FASTENING.



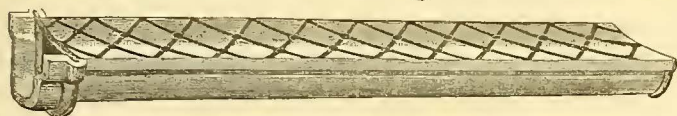
The accompanying cut shows a cross section through joint. A is the rail, B the joint chair, C the stringer, D the patent serew fastening, E the nut, F a slot in chair allowing rails to contract and expand. The chair cannot settle and the rail ends are held level with each other, preventing the many evils of ordinary construction.

For Further Particulars Address

AUGUSTINE W. WRIGHT,
NORTH CHICAGO CITY RAILROAD,

CHICAGO, ILL.

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



Descent 1/4 in. per foot. Pieces 5 feet lengths. Short pieces furnished to suit any length. Spouts to connect with Sewer, &c.

BOWLER & CO., Cleveland, Ohio.



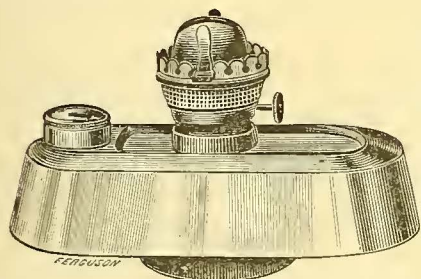
PRACTICAL, ECONOMICAL, ANTI-FRICTIONAL & EXCEPTIONAL.

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

J. G. HENDRICKSON, THE AJAX METAL CO.,
F. J. CLAMER, PHILADELPHIA, PA.
Co-partners.

**CLUTE PATENT
DOUBLE-BOTTOM**

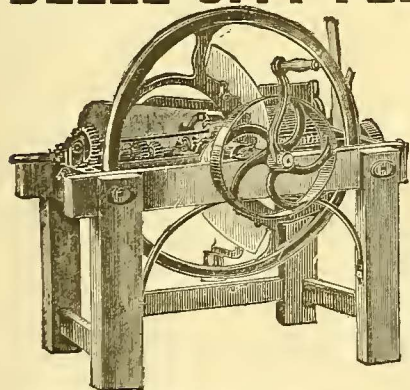
STREET CAR LAMP.



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

GEO. M. CLUTE, Sole Manufacturer.
Also Dealer in Car Reflectors, Chimneys, Burners, &c.,
WEST TROY, N. Y.

**THE
BELLE CITY FEED CUTTER**



IS THE
Strongest, Most Durable,
and on the whole
it is the

**BEST FEED CUTTER
IN THE WORLD.**

For Street-car Barns it has no equal. Write for Reference, Circular, &c., to

**THE BELLE CITY M'FG CO.,
RACINE, WIS., U. S. A.**

**F. W. JESUP & COMPY.,
67 LIBERTY ST., NEW YORK,
Street Railway Supplies,
OF EVERY DESCRIPTION.**

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

The "BROADWELL CAR STARTER,"
having been subjected to practical tests, is now
placed on the market at a very low price.

**C. B. BROADWELL,
169 Laurel Street, - New Orleans, La.**



(This Trade Mark on all Genuine Covert Goods.)

We call particular attention of all horse railroad companies to our celebrated

- HARNESS SNAPS,
- SWIVEL SNAPS,
- OPEN EYE BIT, CHAIN AND TRACE SNAPS,
- ROPE AND WEB HALTERS,
- HALTER LEADS,
- BREAST CHAINS,
- HALTER CHAINS,
- TRACE CHAINS,
- REIN CHAINS AND
- BREAK CHAINS.

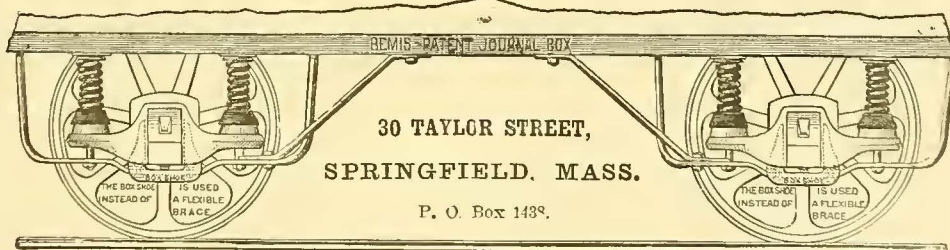
Send for illustrated catalogue and price list.

**COVERT MANUFG. CO.,
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THE BEMIS CAR BOX CO.,

Light Draft, Easy
Riding, Durable
Economical.

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



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SPRINGFIELD, MASS.**

P. O. Box 1432.

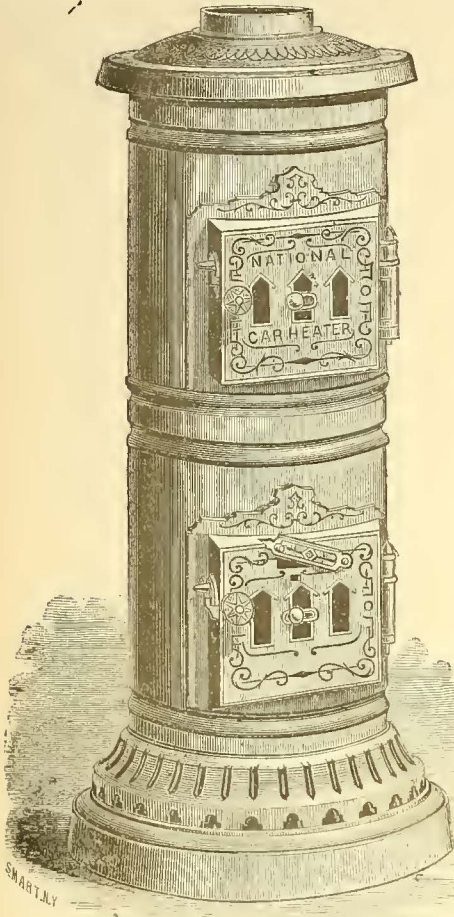
Requires oiling or
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in 12 months.

Boxes are posi-
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MANUFACTURERS OF

THE BEMIS PATENT JOURNAL BOX.

THE NATIONAL CAR HEATER,



Epecially Adapted
FOR
Warming Horse
OR
Street Rail Road
CARS.

Brick Lined, Rotating
and Dumping Grate,
Safety Door Catch.

For Neatness of Ap-
pearance, Compact-
ness in Space, and
Safety it has no
equal.

These Car Heaters are
in use on Railroad Lines
in different Cities and
Towns of the United
States and Canada, and
are giving entire satis-
faction.

Sole Manufacturers,
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Stove Co.,**
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WIRE CABLES

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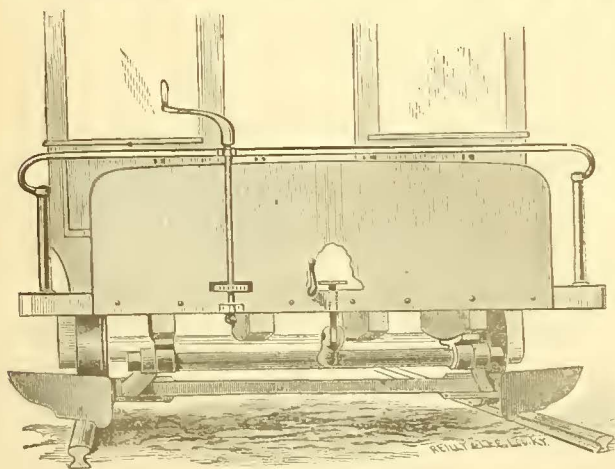
STREET RAILROADS.

MADE BY

Broderik & Bascom Rope Company,

ST. LOUIS, MO.

LITTELL'S TRACK SCRAPER



END VIEW.

Patented June 16th, 1885.

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

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

Having once tried them you will abandon all others.

H. H. LITTELL,
LOUISVILLE, KY.

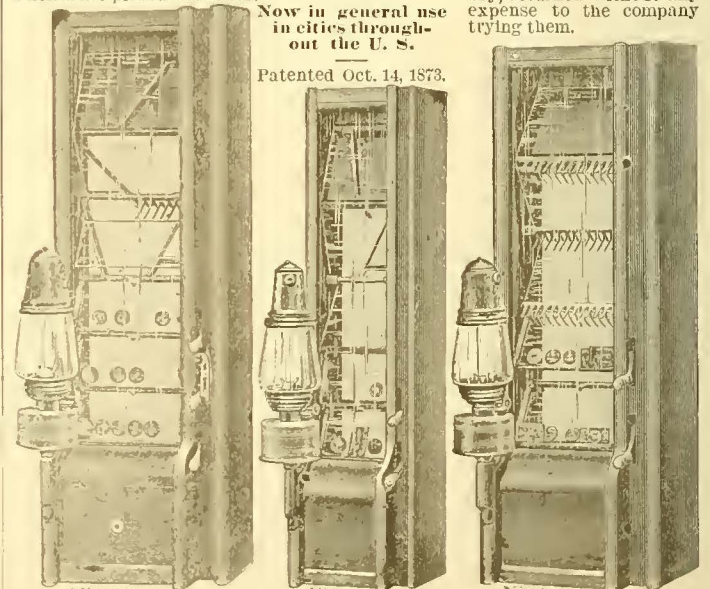
Ornamental to any car. Re-
duction in price where 2 boxes are placed in one car.

TOM L. JOHNSON'S
IMPROVED FARE BOX.

Roads equipped with boxes on trial, and if not satisfactory, returned without any expense to the company trying them.

Now in general use
in cities through-
out the U. S.

Patented Oct. 14, 1873.



BOX NO. 1.

CHARIOT PATTERN.

BOX NO. 2.

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

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.

EVERIL'S

NEW STYLE CAR SASH.

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

Address,

W. L. EVERIL,

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AMERICAN SYSTEM TRACTION ROPE RAILWAY.

OPERATED BY INDEPENDENT DUPLICATE CABLES.

CABLE ROADS.

D. J. MILLER, ENGINEER.

234 BROADWAY, . . . NEW YORK.

J. M. JONES' SONS,

AGENTS,

Street Railway Car Builders

WEST TROY,

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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.

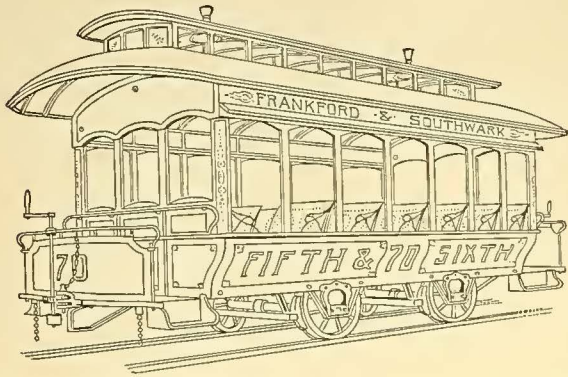
WORKS AT

STEELTON, DAUPHIN CO., PENN.

NEW YORK OFFICE, - 160 Broadway.

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FOR SALE.



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

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**A. WHITNEY & SONS,
CAR WHEEL WORKS,
PHILADELPHIA, PENN.**

**CAST CHILLED WHEELS,
AXLES AND BOXES
FOR EVERY KIND OF SERVICE.
Street Railway Wheels of all Sizes.**

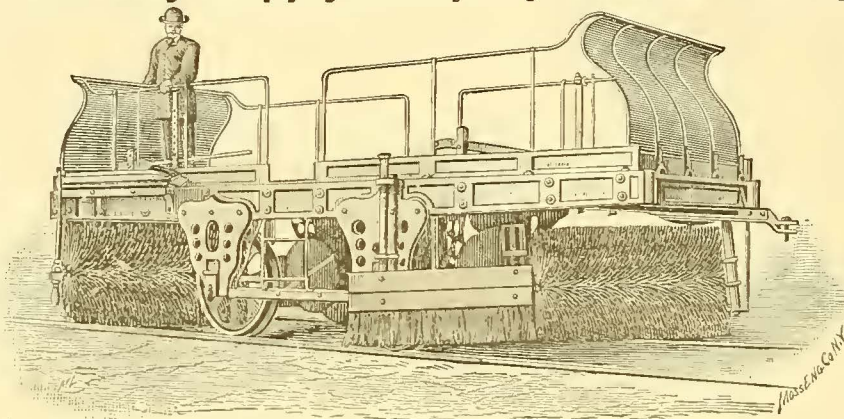
The Brooklyn Railway Supply Company's Snow Sweeper and Plow.

Best Materials only used in construction.

White oak frames.

Many improvements.

The famous cylinder brooms, for heavy snows, under United States Letters Patent, supersede old six wing sectional broom.



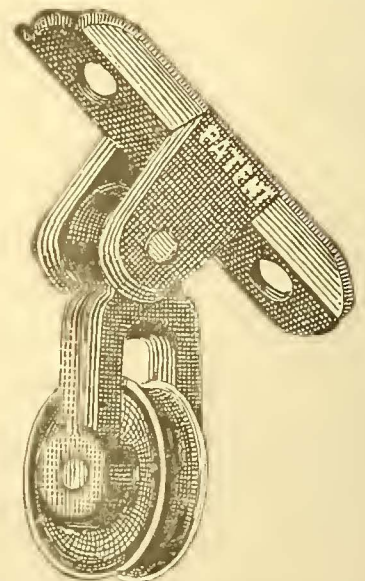
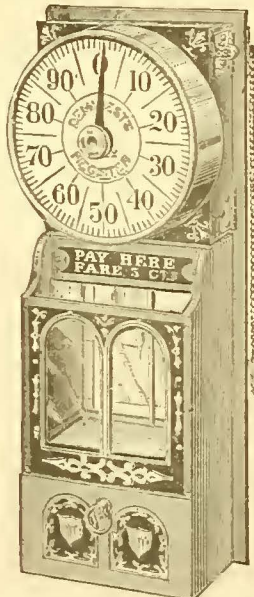
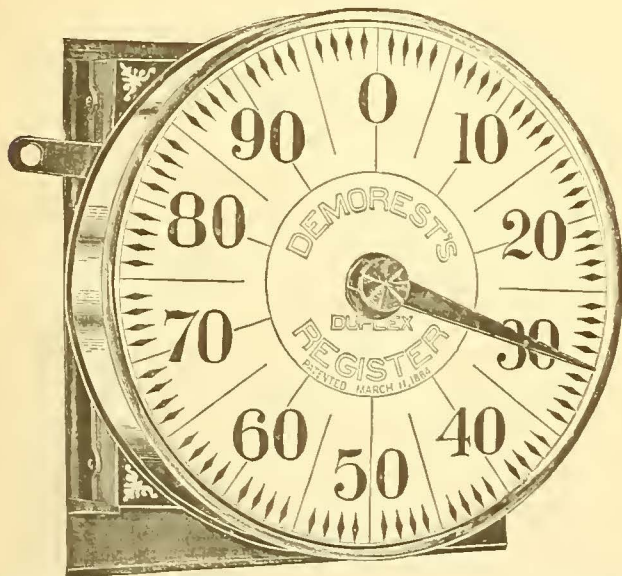
Refer to the larger companies who have used all kinds of snow sweepers, and can therefore speak from actual experience.

WORKS:

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DEMOREST'S DUPLEX FARE REGISTERS.



The Half Trip system and the perfect safety in allowing the conductor to reset his register by being required to sign his name, surpass anything of its kind ever before offered to the public.

All companies who use the Duplex Register will be indemnified.

We will place any number of our Duplex Registers (with or without the fare box, according to the kind of car), upon trial for any time desired, at a very slight cost. Our terms of trial are quite reasonable. A trial is solicited.

Address the proprietor,

The fare-box and register combined is the only perfect system of checking the driver in neglect to register fares put in the box, and marking the registrations upon a paper dial serves as an infallible record to be filed away for future reference.

Patent Hinge Rib Pulley is acknowledged the best.

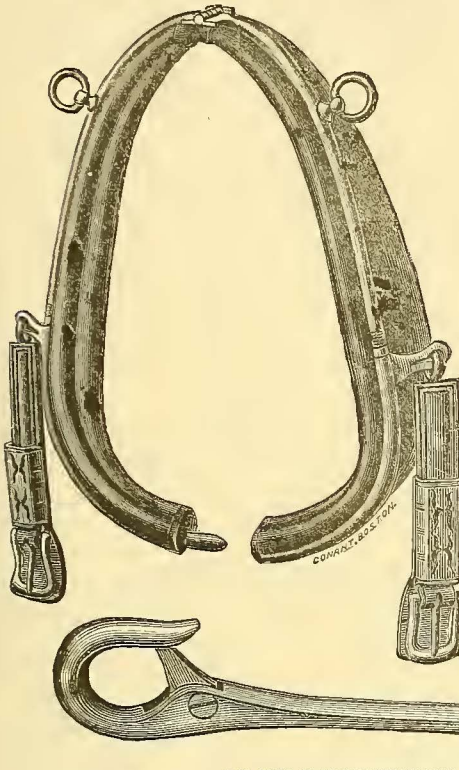
Railroad companies should be careful in ordering this line of goods. As owner of the patents we are the only ones to order from.

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BERRY'S PATENT HARNESSES.



Lightness, Strength,
Durability, Quick-
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licity.

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

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

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

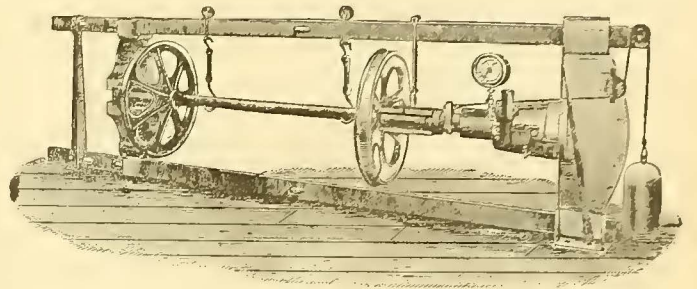
WE ALSO MANUFACTURE THE

REGAN PATENT SNAP.

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

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HAND POWER, LEVER AND HYDRAULIC PRESSES.



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

Screw and Hydraulic Jacks.

WATSON & STILLMAN,
471 S. GRAND ST., N. Y.

FRED. J. KALDENBERG,

SUCCESSOR BY PURCHASE TO THE

NEW ENGLAND CAR SPRING CO.

(ESTABLISHED 1851),

MANUFACTURER OF SUPERIOR QUALITY

VULCANIZED RUBBER CAR SPRINGS,

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FACTORY AND OFFICE :

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TELEPHONE CALL, NASSAU 696.

Correspondence Solicited.

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

THE ROSS HAY CUTTERS.

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

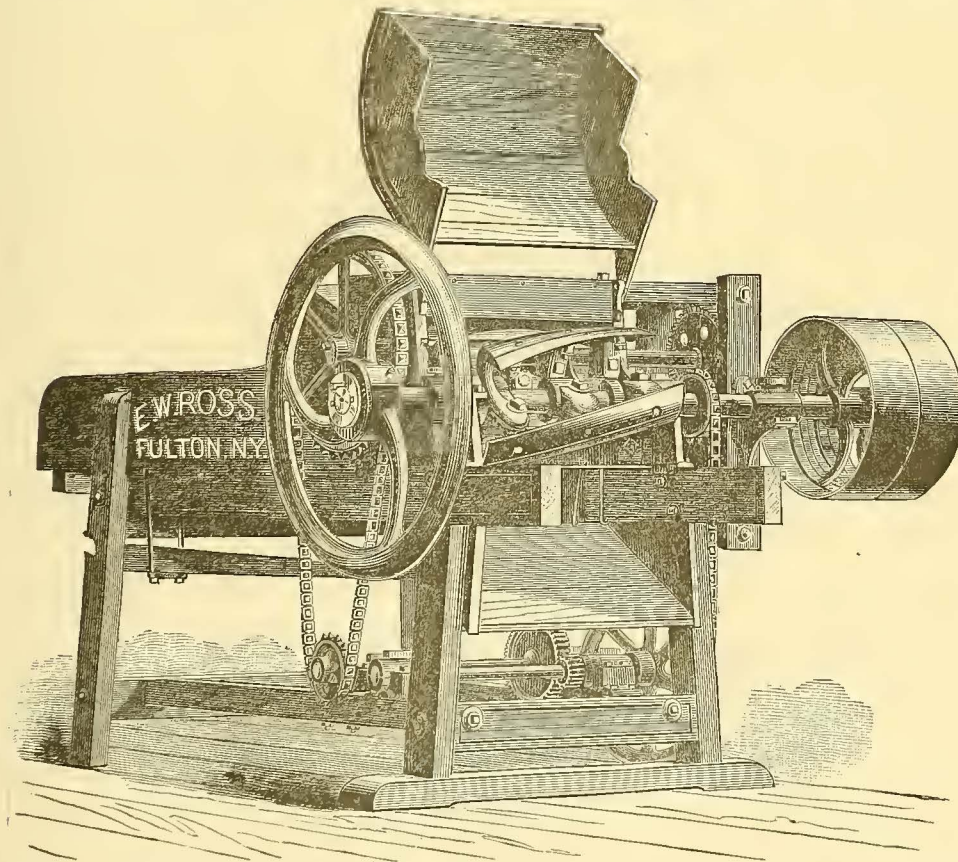
THEY HAVE COMBINED STRENGTH, DURABILITY AND GREAT CAPACITY.

ARE EASILY OPERATED AND CAN BE RUN TO FULL CAPACITY BY SMALL GAS ENGINE.

MACHINES SENT TO ANY PART OF THE U. S. ON APPROVAL IF DESIRED.

GUARANTEED TO BE THE BEST.

ILLUSTRATED CATALOGUE AND FULL PARTICULARS FURNISHED WHEN REQUESTED.



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AND OTHERS,

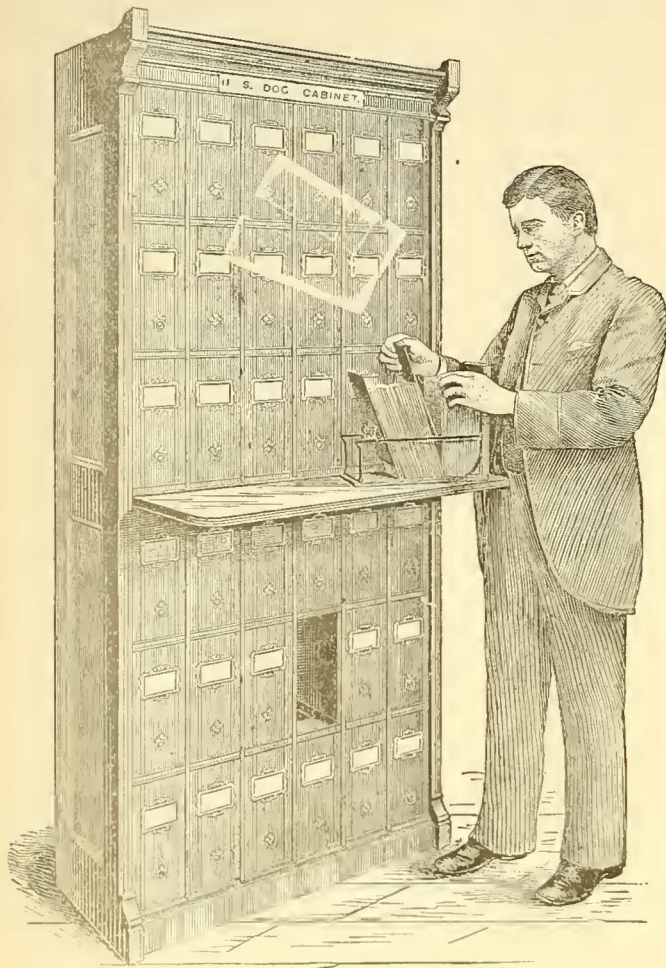
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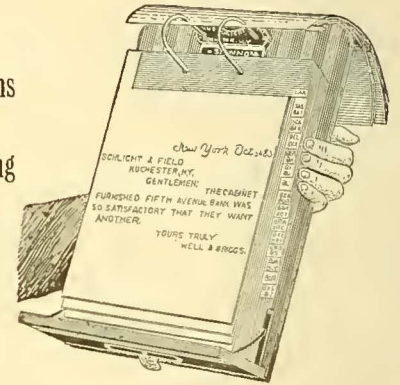
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The Most Perfect Systems

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all kinds of papers.



WHEN DESIRED

We Combine Both Systems in One Cabinet.

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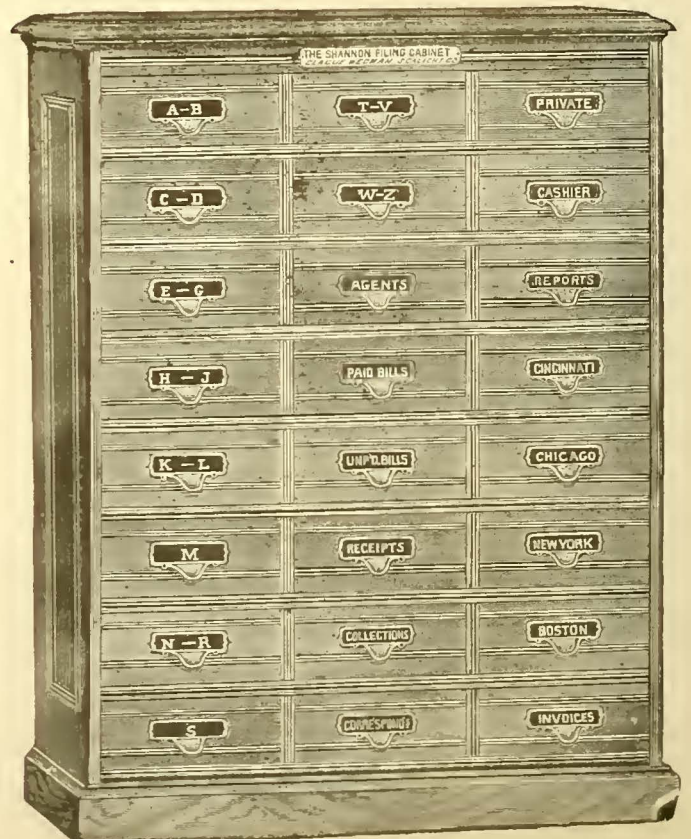
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Copying Letters, Bills, Way Bills and all other papers as rapidly as clothes can be run through a wringer.

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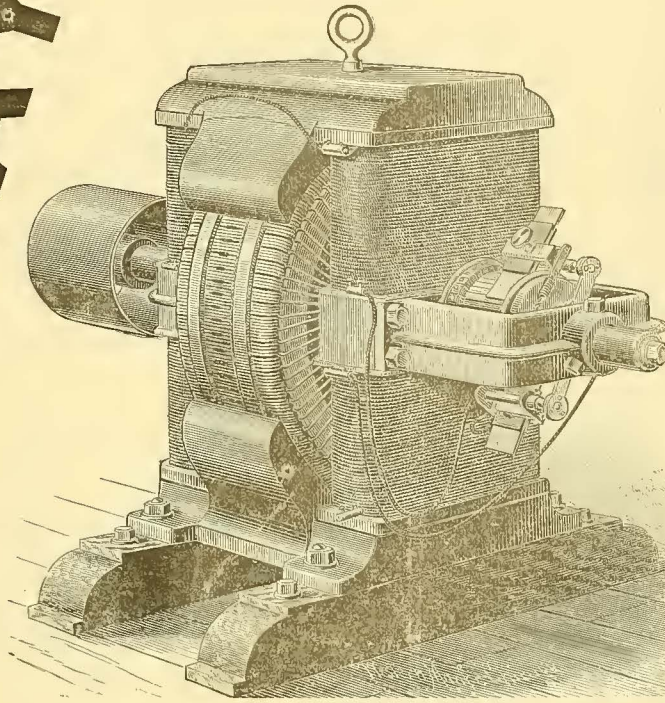
ROCHESTER, N. Y.



Branches: 37 Lakeside Building, Chicago, Ill.; 31 Adelaide Street, E., Toronto, Ont.; 339 Broadway, New York; 288 W. Baltimore Street, Baltimore, Md.

THE VAN DEPOELE ELECTRIC

RAILWAY



SYSTEM.

The Van Depoele Electric Manufacturing Company,

203 VAN BUREN STREET, CHICAGO, ILL.,

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.

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. W. FOWLER, President.

THE

DAN'L F. LEWIS, Treasurer.

LEWIS & FOWLER M'F'G CO.

P. O. BOX 102.

BROOKLYN, N. Y.

Patentees and Manufacturers of

IMPROVED

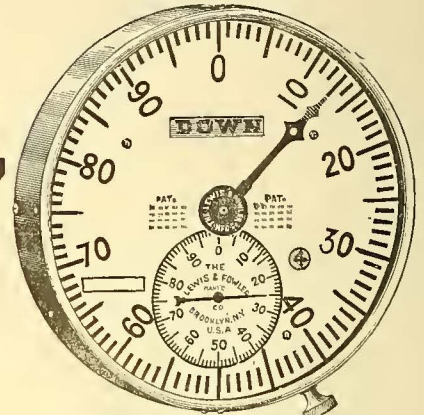
"ALARM"

PASSENGER REGISTER.

—SOLE AGENTS AND MANUFACTURERS—

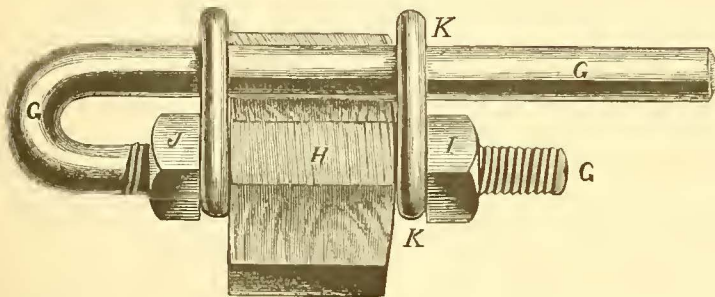


HIGHEST PRIZE.

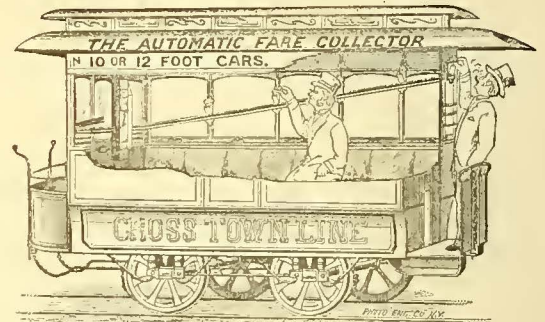


SILVER MEDAL, CHICAGO, 1883.

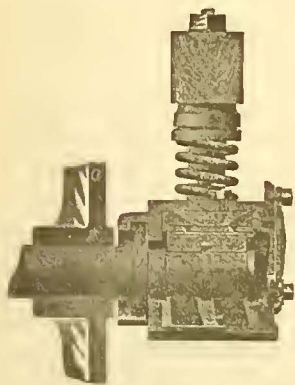
VAN TASSEL'S Patent Brake Rod FOR STREET CARS.



SMALL'S Automatic Fare Collector. FOR FARE BOX CARS.

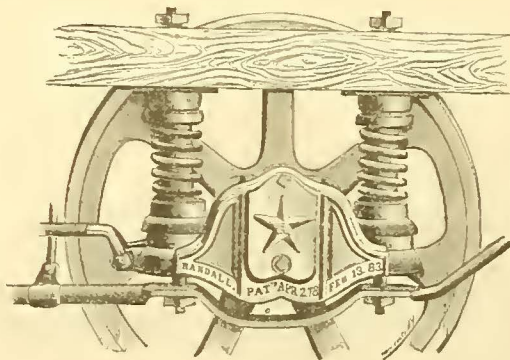


"RANDALL'S" PATENT CAR AXLE AND BOX.



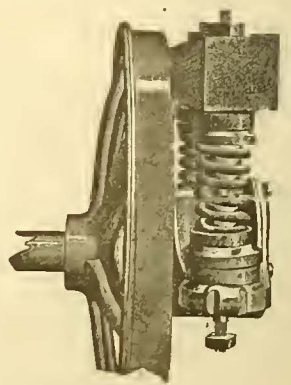
SECTIONAL VIEW.

DUST TIGHT.



FRONT VIEW.

ANTI-FRICTION



END VIEW.

Agents for ORIENTAL METAL for Street Car Journal Bearings.

The Goodenough System

OF

HORSE-SHOEING.

The Goodenough System of Horse-Shoeing, of which the GOODENOUGH HORSE-SHOE is the exponent, is an endeavor to take from the hand of unthinking and barbarous method, the important art of farriery.

In the correct use of the system and proper application of the shoe, the sole bars and frog of the horse's foot are never cut, the rasp and knife being applied only to the wall of the foot, and no fire is used in the fitting.

The shoe is very light and narrow (Army pattern), easily worked cold and allowing frog bearing, without which there can be no good horse-shoeing.

FROG PRESSURE

is as important a factor to the health of the horse's foot as air is to the lungs or food to the stomach. It is the

KEY-STONE OF THE ARCH.

The advantages of the Goodenough System are, first and foremost, SOUND HORSES; Secondly, CHEAP HORSE-SHOEING.

Horse railroads using the system in its entirety not only buy much less iron and pay for much less labor, but have also much more serviceable stock.

Said a horse railroad superintendent of now the largest road in the United States:

"We don't wear iron nowadays, we wear frogs and cobble stones; nature provides frogs and Boston finds cobble stones."

To those who desire to read further upon the subject we will send upon application free of cost our pamphlets entitled,

"HORSE-SHOEING," and "FACTS FOR HORSE-OWNERS."

THE GOODENOUGH COMPANY,

156 and 158 East Twenty-Fifth Street,

NEW YORK.

LAKE & McDEVITT'S Patent ROPE TRACE

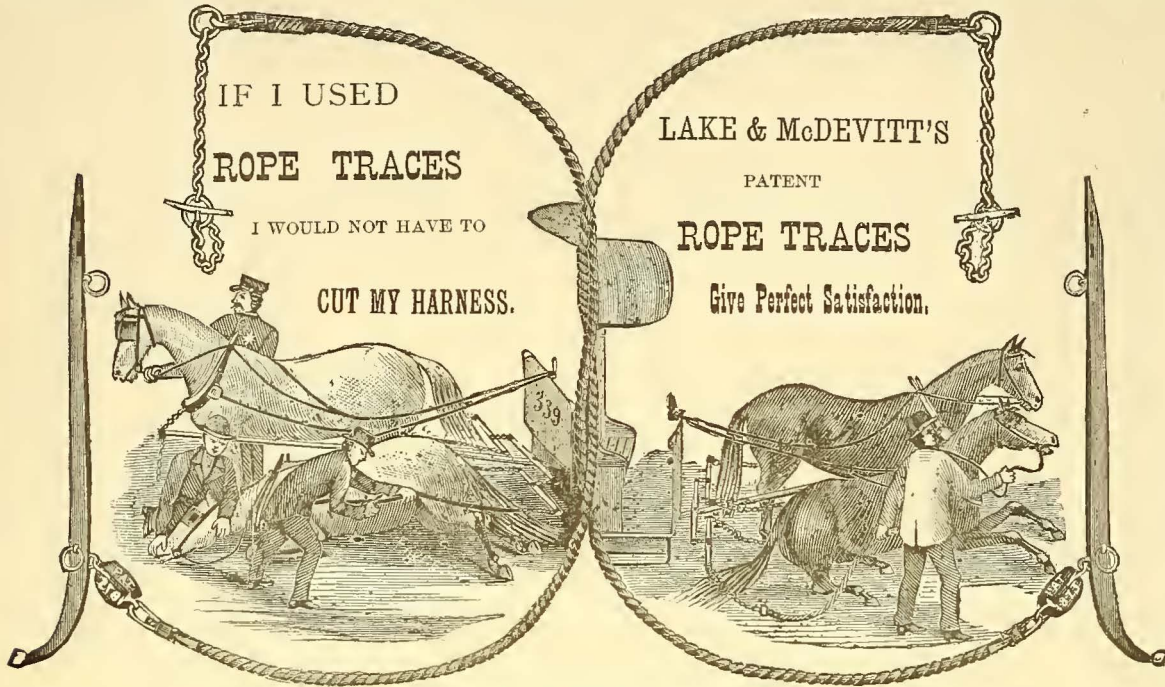
For Horse Railways, Omnibus Lines, Etc.

The Advantages

OF THE

ROPE TRACE

are its ready application to Horse-Car service, or to any other purpose where cheap harness is required. It only costs about half as much as leather traces, while at the same time one set of Rope Tugs will (when used on horse cars) take the place of three or more sets of leather traces, as the Tugs remain attached to the car all day, no matter how many changes of stock are made. The relief horses having hooks attached to their hames, all that is necessary is to unhook the tugs from the working team back in the fresh horses, hook on the tugs, and the change is made. Railroad men will at once perceive their adaptability and economy from the above facts. They will also last longer than leather traces, and require but very little care. From their durability and cheapness they are also especially adapted for all kinds of farm use and heavy teaming, as farmers, etc., can easily repair them.



Patent No. 171,232, December 21, 1875.

In use on the Chicago West. Div. R'y.; Louisville City R'y Co.; Milwaukee City R'y.; Transverse R'y Co., Pittsburg, Pa.; Citizens Street R'y Co., Pittsburg, Pa.; Pittsburg and Birmingham, Pittsburg, Pa.; Central City R'y, Peoria, Ill.; Grand Rapids R'y; Minneapolis St. R'y Co.; St. Paul City R'y; Houston City R'y, Texas; Superior Street R'y, Cleveland, O.; Cincinnati City R'y Co.; Fifth Ward Street R'y, Syracuse.; Detroit City R'y.; Ft. Wayne and Elmwood St. R'y, Detroit, Mich.; Galveston City R'y; Springfield City R'y, Springfield, Ill.; Toledo St. R'y, Toledo, O.; Adams St. R'y, Toledo, O.; Atlanta Street R'y, and others, in all on about 100 Street R'ys in United States and Canada, and a large number of other prominent Street R'y Companies throughout the Country. Send for descriptive Circular containing testimonials, prices, etc., to

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Patented January 5th, 1883.

TO STREET RAILWAY COMPANIES AND OTHER STOCK OWNERS.

This machine for grooming may be driven by any known power, and can readily be placed for use in any stable or out-building. It can be operated by an ordinary groomer; its work is perfect; its action simple and effective. Stock owners will readily realize the importance of the machine. The perfection and rapidity of its work, and the benefits derived by its use, commend it to those interested in the care and use of all classes of thoroughbred and work stock. The most vicious animal readily submits to its use. Machine Grooming is found to be less expensive than hand grooming, saving in food and medicines, and materially increasing the value of the animal.

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This Grooming Machine is in daily use in some of the largest Street Railway Companies' stables, and has always given perfect satisfaction. Among those using it are the City R'y Co., Chicago, Ill.; Detroit City R'y Co., Detroit, Mich.; Central City R'y, Peoria, Ill.; M. W. Dunham, Wayne, Ill.; West Division Street R'y Co., Chicago, Ill.; Lindell Street R'y Co., St. Louis, Mo.; Pleasant Valley R'y Co., Allegheny City, Pa.; Marshall, Field & Co., Chicago, Ill.; Leroy Park, Chicago, Ill.; Saginaw City R'y, Saginaw, Mich.; Pittsburg and Birmingham R'y Co., Pittsburg, Pa.; and a number of others who have given testimonials as to the perfect working of the machine. For prices, circular and other information apply to

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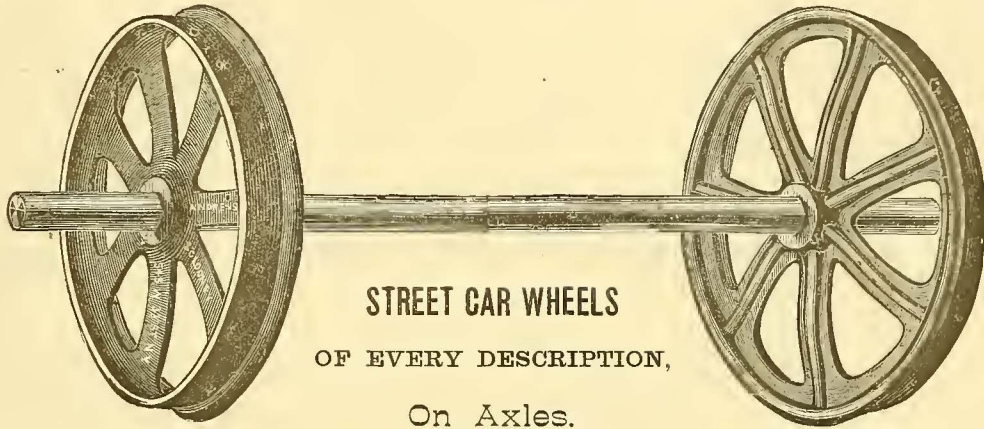
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STREET CAR WHEELS
OF EVERY DESCRIPTION,
On Axles.

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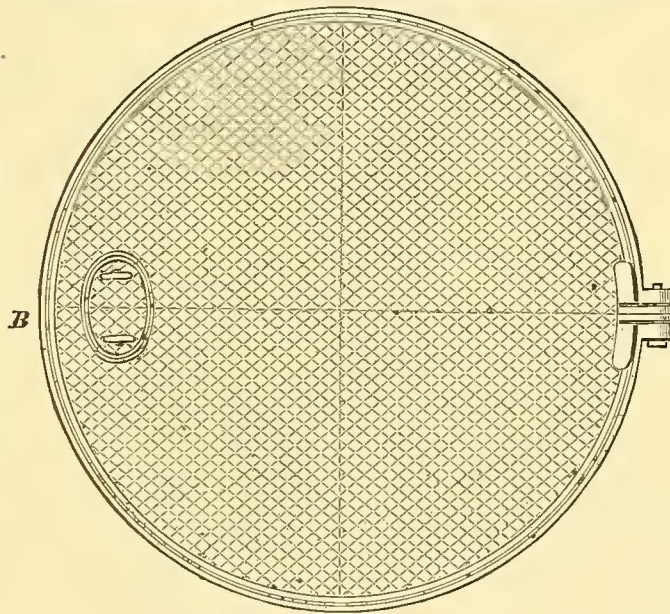
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Of Every Description.



Street Railway Turn-table.

Car Wheels,
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of all Descriptions where great
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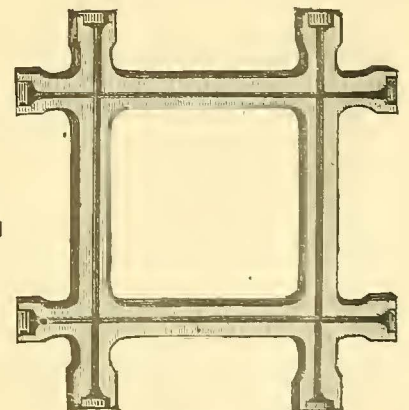
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Street Car Springs.

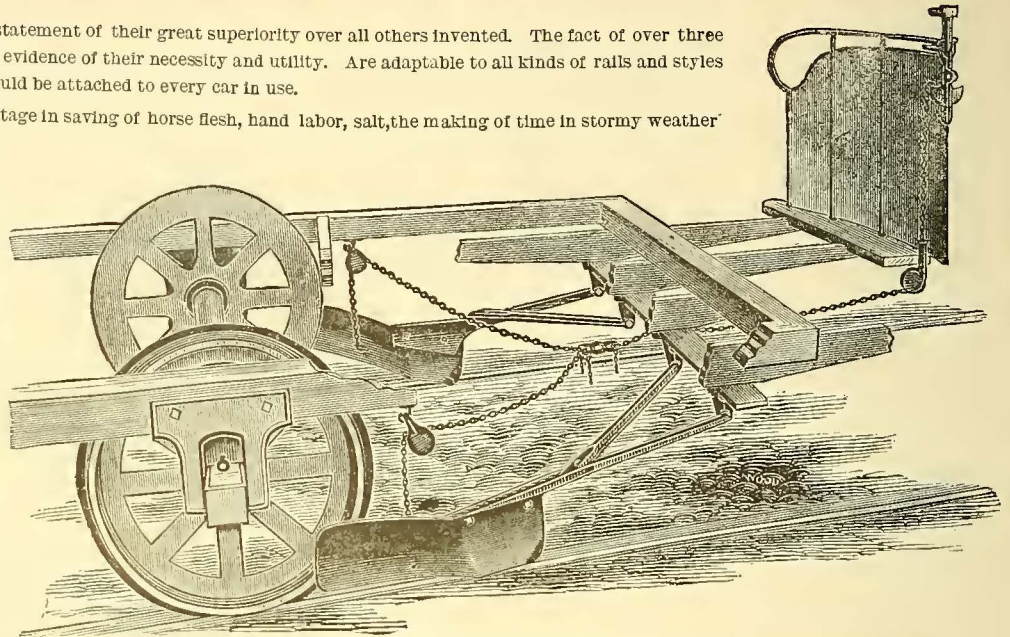
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DAY'S IMPROVED STREET RAILWAY TRACK CLEANERS.

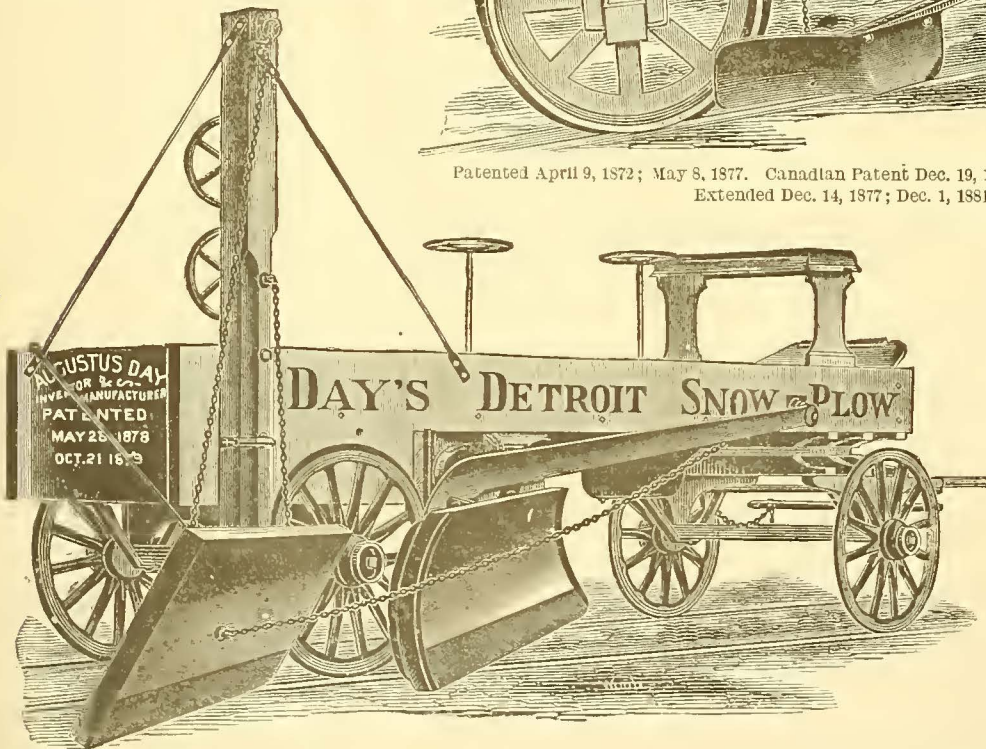
These Track Cleaners need no extended statement of their great superiority over all others invented. The fact of over three thousand pairs being now in use is sufficient evidence of their necessity and utility. Are adaptable to all kinds of rails and styles of cars. To secure the largest benefit they should be attached to every car in use.

No estimate can be made of their advantage in saving of horse flesh, hand labor, salt, 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 best and most efficient article in preference to other considerations. Method of sale and price considerably changed.

Reference is made to a few of the many roads using these Cleaners, with respective numbers of each, viz.:



Patented April 9, 1872; May 8, 1877. Canadian Patent Dec. 19, 1872; Dec. 18, 1876. Reissued Aug. 27, 1878. Extended Dec. 14, 1877; Dec. 1, 1881; Dec. 12, 1882.



Fort Wayne & Elmwood Ry., Detroit, Mich.,	.....	30 pair.
Detroit City Ry., Detroit, Mich.,	.....	135 "
Chicago City Ry., Chicago, Ill.,	.....	350 "
Rochester City & Brighton R. R., Rochester, N. Y.,	.....	75 "
Albany Ry., Albany, N. Y.,	.....	40 "
Waterville Turnpike & R. Co., Albany, N. Y.,	.....	24 "
Elmira & Horseheads R. R., Elmira, N. Y.,	.....	11 "
Lynn & Boston R. R., Boston, Mass.,	.....	68 "
Boston Highland Ry., Boston, Mass.,	.....	46 "
Lowell Horse Ry., Lowell, Mass.,	.....	27 "
Grand Rapids Street Ry.,	.....	50 "
Naumkeag Street Ry., Salem, Mass.,	.....	40 "
Merrimack Valley Ry., Lawrence, Mass.,	.....	21 "
Louisville City Ry., Louisville, Ky.,	.....	55 "
Cream City Ry., Milwaukee, Wis.,	.....	37 "
Milwaukee City Ry., Milwaukee, Wis.,	.....	40 "
Buffalo Street Ry.,	.....	40 "
And many others.		

Taunton Street Ry., Taunton, Mass.,	.....	10 pair.
New Haven & West Haven Ry., New Haven, Conn.,	.....	16 "
Bridgeport Horse Ry., Bridgeport, Conn.,	.....	32 "
Adams Street Ry., Toledo, Ohio.,	.....	14 "
Toledo Street Ry., Toledo, Ohio.,	.....	13 "

For Illustrated Circular and New Price List, address

AUGUSTUS DAY,

Detroit, Mich., U.S.A.

76 State Street.

RICHARD VOSE,

13 Barclay Street, . New York,

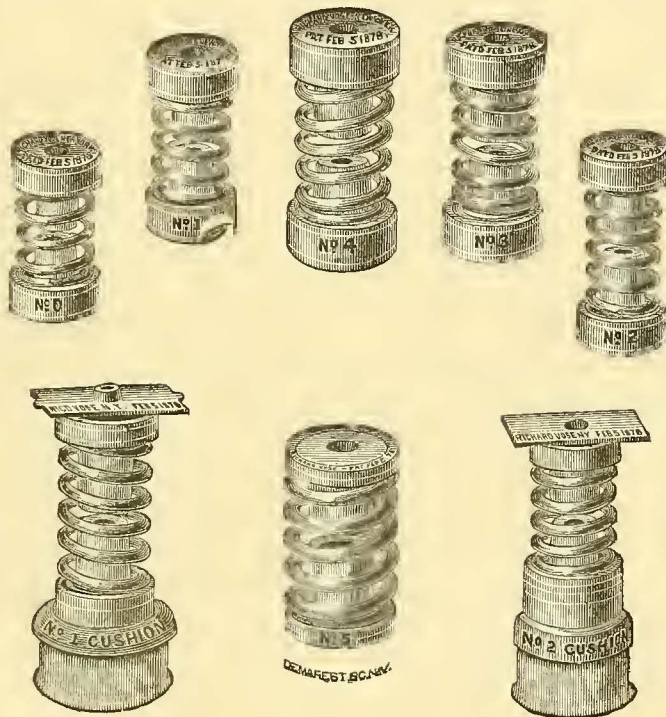
PATENTEE AND MANUFACTURER OF

Graduated Street Car Springs.

RUBBER CONE.

Patented, April 15th, 1879.

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 —AND—
 ALL OTHER BOXES.



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- 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.

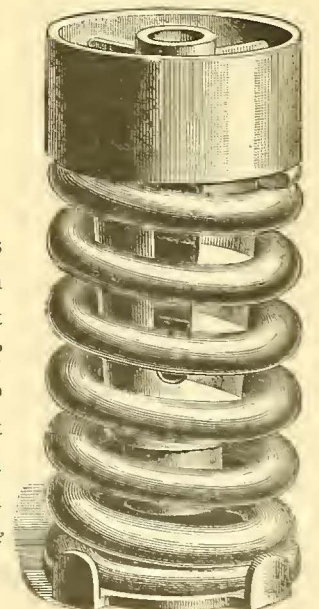
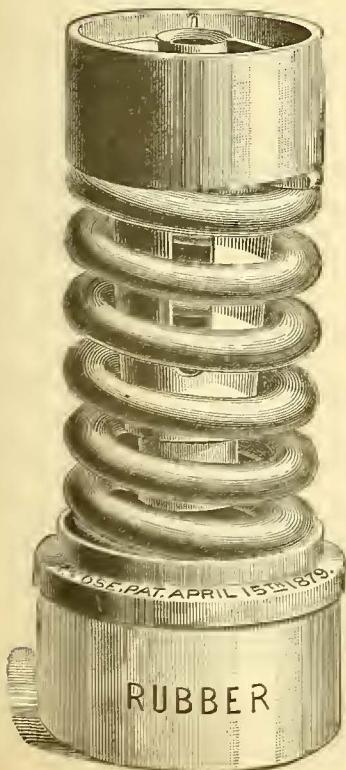
STEEL CONE CITY CAR SPRING.

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for HORSE CARS has induced the inventor to bring this class of Springs as near perfection as possible, and after a series of experiments and tests now presents for favor what he claims to be the *MOST PERFECT SPRING FOR HORSE CARS* ever offered. It is exceptionally *SOFT AND EASY* with the *EMPTY CAR* or with the *GREATEST LOAD*. It is believed to be the *MOST DURABLE*, being constructed upon a principle that seems to insure that the Spring must *ACTUALLY WEAR OUT*. The very *Finest Quality of Crucible Cast Steel* will always be used in these Springs.



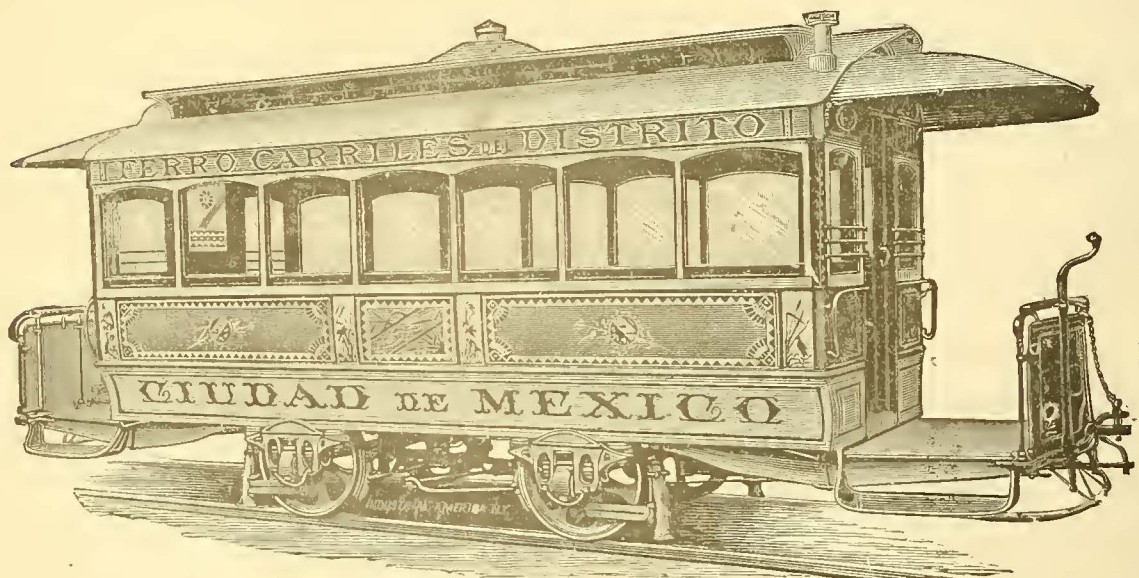
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