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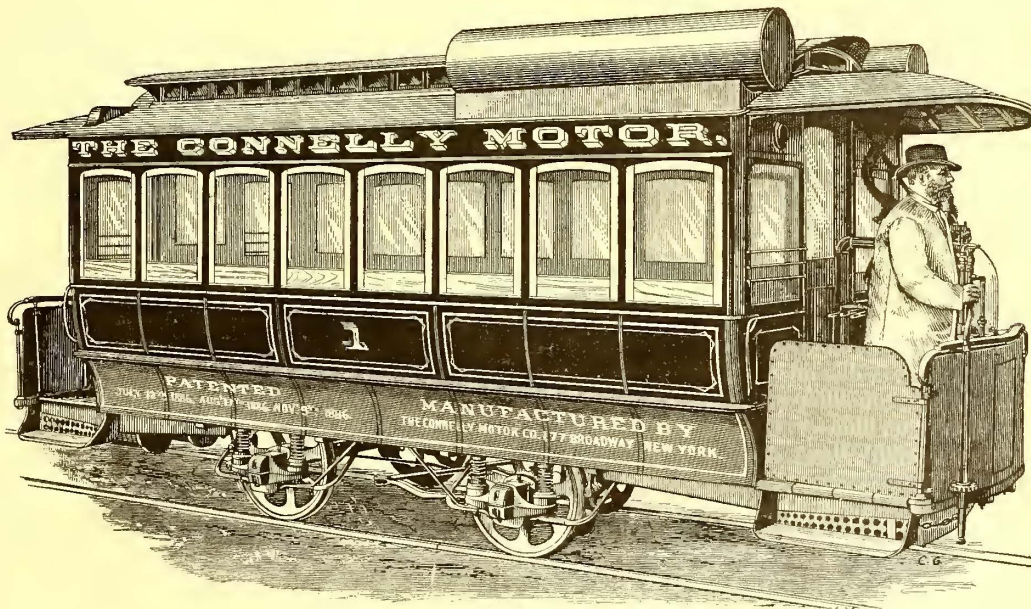
## The Connelly Motor.

For a number of years there have been experiments which have been directed toward the placing upon street cars of a motor which would be practically independent of any central system, and at the same time provide sufficient power for the propulsion of the car in its ordinary work of the day. In cases where the experiments have been made with steam, the difficulty of reducing the weight has appeared to be the great obstacle to be overcome, the difficulty arising from the fact that large weights of fuel and water must be

other changes than the attachment of the motor. No changes of any kind were made in the framing or design of the car, and the only change in the platforms was that of putting a heavier flooring over the timbers which were originally intended to be used. This was simply to give a strength of bed sufficient to bolt the motor to the platform, but in other respects the car remained untouched.

The essential features of the motor are that it is practically a gas engine carrying its own store of fuel and manufacturing its gas upon the car. The fuel used is a naphtha which is aerated and put into the en-

tershaft in which there is a heavy fly wheel capable of exerting about 8 horse power when it becomes necessary to start the car. This of course renders valuable assistance to the engine. The main shaft is connected to the axle by means of friction gearing and countershaft. There is an automatic governor by which the engine is run light when not driving the car, the gas being admitted to the car only when it is required, say once in from five to nine or ten revolutions. Provision is made for catching any naphtha which may be condensed in the pipes leading from the carburetter to the cylinder. This is saved and



THE CONNELLY STREET CAR MOTOR.

added to the necessary weight of the engine and boiler. There is now in operation an experimental car upon the out-going track of the Brooklyn, Flatbush & Coney Island R. R. in Brooklyn, N. Y., in the motor of which gas is used to develop the power, and in this way the weight, not only of the fuel but of the operating machinery, is brought down to a very low figure. In the case to which we refer an ordinary horse car was built in every particular like those in use upon ordinary lines, with a 16 foot body and platforms of ordinary dimensions at each end. This car was taken and the motor adapted to it without making any

change in the form of vapor by a modification of the ordinary methods. The engine is a two cylinder machine and drives the car by means of friction gears and countershaft.

The engine operates upon the same principle as the Otto engine, its cylinder receiving a charge of gas once in each alternate revolution.

The two pistons are connected opposite one another on the shaft so that the reciprocating parts balance one another and there is no perceptible jar upon the car from their action. These drive the main shaft, which is belted to a suspended coun-

tershaft in which there is a heavy fly wheel capable of exerting about 8 horse power when it becomes necessary to start the car. This of course renders valuable assistance to the engine. The main shaft is connected to the axle by means of friction gearing and countershaft. There is an automatic governor by which the engine is run light when not driving the car, the gas being admitted to the car only when it is required, say once in from five to nine or ten revolutions. Provision is made for catching any naphtha which may be condensed in the pipes leading from the carburetter to the cylinder. This is saved and

taken care of whenever the car is stopped or at any time it may suit the convenience of the operators. There is also a reversing clutch whereby the car may be run backward, and the driver has complete control over it at all times.

No skilled labor is required upon the car and the only engineer that it would be necessary to employ would be one at headquarters to examine and inspect the engines or motors as they came into the car shops at night. The sprocket wheel is attached to a spring which in turn is rigidly attached to the axle, so that the sprocket



wheel may make one complete revolution before it is absolutely necessary for the car to start, thus bringing a gradual pressure upon the axle and starting the car gradually, thus allowing the driver to throw the clutch in suddenly without producing any appreciable jar upon the car itself. The motor, as has been said, is in experimental use upon the Brooklyn, Flatbush & Coney Island R. R., but it seems now to be in such a state of development that motors may be made after this model for actual service. The total weight of the machine in running order is about 1,400 lbs.

The motor is now being run daily upon the tracks referred to, and we recently had an opportunity of witnessing its efficiency. It is geared to run ten miles per hour and

and around sharp curves and yet has been operated economically and advantageously, according to reports of the management.

Primarily the size of each conduit for the use of this system is prescribed by the different circumstances under which it is constructed. It must be of sufficient dimensions so that it will not fill with water faster than it can drain, and to provide for the removal of such accretions of mud, dust and snow as may accumulate from time to time. It is simply to be occupied by the conductor and insulators, and the size which these impose will be much less than that occupied by the ordinary cable conduit. Of course it can also be made more rigid in its construction, inasmuch as it is not necessary to have access to it for repairs the same as in the cable road, and

dynamo to revolve and the movement is communicated to the wheels, thus impelling the car backward or forward. After passing through the motor the current returns by way of the wheels opposite to those by which it entered and by the opposite rails to the generator, thus completing the circuit. The course of the current is regulated and controlled by a hand lever connecting with metallic strips or brushes which are in contact with a piece of mechanism called a "commutator" and give the desired direction of rotation. The rate of speed is completely under the control of the operator. The rotary velocity of the armature, being far too great for direct connection with the wheels, is brought down to reasonable limits by reducing gearing. One characteristic of the



THE DAFT ELECTRIC STREET RAILWAY SYSTEM IN OPERATION AT BALTIMORE, MD.

maintains this speed with perfect ease with a fuel consumption of one gallon of naphtha per hour.

#### Daft Electric Motor.

The Daft electric railway system permits the using of track-rails for the out-going and in-coming currents, or a third conducting rail either in a subterranean conduit or on the surface, or an overhead conductor, as may be determined by local conditions. The method adopted on the Ninth avenue road, New York, in the tests made some time ago, was that of laying a center rail.

The views which we illustrate are taken from points along the line of the road which has been built and has been in operation in Baltimore, Md., for a number of years. The road is built over heavy grades

and it is claimed that the conductors will last practically for a lifetime.

The mode of operation which is followed in this system is that which is common with ordinary systems, although varying very greatly in some of its details. Two dynamos are employed, one the generator which is stationary, for producing the current, and the other called the receiver or motor, which is an attachment of the car. The generator may be located in any convenient position and driven by the steam engine in the ordinary way. The current of electricity which is thus produced is led from the generator by a conductor over any desired distance to one track, passes through the line of rails until it reaches the motor and penetrates by way of the wheels, etc., to the receiving dynamo. The presence of this current causes the armature of the

system is the use of currents of low potential, which never exceed 120 volts for any size machines.

The objection which is raised to currents of high potential is that the great risk incident to their use neutralizes the first advantage, and to this is added the great expense necessary for obtaining thorough insulation. One of the early steps taken by the company to exploit their machine was on the Mount McGregor road near Saratoga. Here the steam engine was rated at 25 H. P., and an average current was supplied by two generators of 10 H. P. each, and conducted to the motor by an ordinary track rail laid between the two, upon blocks saturated with asphaltum and capped with vulcanized fiber. The load hauled was 18 tons, the grade 90 feet per mile, and the maximum speed was 12 miles



per hour. There was also a short line built some time afterwards on the Iron Pier at Coney Island and another one at the New Orleans Exposition. In construction, the ordinary switch-frogs are introduced into the central rail system and no difficulty whatever has been experienced in taking the turnouts at various points along the road; switching has been accomplished with perfect success and the only thing necessary to be done was to cut out the frogs and maintain the continuity of the third rail by means of a short subterranean cable. In these places the car was carried by momentum, but of course the distance was so short that the want of electricity was inappreciable.

In a future issue we expect to illustrate and give more complete details in regard to the construction of the system and the

be met, and where neither overhead nor surface conductors will be tolerated on account of the disfigurement of the streets which would result from their use and their danger and uncertainty of service.

Our cuts Nos. 1 and 2 show a fully equip-

Upon the extremities of the armature shaft are keyed pinions which mesh with gear wheels mounted on the central crank-shaft. From this shaft the motion is transmitted by connecting rods running to each wheel. All parts of the machinery

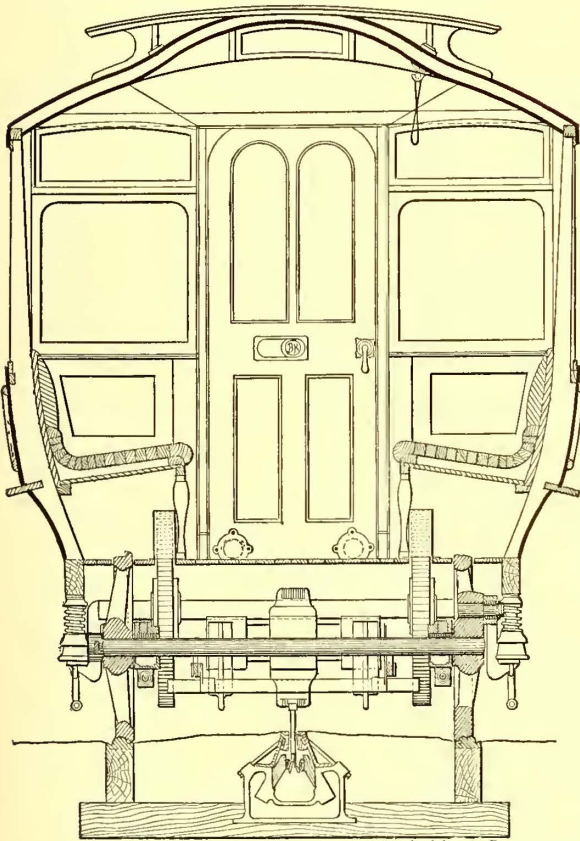


FIG. 1. END VIEW OF CAR.

peculiar details of the mechanism which have been employed.

**The Bentley-Knight Electric Railway:**

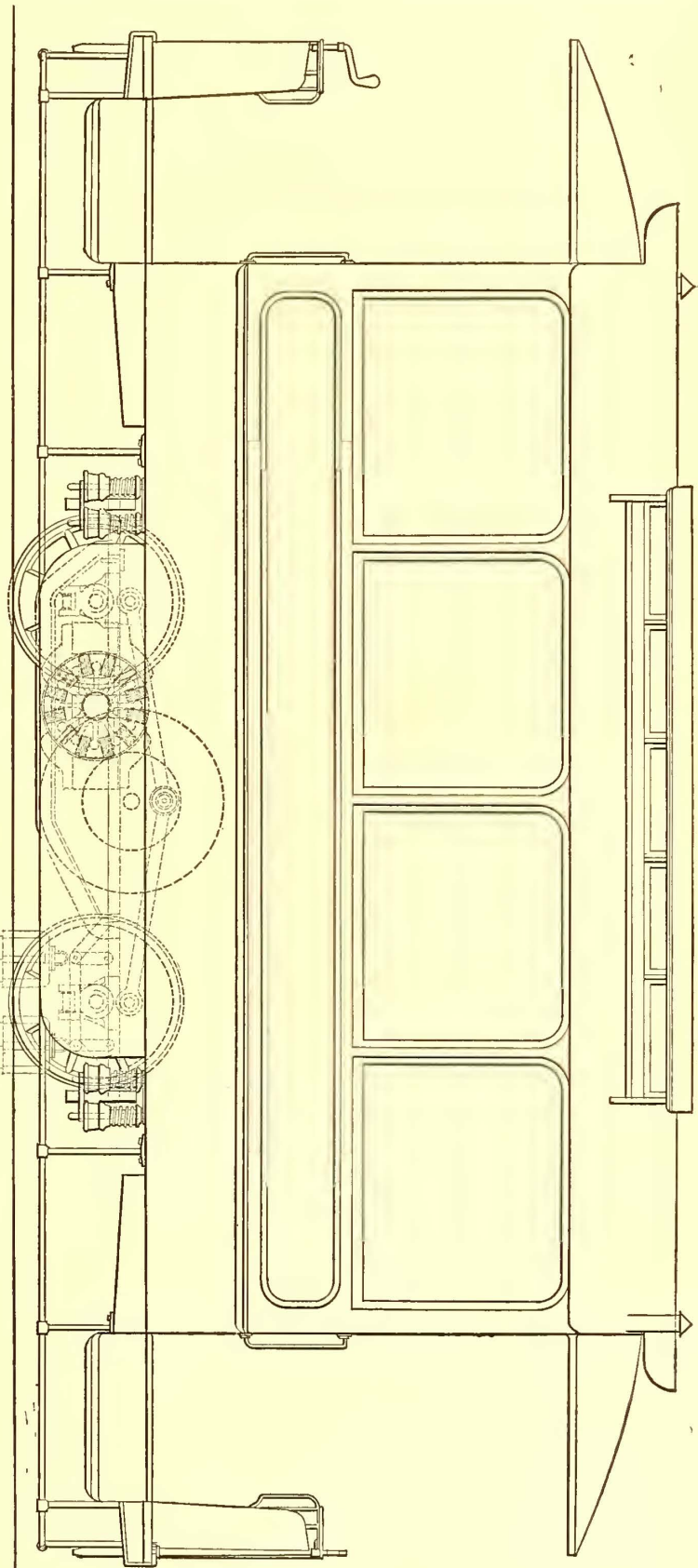
The Bentley-Knight system of electric motive power for tramways has been brought prominently forward by the grant of a franchise to the North and East River Railway Company, whose line runs through Fulton street, New York, to Wall and Pavonia Ferries, in which franchise this system is expressly named.

The patents of the Messrs. Bentley and Knight, who were for years electrical examiners in the United States Patent Office, are especially applicable to the use of electricity in the paved and sewered streets of cities, where the exacting requirements of municipal authorities and of heavy traffic must

ped car in side elevation and section. The motor and all mechanism is carried by the street truck-frame which form a rigid connection between the wheels (see cuts 3 and 4), allowing any type of car-body to be used and making it easy to change from closed to open bodies whenever desired.

are interchangeable, reduced to the utmost simplicity, noiseless in operation and built of exceptional strength, the motors especially being of a new and improved form, giving great durability and efficiency. The government of the motor is effected by means of the ordinary brake handle, so

FIG. 2. SIDE VIEW OF CAR.





that in the act of putting down brakes, the motor is automatically cut out before the brakes are set, and after the latter are released the motor is again brought into service. A car can be reversed at any time.

There is no complication of levers or

These plows can be thrown out of the conduit at will at any point in the line and fold up under the car. They also are automatically thrown out at any time by meeting an irremovable obstacle and can be replaced at once without injury to themselves or the conduit. In no way can any part of

ing or attention in any way and the facility with which the small conduit can always be kept entirely clean, are strong recommendations.

The great advantages of the electric system are

1. The cost of first construction and

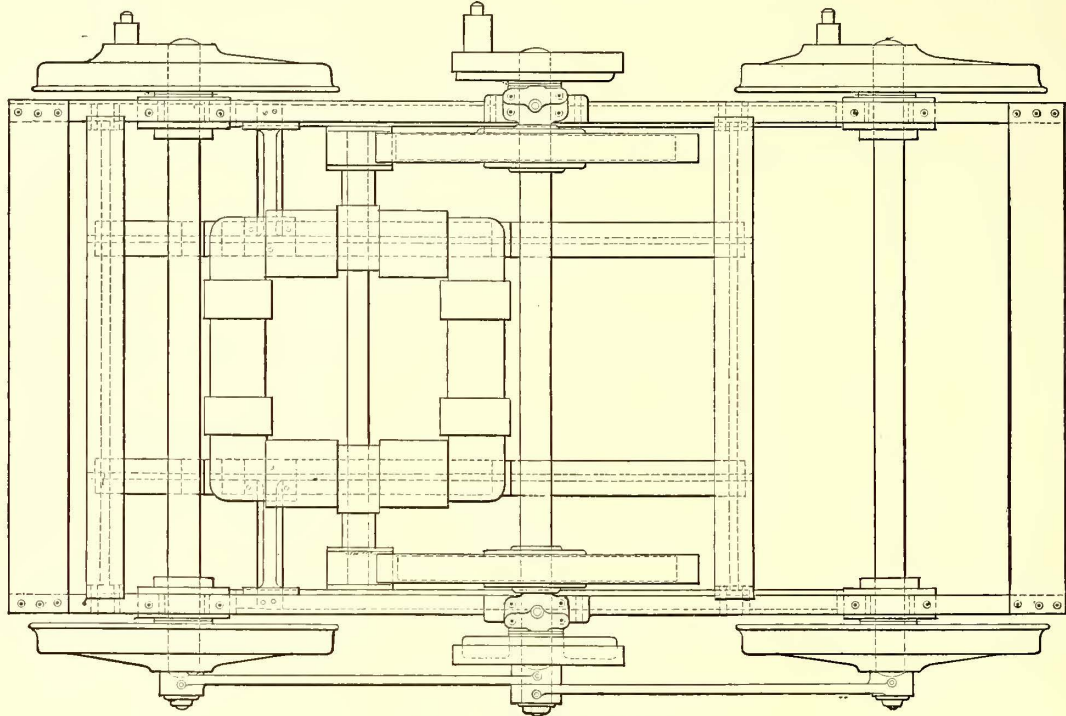


FIG. 3. PLAN OF TRUCK.

handles and the ordinary car driver is fully competent to do all that is required. Direction and speed are controlled from either platform, the driver removing the brake handle from one spindle and attaching it to the other when he reaches the end of the route.

Power for the cars is generated at a central station, which can be placed on or off

the plows get stuck in the conduit to obstruct succeeding cars. They are supported on transverse axes and swivel joints, giving full lateral and vertical play as well as enabling them to run easily around any curves, and are protected from possible injury by hardened steel wearing guards and plates. All wear on the plows is taken up by these guards and by the chilled cast

plant is less than any other mechanical tramway motive power.

2. Each car is absolutely independent of every other in every way.

3. There is no limitation upon the speed of any individual car. Time lost by "blocks" can be caught up easily.

4. There is no waste of power when only a few cars are in operation. Neglecting in-

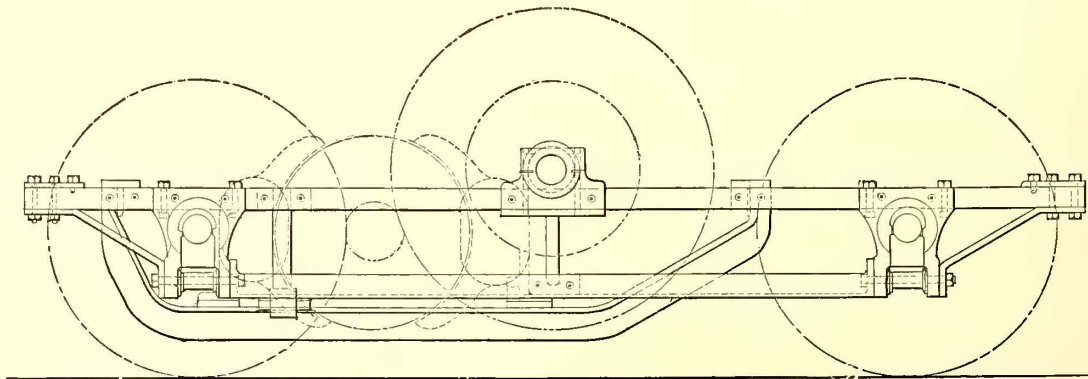


FIG. 4. SIDE VIEW OF TRUCK.

the line of the road, wherever property and fuel can be most cheaply obtained. Thence it is carried along the line by conductors contained in and protected by a sub-surface conduit (several types of which are shown in our cuts). Connection between the motors on the cars and the conduit conductors is maintained by plows which, passing through a  $\frac{5}{8}$ " slot in the conduit, slide along in frictional contact with the stationary conductors under the street surface.

iron contact shoes, which stand weeks of constant use, are replaced easily, and cost very little.

The conduit is kept always clean by brooms attached to some of the cars which sweep the snow and dust into catch-pits having sewer connections. The latest type of conduit, such as will be used in Fulton street, is only  $13\frac{1}{2}$  inches deep and  $25\frac{1}{2}$  inches wide, outside measurements (see cut). The absence of all parts needing oil-

terest on first cost, one car can be run alone with almost the same economy as if 40 were on the line.

5. The conduit can always be effectually cleaned and needs no attention.

6. Corners can be turned, drawbridges crossed, switches, turnouts, sidings, branch and cross roads, single tracks, etc., worked with ease and economy.

7. No skilled labor is required in the cars.



8. Lines can be extended at any time to any length without difficulty.

9. Only a small reserve power is required at the central station, as any engine or dynamo can be cut out for repairs and the others slightly speeded up to take its place until it is again ready for work.

The following estimates have been carefully prepared and are approximately accurate for our larger cities.

ESTIMATES.

The following estimates are all made for a road 5 miles long, double track, operating 40 cars. Average speed, 6 miles an hour. Headway, 2½ minutes. Maximum grade, 5 feet in 100. Sixteen full running hours per day.

AVERAGE PRICES FOR NEW YORK CITY.

TABLE A.

Electric tramway. B.-K. system. Construction and equipment.

Track, 10 miles @ \$7,000.....	\$70,000.
Cars, 40 @ \$650.....	26,000.
Conduit, 10 miles @ \$20,000.....	200,000.
Steam power plant.....	20,000.
Dynamo plant, 8 50-H. P. dynamos @ \$2,500.....	20,000.
Motor trucks, 40 @ \$1,200.....	48,000.
Building and foundations.....	10,000.
Engineering.....	10,000.
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	\$404,000.

TABLE B.

Electric tramway. B.-K. system. Annual running expenses.

Coal, 8½ tons per day @ \$2.50.....	\$7,756
Engineer \$2.50 and assistant \$1.50.....	1,460.
Firemen, 2 @ \$1.50.....	1,095.
Wear and tear 4% of \$494,000 (Table A.)....	15,760.
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	\$26,071.
Interest 6 per cent of \$404,000 (Table A.)....	24,240.
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	\$50,311.

TABLE C.

Horse tramway. Construction and equipment.

Track, 10 miles @ \$7,000.....	\$70,000.
Cars, 40 @ \$800.....	32,000.
Horses, 400 @ \$150.....	60,000.
Building.....	40,000.
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	\$202,000.

TABLE D.

Horse tramway. Annual running expenses.

Feeding, replacing and caring for 400 horses @ \$219 per year.....

	\$87,600.
Wear and tear 5 per cent of \$142,000 (Table C.)....	7,100.
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	\$94,700.
Interest 6 per cent of \$200,000. (Table C.)....	12,120.
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	\$106,820.

TABLE E.

Cable tramway. Construction and equipment.

Track, 10 miles @ \$7,000.....	\$70,000.
Cars, 40 @ \$900.....	36,000.
Conduit, 10 miles @ \$40,000.....	400,000.
Steam power plant.....	25,000.
Curves.....	8,000.
Driving machinery and sheaves.....	7,500.
Building and foundations.....	10,000.
Engineering.....	10,000.
	<hr/>
	\$566,500.

TABLE F.

Cable tramway. Annual running expenses.

Coal 10½ tons per day @ \$2.50.....	\$9,581.
Engineer \$2.50 and assistant \$1.50.....	1,460.
Firemen, 2 @ \$1.50.....	1,095.
Oiling, 2,000 sheaves.....	4,000.
Maintaining plant 4 per cent of \$543,300 (Table E.)....	21,732.
Maintaining wire rope.....	13,200.
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	\$51,068.
Interest 6 per cent of \$566,500.....	33,990.
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	\$85,058.

TABLE G.

Changing from horse to electric, B.-K. system. Cost of change and equipment.

Conduit 10 miles @ \$20,000.....	\$200,000.
Steam power plant.....	20,000.
Dynamo plant.....	20,000.
Motors.....	48,000.
Engineering.....	6,000.
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	\$294,000.

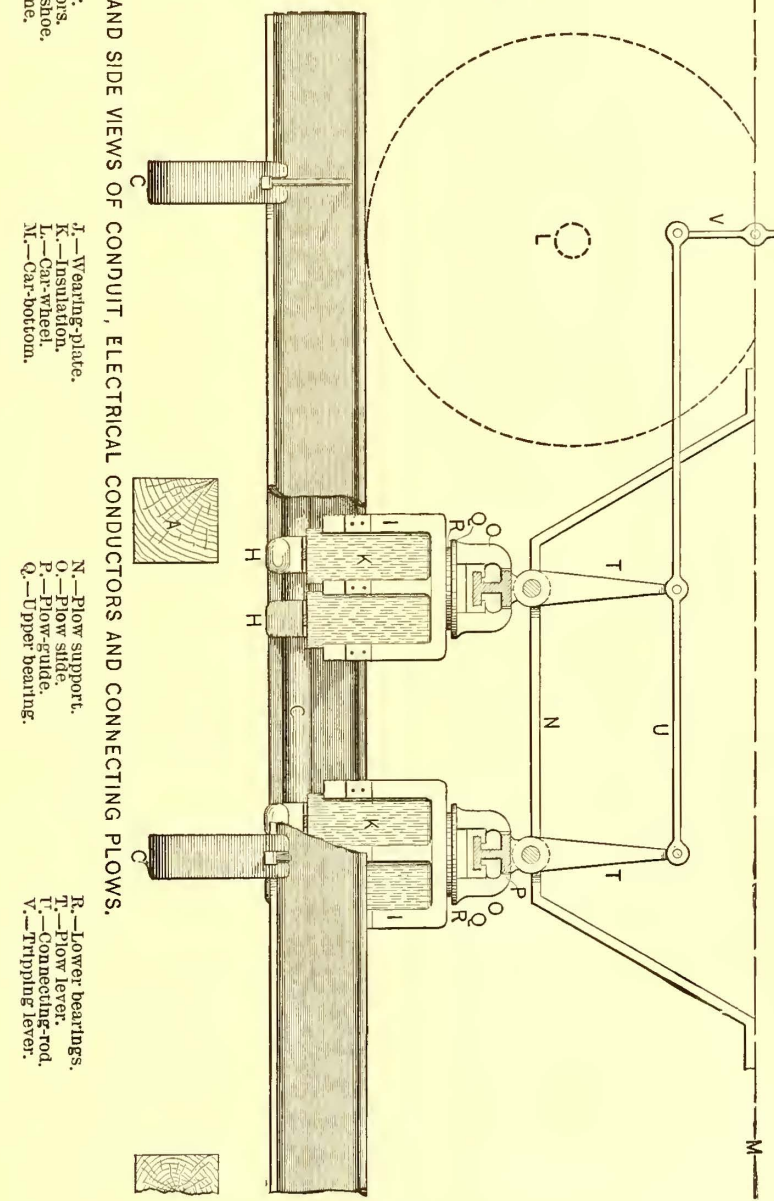
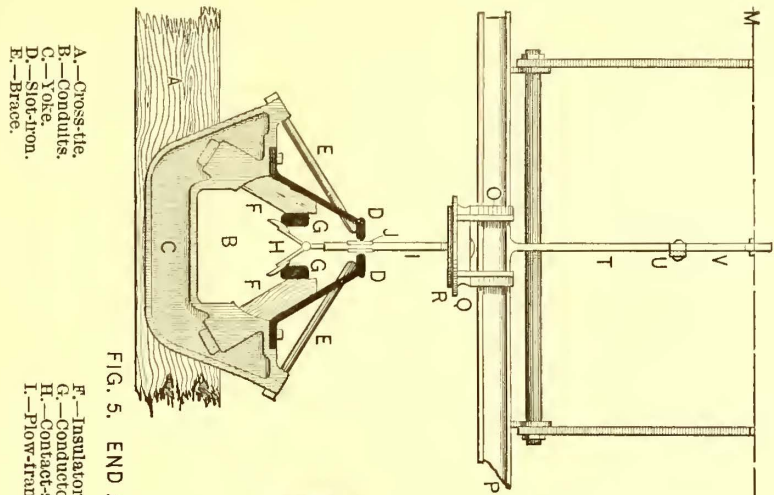


TABLE H.

Road changed from horse to electric, B.-K. system. Annual running expenses.

Coal 8½ tons per day @ \$2.50.....	\$7,756.
Engineer \$2.50 and assistant \$1.50.....	1,460.
Firemen 2 @ \$1.50.....	1,095.
Wear and tear 4 per cent of \$430,000.....	17,300.
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	\$27,511.
Interest on cost of change, 6 per cent of \$294,000 (Table G.).....	17,640.
Interest on first cost of horse tramway 6 per cent of \$202,000—\$60,000 (price of horses) \$142,000.....	8,520.
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	\$53,671.

TABLE I.

Changing from cable to electric, B.-K. system. Cost of change and equipment.

Conductors, 10 miles @ \$1,000.....	\$10,000.
Insulators.....	9,600.
Dynamo plant.....	20,000.
Motors.....	48,000.
Engineering.....	2,000.
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	\$89,600.

TABLE K.

Coal 8½ tons per day @ \$2.50.....	\$7,756.
Engineer \$2.50 and assistant \$1.50.....	1,460.
Firemen 2 @ \$1.50.....	1,095.
Wear and tear, 4 per cent of \$618,600.....	24,744.
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	\$35,055.



Interest, 6 per cent of \$89,600 .....	5,376.
Interest on first cost of cable tramway 6 per cent of \$566,500.....	33,990.
	\$74,421.

SUMMARY.

Cost of construction and equipment.

Electric tramway (B.-K.) (Table A.).....	\$404,000.
Horse tramway (Table C.).....	202,000.
Cable tramway (Table E.).....	566,500.

Cost of change and equipment.

From horse to electric (B.-K.) (Table G.)....	\$294,000.
From cable to electric (B.-K.) (Table I.).....	89,600.

Annual running expenses.

Electric tramway (B.-K.) (Table B.).....	\$50,311.
Horse tramway (Table D.).....	106,820.
Cable tramway (Table F.).....	85,058.

Annual running expenses of changed roads.

From horse to electric (B.-K.) (Table H.)....	\$53,671.
From cable to electric (B.-K.) (Table K.).....	74,421.

For suburban roads or for lines in towns or villages where there is no objection to the use of exposed conductors, the company will supply elevated conductors, the cost of which is not more than \$2,000 per mile, a great economy over the conduit system. Motors of sufficient power to tow trains of two, three or more cars can also be supplied where desired and the expense

first cost. Regarding the feasibility of a cable system on Eighth avenue, the engineer found that, in spite of the objections to running cars around the curves at Bank and Vesey streets and through the crowded lower sections of the city, there really are no reasons why the change should not be made. Cable cars are run around sharp curves and through crowded streets elsewhere, and whatever difficulties might arise in New York could, no doubt, be overcome by practical engineering skill. The report suggests that two stations for cable motive power be built, one at Abingdon square and the other at 100th street. This would divide the road into four sections, each with its own cable. The speed on the different sections could thus be regulated in a measure. Down-town it could run at a rate of five miles an hour, and up-town at twelve.

ESTIMATED COST OF CABLES.

The engineer then proceeds to calculate upon the cost of converting the Eighth avenue line to a cable road. The length of the road is 50,000 feet, or 9.47 miles. The estimated cost of construction per mile is as follows:

than 20 per cent in decreased expenses. In this computation, too, no account is taken of the value of the rails, horses, etc., now owned by the company, which certainly would make a material difference in the cost of making the change.

"OTHER EXPENSES."

A noticeable feature of the report is the fact that after he has all the expenses for the legitimate operation of the road, he adds another sum, which apparently is not connected with the real conduct of the road, and calls it "other expenses."

The officers of the Eighth avenue line do not look favorably upon the cable system, notwithstanding the enthusiastic report of their engineer. Superintendent Wilson said he did not believe a cable road was practicable in New York city. "If they would surrender entire streets to us, so that we could run on without interference from trucks and danger to pedestrians, it might be all right. But I shouldn't consider it at all safe under present circumstances. It has been suggested that we might put a flagman at every corner. That wouldn't do any good. We would be ob-

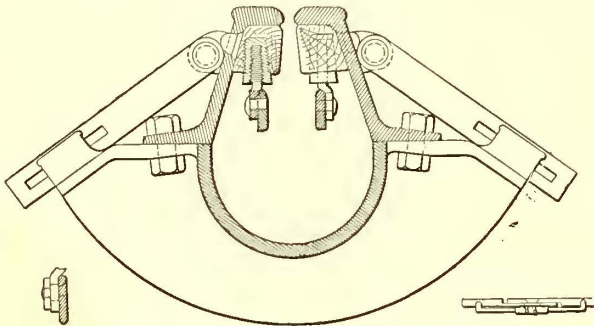


FIG. 6. CONTINUOUS CABLE CONDUIT.

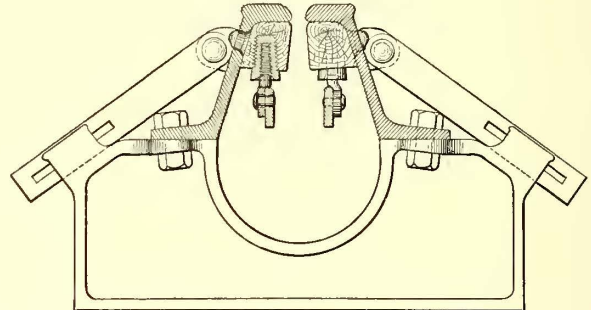


FIG. 7. YOKE TO BE USED WITH CONCRETE CONDUIT.

of individually equipping each car and of extra conductors and drivers during "rush" hours thus avoided, as is done in the cable system.

On application at the company's offices, 115 Broadway, full estimates, drawings, etc., will be forwarded.

Cabling the Eighth Ave. Line in New York.

Several months ago the President of the Eighth avenue surface street railway employed a civil engineer to investigate cable railways and report on the feasibility and expense of converting the Eighth avenue road into a cable system. The report of the engineer has been submitted and is exceedingly interesting.

The engineer visited all the cable roads in the United States, and carefully examined their workings. There are, he says, eighty-seven miles of such road in successful operation. The mechanical devices in use on all the roads are nearly the same, and have been brought to such perfection that the breaking or wearing out of one fiber of the cable is quickly detected. The damage can be repaired in a few minutes. The best cable roads are provided with two cables and double sets of motive machinery to provide against accidents, although such provisions, of course, greatly increase the

Two tunnels, \$5.70 per foot.....	\$30,960
Yokes.....	15,785
New tracks.....	8,560
Splice plates.....	176
Slot rail.....	7,040
Joints.....	5,280
Pulley.....	2,561
Paving.....	13,500
Hangings.....	6,336
Total.....	\$84,500
9.47 miles at, say, \$83,000 a mile.....	\$804,950
Two buildings for engines, etc.....	150,000
Two sets of machinery.....	146,000
Seven curves.....	12,500
Total.....	\$1,113,450
Sixty cars at \$900 each.....	\$54,000
Engineers' fees.....	25,000
Contingencies.....	59,620
Total.....	\$1,252,072

OPERATING EXPENSES FOR ONE YEAR.	
Engineers, firemen and assistants at two engine houses.....	\$26,070
Coal.....	12,000
Waste.....	2,400
Oil.....	3,000
Water.....	2,500
Machinists, etc.....	42,157
Gripmen, brakemen, conductors, switchmen, trackmen, inspectors, etc.....	186,150
New cable.....	20,091
Total operating expenses.....	\$294,373
Present capital of road.....	\$1,000,000
Added investment for cable road.....	\$1,250,000
Five per cent on \$2,250,000.....	\$112,500
Expenses.....	300,000
"Other" expenses, as from report to railway commissioners.....	75,000
Total.....	457,500
Present expenses of the road.....	618,009
Balance in favor of cable system.....	\$130,500

That is to say, after allowing five per cent on the old capital and the added investment necessary for the cable road, there would still be an advantage of more

liged to have a flagman every two feet if we wanted to be safe. In Chicago they used to kill somebody on the cable line nearly every day, and Chicago streets are three times as wide as New York streets and not half as crowded. Then, look at the expense. It would require an investment larger than the whole capital stock of the road, and when we got done we couldn't tell whether the line would be allowed to work or not. I don't think any road in the country would be in a hurry to make a change under such circumstances. I haven't much faith in cable roads or electric motors as yet. I guess we'll have to stick to plain everyday horses for a while."

SEE that your road is properly represented in the Street Railway Directory. This directory is fast becoming the standard, and it is quite essential that it be accurate even in small details. If you have more or less cars than are given, we would like to know it.

If you will send us the names of any parties who are interested in new street railways, or projected street railways, we shall take pleasure in sending them a sample copy of the STREET RAILWAY JOURNAL. The first requisite, after a franchise, is to have the JOURNAL on file.



**Vail Car Starter.**

The principle upon which the starter operates is that of causing the horses to revolve the wheel before they really put any draft on the body of the car at all. In order to accomplish this the device shown in the accompanying engravings is used. It consists primarily of a ratchet wheel placed upon the axle of the car and so arranged that a pawl can be dropped in it, when the drawbar is drawn out in the direction in which the car is moving. Fig.

arm, reaching out and attached by means of a rod to a drawbar which has a very long reach or travel before it will make a direct pull upon the car itself. In the forked lever, which has its bearings upon either side of the machine, will be found a tilting plate, shown in Fig. 6, and a pawl which is shown in all the engravings, and so arranged that the lever marked *F'* is slightly raised when the bar is drawn somewhat forward.

The lever *F*, it will be seen, has a slotted arm with a catch at one end into which the

movement of the drawbar causes the lever *C* to turn forward and of course causes the pawl to turn the ratchet wheel and start the car.

The object of the invention, therefore, is simply to give the horses a leverage over the axle of the car and allow them to start the latter by turning the wheels. After the drawbar has reached the full extent to which it can be drawn, and the spring at the forward end brings a direct pressure upon the body of the car, the pawl will be released from the ratchet wheel, or in case the wheel should move more rapidly than the pawl is being carried forward the latter will be snubbed out of the ratchet and springs back into its position of rest. After the car is once in motion the pawl is thrown out of place and does not come into play again until the car has been stopped.

**Baths for Horses.**

The Cosmos describes an invention which has been introduced among certain regiments of the French cavalry which will be exceedingly interesting to many of our readers. It is a bath for horses. In all establishments where they have a large number of horses they are in the habit, in France, of bathing them in a regular and systematic manner, but oftentimes it has been found very difficult to overcome the obstacles that are raised by the distance at which stables are situated from the course of streams and rivers. Horses that are in good health can, of course, be neglected, careful grooming followed by a sponge bath will supply the deficiency to a certain degree; but there are divers diseases of the foot that are very troublesome and that can be healed only by long soaking in water. A wound of the foot prevents the horse being moved, and some other method is necessary. Separation from a stream of water renders the method inapplicable under circumstances where it is most necessary. The baths of which we speak are complete, and are made of flexible and impermeable tissue. It is a kind of sack which is slipped under the feet, then the sides are raised up so the animal is completely imprisoned, and then it only remains to pour in the liquid. A cock in communication with a source of water allows it to flow into the bath and the water rises little by little without frightening the animal. Furnished with rings at its upper part, this sack is suspended by cords from the ceiling of the stable. They cover the bottom with straw and put shackles upon the feet in order to prevent sudden or violent movements. Something of the same style is designed in cases where only a local bath is required, as for one of the legs. They then insert it in a sort of sack made of this impermeable tissue, and a surcingle or girth holds it in position. The top is furnished with sheet metal and towards the upper portion there is an opening so that it can be seen when it is full. By this arrangement it is possible to run a stream through the sack and produce the same effect as though the bath were given in the river. The same arrangement can of course be used in giving horses additional baths with antiseptics or other lotions.

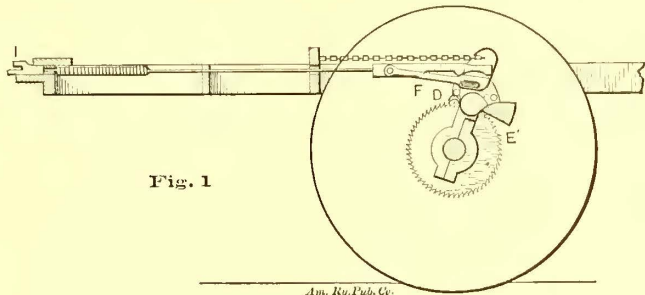


Fig. 1

*Am. Reg. Pub. Co.*

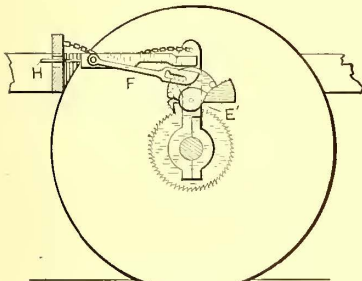


Fig. 2

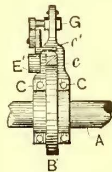


Fig. 3

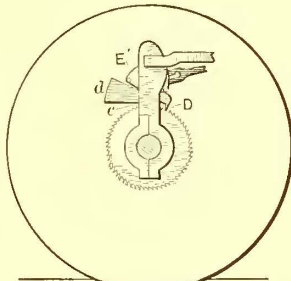


Fig. 4

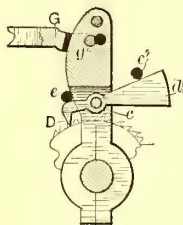


Fig. 5

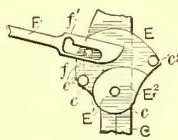


Fig. 6



Fig. 7

**THE VAIL CAR STARTER.**

1 shows the apparatus with the car at rest and in side elevation. Fig. 2 is the same, showing the apparatus midway in its action. Fig. 3 is the rear elevation. Fig. 4 is a side elevation from the opposite side. Fig. 5 is a sectional view of the side elevation. Fig. 6 is an enlarged detail of the tumbler or tilting plate. Fig. 7 is a plain view of what is called the tilting plate.

The ratchet wheel shown in the engraving is keyed rigidly to the axle, and straddling it is a forked lever having bearings upon the axle and extending up and held in position by a chain and attached to one of the cross timbers of the car, as shown. From this upright lever there is a forked

pin drops when the apparatus is attached, as shown in Fig. 1. It will be seen in Fig. 5 that there is a bolt *g'* in the lever arm *G* which is fitted in a slot in the upright arm pivoted to the axle. With the first forward movement of the drawbar in starting the car this pin moves along the slot without moving the lever *C* at all. Then by reason of the pin which is caught up in the hook of the slot in the lever *F*, the tumbling plate, etc., is turned somewhat forward and depresses the end of the pawl, causing the latter to catch in the ratchet wheel. This occurs just as the bolt marked *g'* reaches the forward end of the slot in which it runs, after which the forward



### Ryland's Cable Grip.

This device consists of a grip having the outer edges hinged or journaled in a frame work and with the inner edges formed to hold suitable shoes which are adapted to grasp the cable when the edges of the jaws are moved together. In connection with these jaws are adjustably flanged rollers which serve to pick up the cable and direct it so it may be grasped. The construction of the grip will be readily understood by reference to our engraving. Fig. 1 is a side and Fig 2 an end elevation and Fig 3 a plan of the device.

The gripping jaws are made long in the direction of the cable and indicated by the letter *A* in our engraving. They are hinged, as we have already said, on the outer extremity in the transverse bars marked *E*. These bars are fixed, as shown, to the guides or standards *C*, which extend upward through a slot and are rigidly attached to the car. The inner edges of the jaws are provided with semicircular shoes, which are curved so as to fit over the cable and grasp it tightly when they are brought together. To the inner edges of the jaws are attached the links *E*, which are also attached to the sliding bar *D* which runs between the two rigid portions of the frame. It will be seen then by raising or lowering this sliding bar the jaws will be brought together, and upon the principle of the knee joint, the nearer they are brought to a horizontal position the greater will be the pressure brought to bear upon the cable, which lies between them. When they are released they will drop down, automatically letting go of the cable.

In order to assist in picking up the cable and prevent it from dropping entirely out of the jaws whenever it is desired to slacken the grip, the rollers *G* are fixed to the bars *H*. These bars are provided with the springs *K*, shown in the engraving, by which they are held together and thus when dropped prevent the cable from dropping away from the grip entirely and hold it in readiness to be grasped again when it is desired to start or move the car. They also act to lift the cable up into position to be caught by the jaws when they are brought together, as will be readily seen by examination of the construction.

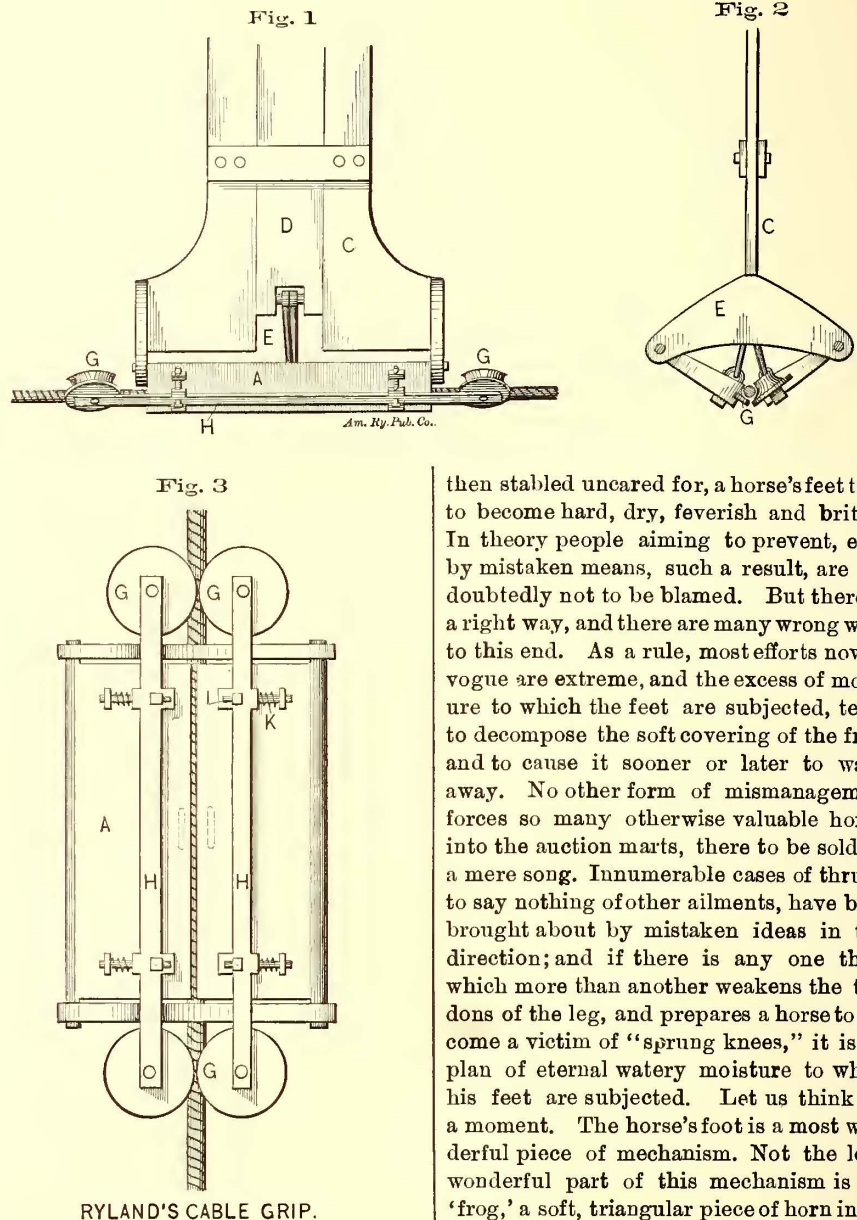
### The Care of the Hoof.

A recent writer in the Boston Herald brings out some strong points in regard to the care of a horse's hoof that cannot fail to be of interest to our readers. He says:

"A great many years ago a distinguished veterinary surgeon of France laid down the axiom: 'No frog, no foot; no foot, no horse.' The axiom has passed into all languages, and is certainly one of the sayings that no person will dispute. Everybody who has ever owned a horse, whether for work or pleasure, knows that a sound foot is worth a pair of sound legs, and that an injured or diseased foot impairs the value and utility of the entire animal. The proper management, then, of the horse's foot at

all times, in health or disease, ought to be a subject of the greatest interest to all horse owners. But in all books published upon this subject, it will be found that the teachings in regard to the management of the horse's foot are but the reflections or reiterations of what was asserted by authors of forty and fifty years ago. Earlier notions still prevail, and seem to possess the authoritativeness of gospel truth. But they are in reality the veriest nonsense.

pads, which are first to be soaked in water, and then inserted in the hollow of the shoe; wet sawdust, wet moss, wet turf, and the like. It is still further asserted by these self-same authorities, that a hard wood floor is productive of injury to the feet. The writer undertakes to say that a clean, wood floor has never yet injured a horse's foot, provided the foot was properly managed. But it is true that, when driven over a hard, dusty or muddy road, and



"The diseases of a horse's foot are many. And the question is, How may most of them be prevented? There are three points that must be considered: First, how to prevent the feet from becoming too dry; second, how to keep them properly moist; and third, how to manage the shoes. The first and second points will be treated together. All the older authorities lay down the rule that while standing in the stable, a horse's fore feet should be 'stopped,' either with cow dung alone, or with cow dung and clay. The purpose is explained to be, 'to prevent dryness of the feet.' The use of such substances being quite impracticable in city stables, various substitutes have been recommended, namely, patented feet

then stabled uncared for, a horse's feet tend to become hard, dry, feverish and brittle. In theory people aiming to prevent, even by mistaken means, such a result, are undoubtedly not to be blamed. But there is a right way, and there are many wrong ways to this end. As a rule, most efforts now in vogue are extreme, and the excess of moisture to which the feet are subjected, tends to decompose the soft covering of the frog, and to cause it sooner or later to waste away. No other form of mismanagement forces so many otherwise valuable horses into the auction marts, there to be sold for a mere song. Innumerable cases of thrush, to say nothing of other ailments, have been brought about by mistaken ideas in this direction; and if there is any one thing which more than another weakens the tendons of the leg, and prepares a horse to become a victim of "sprung knees," it is the plan of eternal watery moisture to which his feet are subjected. Let us think for a moment. The horse's foot is a most wonderful piece of mechanism. Not the least wonderful part of this mechanism is the 'frog,' a soft, triangular piece of horn in the middle of the sole toward the heel. In its healthy state, it is exceedingly elastic, and serves as a cushion to prevent concussion, and also to hinder the horse from slipping. The sole, frog, and lower border of the wall have all to come in contact with the ground and loose stones. Therefore, nature has furnished them with an abundance of horn to make them strong enough to bear the animal's weight, withstand wear, and keep the delicate parts from injury. Nature also secretes in the tissue around the foot an oily substance, emollient and lubricant, which assists in maintaining the healthful condition of the foot. Any interference, from whatever cause, with the free circulation of the blood in the extremities, stops or prevents this secretion and causes con-



gestion, inflammation and contraction to ensue. Now, water is one of the beneficent gifts of nature. But when applied to a horse's foot, it acts only as a cleansing agent, and it should be thus applied, never with any other end in view, in the state of health. Water furnishes no emollient qualities; it does not, even in the slightest degree, soak into, or beneficially affect the horn itself, but, when kept constantly applied, it does tend to decompose the soft covering of the horn, and to generate debility and disease.

"The argument is often advanced in favor of this continued wetting that a horse in his wild state never, for instance, has contracted feet, and that the moisture which he gathers from the fields prevents contraction. At first thought, such an argument seems plausible. But it so happens that the fields are not always wet. The dews of the morning cleanse the feet of the roving herd, and then the dews are dissipated, and for the rest of the day the animals wander at pleasure over the sun-dried earth. The feet keep well. The opposite would be the case if they were every day confined in a wet pasture. But, right here, people will say that the wild, roving horse is not the stable-fed horse, and that hence each must be differently managed. The writer assents to the first point, but not to the second. The changed condition of the animal in no way alters the nature of his feet, any more than a shoe covering the human foot changes the nature of the foot. If the Creator had intended that our horse's feet should be forever subjected, either in the stable or out of it, to moisture such as is artificially afforded by damp pads, wet clay, wet moss and the like, he would himself have placed in the mechanism of the feet, not secreting cells of oil, but cisterns of water. The only justification for the use of any of the artificial means thus mentioned is a morbid or diseased condition of the feet, under limited circumstances. What, then, is the secret of the proper management of the feet? Nature, who teaches us our last, as well as our first, lesson, responds in this case cleanliness.

"What ought to be done in order to keep a horse's feet sound and well? At night, when he enters the stable, brush his hoofs with a good, stiff brush, and use a foot hook, if deemed necessary. Then wash the feet with salt and water—cold in summer, moderately hot in winter. If occasion demands it—and it is demanded if the animal has had a hard day over rough or muddy roads—soak the feet in the salt water. No other treatment in the world is so beneficial. It removes all the accumulated dirt and stones, imparts vitality and strength, drives out the aching, tired sensations, and prepares the animal for a good night's rest. After this cleansing, wipe the feet thoroughly dry—the dryer the better. By so doing, you stimulate the secretion of the natural hoof oil, and this is the only moisture, so to speak, that the horse's feet require while in the stable. Having completed the grooming, you can

now lead the horse into his stall, on a clean, dry floor, with just enough dry litter in the daytime to cover it, and at night well supplied with clean bedding. This treatment is applicable to every horse, and the writer is firm in his conviction, based upon practical experience with sick and well horses, that a sound animal should never be otherwise treated. The salt water is easily prepared. A good plan is to keep a good supply of strong brine in the stable, adding a cupful to half a pail of water, hot or cold, as wanted for use.

"Thus far our remarks have been confined to the well horse. For further illustration, let us consider the case of a horse suffering from contraction of the feet. This so-called disease, which is not a disease at all, but only a symptom, is said to be 'the bugbear of horsemen.' Many a horse worth four or five times the money has been sold at auction at a nominal price, simply because he had contraction of one or both fore feet. A few grains of common sense at this time would mend the whole matter. But let us, as we said, consider one of these cases. If there is disease of the bone—navicular disease, which is exceedingly rare—and it has already passed into a state of ulceration, the chances of recovery are slim. But if there is no such disease, and the contraction is due to bad shoeing, or ill-treated founder, long exposure to damp, the trouble may readily be cured. Such a condition implies a sluggish circulation of blood in the foot, a retarded or perverted secretion of the naturally oily lubricant, and a consequent drying of the horn. It is a condition which affects the entire leg; the animal either goes lame or has a 'groggy' gait, and ere long we are forced to appreciate the truism, 'no foot, no horse.' What shall be done?

"Don't expect to accomplish a cure by keeping the feet constantly wet. Adopt in the main the following plan: Soak the feet every morning in the hot salt solution, dry thoroughly, and then apply to the hoof, inside and outside, the following ointment: Raw linseed oil, one pint; spirits of turpentine, half pint; oil of tar, 12 ounces; oils of wormwood and origanum, each six ounces; shake well before using. Every night apply the following stimulating lotion to the entire leg, and especially around and above the coronet, rubbing in well: Raw linseed oil, one pint; spirits of turpentine, half pint; aqua ammonia (strong), half ounce; oil of wormwood, half ounce. Mix these ingredients in an earthenware vessel, and add sulphuric acid, half ounce. When the mixture is cooled down, bottle it for use. The writer knows of no two more valuable remedies than these in the whole field of veterinary materia medica. The use of these simple, inexpensive remedies assists nature, and, in good season, the result shows itself. A new growth of the hoof, from above downward, will be soon discovered; the contracted heel will expand, and the unnaturally deep fissure of the frog will have become a natural, small and simple cleft.

"To sum up on this point: Did you ever wash your feet before going to bed? Try it

on the horse, and if he could speak, he would thank you. He would always thank you, too, for clean floors, clean litter, clean feed and clean air. As a cleanser, use salt and water; it is as cheap as dirt, and is as good for the whole body as it is for the feet and legs. After washing, dry thoroughly. For any disease that may already exist, use this and the allied treatments which have been suggested. Always bear in mind, also, this fact, some daily exercise out of doors. This plan will keep the feet sound and well, and in cases of contraction, grease, thrush, scratches and the like, the same plan, together with the judicious use of the remedies named above, will tend to hasten a rapid recovery. Cases will arise now and then demanding the removal of the shoes before beginning treatment.

"There are a few points in regard to horse-shoeing, which the writer would here emphasize, and first, that shoeing is a necessary evil, and alone justifiable in the case of horses driven over the macadamized roads and hard pavements of cities. Every mother knows that concrete pavements are frightful wearers-out of the shoe leather of her children. It is equally bad for the unshod hoof of the horse. Second, admitting that shoeing is an evil, there are some features about it, practiced by very many city farriers, which should be forbidden. The frog, braces, or bars, and the sole should never be cut away. These are as much a part of the healthy foot, as are the lungs a part of the healthy chest. When they have reached a certain thickness—about once a month—they flake off, and, as they have to come in contact with the inequalities of the earth, they should be allowed to retain their normal condition. Third, the front of the wall should never be rasped, for the reason that it makes them thin and brittle. Fourth, avoid 'clips,' as they are called, for they weaken the shell, and eventually may cause a quarter-crack. Fifth, avoid paring off the hoof, so as to produce unnecessary length of hoof at the toe. These long toes tend to produce strain on the flexor tendons and other parts, and a type of unsoundness and lameness may ensue. Lastly, use shoes as light as possible, fastened on with as few nails as will retain them. They should fit the foot, and be applied invariably without heat."

#### Iron Poles for Electric Wires.

T. William Harris, contracting engineer, of Boston, Mass., is engaged in setting a large number of wrought iron poles for the Harlem Electric Light Co. These poles are only four inches in diameter at the bottom and two and three-fourths at the top. They are to be nicely painted and the most particular of the property owners make no objection to their erection.

This style of pole is particularly adapted for the purpose of carrying wires for electric railways, as it presents very little surface to the action of the wind and is really ornamental.

Subscription after May 1st will be \$2.



## Electric Street Railroads.

BY GEORGE W. MANSFIELD.

Why should we prefer electricity as the propelling agent of our street cars over all other known methods? I answer, without hesitation, Because it is the best, and being the best is the cheapest. Briefly I will present the grounds upon which I take my stand.

To-day the only methods for tramway service are three in number: Horses, with a history of 50 years and over; cables, with a history of 15 years; and electricity, with a history of two years. I give the latter two years on the basis of the oldest electric street railroad in existence to-day, and that is the Baltimore railroad, equipped with the Daft system.

The main points for consideration common to each are six in number:—

- 1st. Obtaining of franchise.
- 2nd. Construction of buildings, viz., engine house or stable.
- 3rd. Equipment—rolling stock, horses, engines and dynamos.
- 4th. Construction of tramway.
- 5th. Cost of operation.
- 6th. Individual characteristics and advantages.

Each of these requires a paper by itself, but in as concise a way as possible, presenting only the salient reasons and figures, I shall endeavor to embody it in one.

### 1st. Obtaining of Franchise.

I assume the municipal officers and the promoters honest men.

It is the universal settled conviction that a street car propelled with certainty and promptness by mechanical means is infinitely to be preferred to horses. Hence if this guarantee can be given there need be no fear from the other side of the house. Years of experience prove that this guarantee can be given.

The mechanical methods are Electricity and the Cable. To suit local conditions the former has three general applications—overhead, underground and accumulator systems; while the latter has but one, the underground. Hence the former, electricity, has three chances to the latter's one to meet the whims, opinions, or decisions of municipal authorities. Other advantages accruing from mechanical methods are cleaner streets, absence of noise, quick time, no blockades, no stables accumulating filth and breeding pestilence, and lastly the great moral sympathetic feeling for man's most faithful and valuable servant, the horse. These all are directly in favor of obtaining the right franchise.

The three general ways of obtaining the same are a definite payment of cash to the authorities, a guarantee of an annual payment of a certain per cent of the earnings, and lastly a combination of the two. For the city or town the latter way is the safest, and the best all things considered. As electricity is mechanical, and as it can be shown that it is the cheapest to construct and most economical, and has three chances to operate, it stands by far the most likely to obtain the franchise.

### 2nd. Construction of Buildings.

The governing factors under this head are the local land valuation and tax. The system necessitating a spread-eagle policy on the land question will cost. What could be a more perfect illustration than the horse railroad system? The motive power of the New York Central Railroad between New York and Albany could be comfortably stowed in the barns of some of the New York City street railways. What a contrast. The real estate, buildings and fixtures of the Third ave. line are valued at \$1,524,000, and what buildings! Cattle sheds in the metropolis of America. Surely they did not cost a tithe of this great sum. What did? The land, A whole block and more. Henry George advocates might find food for thought here. All this is true of the other lines in every city in the union. Enormous expenditures for land. A good one-half of their capital sunk in purchasing the necessary room. Go where you will, a good 50 per cent of the capital is used for land for their stables. This obviously does not include equipment.

How is it with mechanical systems? The land is one of the minor considerations. The last thing considered.

Let us look at some figures. From careful examination of many engine plants, considering the ratio between a certain number of horses with their necessary adjuncts and a steam plant of numerically equal power, I find it stands as 1 to 30. That is, a steam plant complete of 30 H. P. capacity would need only one-thirtieth the floor space of 30 horses. With larger powers this ratio is still greater, and from one estimate I found that it stood as 1 to 108, *i. e.*, for horses I should have to have 108 times more floor space than for an equal number of mechanical horse power. It must be remembered also that the mechanical horse power is 50 per cent greater than the best animal horse power.

From one maker, taking the engine alone, I found that a rated 100 H. P. engine, guaranteed in every particular, would have ample room in the stall for one horse in the average stable. Another instance showed that I could get a steam plant complete, engine, boiler, etc., of 50 H. P., in a space 5 by 6 feet, which is smaller than the average stall. Here is shown the enormous saving in land purchase.

For car room a building several stories high would answer perfectly, since quick hoisting elevators could be put in and the tracks on each floor have wire connections with the dynamos, so that the cars could be run across the floor to where you please, facilitating storage and dispensing with handling. This would not be possible with the cable.

Comparing electricity and cable on this point, all things favor the former clearly and beyond all question. Furthermore, if locality so favored, the subject of land purchase for electricity could be tabooed entirely, since distance can be so readily overcome. Way out in the suburbs or back in the country by the side of some waterfall, your station might be, whilst the current

is sent to the great city over heavy conductors. Here land rent or tax would be at the minimum. With horses or cable plainly proximity must be had. It is estimated that the land occupied by the Madison avenue line of New York City is worth the cost of 40 miles of ordinary double track.

### 3rd. Equipment at Station and Rolling Stock.

The rolling stock would be in each case approximately the same. Consisting of cars of equal seating capacity, the difference of cost would be the necessary attachments for the mechanical systems.

A first-class 16-foot horse car costs \$1,200;

A first-class 16-foot cable car costs about \$1,800; and

A first-class 16-foot electric car costs about \$2,200.

Rates: Electricity, 1; horse, .54; cable, .81.

I believe, however, that the mechanical system is bound to work material changes in car construction, in fact 'tis almost imperative. In all probability a car with 15 to 20 per cent greater seating capacity than the horse car, can be constructed on a different plan for the price given for the electric car. This price, it must be noted, is the one for attachment of motor to the present horse car. The horse cars produced to-day are most carefully planned, thoroughly built and admirably adapted to their service, but the inexorable law of progress decrees their extinction, for something better.

Motive Power. To represent clearly the costs, etc., of the three systems under this head, let us assume a road. Take, if you please, a double line 6 miles long, and operating 24 cars with speed of 6 miles an hour, and running 20 hours out of 24. This would call for 48 horses on the track and 192 horses in the stables, or a total of 240 horses; at \$160, counting harness, etc., this would cost \$38,400.

With electricity we will proceed as follows:—The weight of car with 30 passengers and motor attachments would be about 9,000 lbs. It is easily calculated that to propel the same at the specified rate on a level would take about 1.75 H. P., a total of 42 H. P. To make allowances for grades we can calculate that, if the entire road was one gradient of three per cent, each car would take about 6.4 H. P., or since only 12 are going up, a total of 76.8 H. P. It will be fair now to take the average of these two, or 59.4 H. P. for an average road. Allowing 35 per cent loss from engine to work done in actually propelling car, we would have to have 91.3 H. P. Allowing a good safety factor, it would be well to put in a 150 H. P. plant. This would cost complete \$7,000; necessary dynamos, \$3,500. Among these figures should be counted cost of conductor of sufficient size to allow of but 3 per cent in energy to overcome its resistance. This I have calculated using a potential of 600 volts; and find that the total cost of 6 miles copper conductor is \$16,000 with above conditions. The total cost is now seen to be \$26,500.

As to cables, since the recovery of energy



available for tractive purposes is but 35 per cent, then the engine of 169 H. P. represents what must be had. Allowing a generous factor of safety, let us say that a 250 is all sufficient. This would cost complete and erected about \$12,000. The cable would cost \$15,000 and gears, etc., \$8,000, making a total of \$35,000.

The ratio of the three systems stands: Electricity, 1; cable, 1.09; horse, 1.45.

4th. Construction of Tramway.

Figures upon this point must necessarily be either averages or approximations. The nature of the locality socially, naturally, and we grieve to say it, politically, have a strong influence upon its construction. Estimating on single track only, a horse road would cost as an average \$9,000 per mile. With electricity we have several methods we can avail ourselves of: Surface, costing about \$10,000; overhead double conductor, \$15,696; underground, \$23,500.

With cable but one method, the underground, is possible. This cost is variously estimated at from \$30,000 to \$110,000 per mile; however, the latter figure is excessive. A fair average would be \$35,000.

The ratio of constructions could be fairly placed as follows, putting electricity as 1, by taking the average of the three methods at \$16,732: Horse road, .53, cable, 2.09.

Unquestionably a great majority of roads of the past have not been constructions of engineering, and of all places requiring care, skill and engineering the street roads are the places.

5th. Cost of Operation.

A fair figure for cost of one horse for one year is \$220.

For electricity, allowing 35 per cent loss in transmission, etc., 1.54 H. P. would be the work done by engine to get 1 H. P. on the track. There are to-day plenty of steam plants producing 1 H. P. for work at from \$30 to \$50 per annum. Take the average, \$40. With electricity then \$65 would well represent the price of producing 1.54 H. P.

With cable these figures would hold true, but more work is required. A greater loss is entailed. Since but 32 per cent is recovered, the figure for 1 H. P. on the track would be 2.86 H. P. At the above rates this would be \$110 per horse power per year.

Our ratio here is: Electricity, 1; cables, 1.71; horses, 3.38.

This is by no means the whole of the story, for just here must we compute the depreciation and hence repairs due to time. Let us take the road figured on heretofore, and make three tables.

In the following I have under each system taken the estimated costs, allowed a fair per cent for depreciation, summed up and obtained the ratios.

Any figure then like interest, etc., which would not affect ratios, I have omitted.

ELECTRICITY.

Conductors, 1 per cent,	\$160.00
Engine and dynamos, 5 per cent,	525.00
Cars, 10 per cent,	5,280.00
Roadway, 10 per cent,	2,007.00
Total	\$7,972.00

HORSES.

Horses and appurtenances, 20 per cent,	\$7,780.00
Cars, 10 per cent,	2,880.00
Roadway, etc., 10 per cent,	3,500.00
Total	\$11,740.00

CABLES.

Cable, 50 per cent,	\$7,500.00
Engine and boiler, etc., 5 per cent,	1,000.00
Cars, 10 per cent,	4,320.00
Roadway, 10 per cent,	3,500.00
Total	\$16,320.00

These totals put in ratio are as follows: Electricity, 1; cable, 2.04; and horses, 1.47.

Placing all the ratios obtained in a table, we have the following:—

	ELECTRICITY.	HORSES.	CABLE.
Depreciation,	1	1.47	2.04
Operating expenses,	1	3.38	1.71
Construction of tram'way,	1	.53	2.09
Motors, cars, etc.,	1	1.63	1.21
Cars,	1	.54	.81
Totals	5	7.55	7.86
Average	1	1.51	1.57

Now this table must stand by itself for what it represents, and no more. It will be noted that I have not introduced the subject of men. This would unquestionably show favorably for both electricity and cable. Again, note please that this table does not represent your profits exactly as per ratios. I have to get them operated the same number of cars and under the same headway. Now with either electricity or cable a higher rate of speed can be maintained with but a very small proportionate increase of cost. This means quicker time, more trips and greater receipts.

Evidently as a financial investment, even if cost of maintenance and operating is greater, the cable is to be preferred to horses.

How is it with electricity? The ratios of expenses, etc., stand for themselves, the law of speed is far simpler than with cable, bringing even greater receipts, and again in practice the saving of coal in proportion to work done on track day or night is immensely more economical than with the cable. This point will be touched upon later.

6th. Individual Characteristics and Advantages.

Under this head a few of the salient features of each system will be mentioned. As the possibilities and limitations of the horse-railroad system are, however, so well known, it is needless to go over them. I therefore will confine myself to the electric and cable systems.

With electricity single track lines, crooked streets, all descriptions of turn-outs, crossings, branches, etc., are as easy to construct and operate as with horses. With the cable system they are either impossible or enormously expensive.

With electricity the line is not a unit. So that the complete stoppage of the whole line is absolutely impossible. With cable it is a unit and it is possible.

With electricity the life of the conductor is infinite; with cable, two years.

With electricity, and the improvements now being made in traction wheels, etc., the heaviest grades are as easily surmounted as with the cable; although it is true that for grades exceptional in character, such as 20 per cent grades or over, I should be willing to give the contract to cable.

With electricity any speed can be at-

tained by the individual cars. They are absolutely independent. Lost time can be made up, etc. With cable the cars are dependent upon speed of cable. Lost time cannot be made up except on down grades.

With electricity work done by engine is synchronous with work done on track at any time of day or night, with the loss of 35 per cent due to the conversions in each case. In other words, for every horse power of useful work done on track the engine does 1.54 H. P. This ratio is constant. It makes no difference whether 1 or 100 H. P. of work is necessary on the track, the engine has but to do 35 per cent in excess.

With cable, if 1 H. P. of work is all that is required on the track, the engine may be doing 25 H. P. to get that amount there through the gears and cable. With heavier loads this is somewhat diminished, but about the very best figure that can be put forth is but 35 per cent recovery with 65 per cent loss; the exact converse of electricity under heavy loads.

Electric Street Cars. II.

BY T. C. MARTIN.

Coming to the overhead conductor systems, the Van Depoele roads form an important group. These roads are now in operation at Detroit, Port Huron, Mich., Windsor, Can., Appleton, Wis., Montgomery, Ala., and Scranton, Pa. Mr. Van Depoele suspends his feeding conductor by side poles, or, as at Appleton, has double wires, corresponding to the track, but immediately above it at a height of 18 or 20 feet. The little Windsor road, two miles long, with two cars, started in June, 1885, has paid for itself. I may mention that when I went on it last August, one evening, I visited the generating station. It was deserted and in black darkness. I made the trip and then went back to the station. The darkness was blacker, and there still was no sign of attendance, but the 30 or 40 passengers each turn were none the wiser and none the worse. I don't approve such practice, however. The Appleton road, with five cars, is the first in this country run by water power, depending, and with great success, upon a pair of turbines that will develop 100 horse power, and are now driving a 60 horse power dynamo. The Montgomery road is notable as being a complete city system, including ten miles of track. The Scranton road that started last week has two features of special interest. One is that in a city of about 50,000 or 60,000 inhabitants the use of the overhead conductor is allowed. Another is that the line is operated from the electric light station. The road is 2½ miles long, with 12 grades, mostly over 6 per cent. There are already in use two heavy Pullman cars, running at a speed of from 4 to 15 miles an hour. The current is conveyed by a conductor 3-10 of an inch in diameter, the rails forming the return. A traveler with rollers and a flexible cable passes the current to the motor, which, it is worthy of notice,



stands upon the front platform in sight of the driver. The electric light station is well satisfied with only \$9 a day for running the 60 horse power generator, and it is evident, therefore, that an increase of rolling stock will involve very little increase in cost of power. Here is a hint by which electric light men nearly everywhere might profit.

In the overhead conductor category should be included Mr. Daff's new roads at Los Angeles, Cal., one  $3\frac{1}{2}$  miles long and the other  $2\frac{1}{2}$  miles. A peculiarity is the placing of the motor in the center of the car, occupying the room of but two passengers, and leaving both platforms clear.

The overhead bare conductor systems are also restricted to currents of low electromotive force. But they, as well as the third-rail systems, do work it is impossible to perform remuneratively by cable, and which would often be beyond the range of horse or mule power on either philanthropic or business principles. Provided permission is obtainable for running the wires, the overhead conductor system seems cheapest, if not best, for cities up to at least 50,000 population. I believe a double overhead conductor system well built should cost from \$1,500 to \$2,000 per mile. The single conductor is, of course, much cheaper.

There are in the United States about forty cities with population above 50,000. In almost every one of these it would be necessary to resort to the electric conduit system, third on our list, unless the storage system be tried, or a combination of the two. At the present time, the outlook for electric railways with conduited mains is very favorable.

The first exemplification of a conduit system in this country was given by the Bentley-Knight Electric Railway Co., in 1885, at Cleveland. A working section of their line can now be seen at the Rhode Island Locomotive Works, and as it illustrates in a striking manner the principles involved, I will touch on a few of the leading points, now described for the first time. The conduit is made to resist the heaviest wear and strain of street traffic. The surface opening, or slot, is only  $\frac{3}{8}$  of an inch wide, and the total width of metal at the street surface is but three inches. The conduit is kept clean by a broom of peculiar shape suspended from the car. This broom is said to have swept out in a single trip the accumulation from twelve hours constant snowing. At convenient point catchpans with sewer connections receive the sweepings and effect drainage. The two main conductors consist of channel iron connected by expansion joints and lined with a continuous strip of copper of sufficient size to carry the current with but small loss of energy. These conductors are fastened to the side walls of the conduit on insulators of vulcanized wood dipped in white lead. The insulators are strongly set in sockets in the cast iron supporting yokes. Neither the traffic rails nor the conduit structure form any part of the electrical circuit. To provide for switching, a mov-

able tongue is pivoted at the point of branching, so as to rest on the top of the conduit and to be readily set to close either of the branch slots and direct the contact plow into the other. A corresponding conductor tongue within the conduit is moved at the same time. The contact plow for making connection consists of a flat frame hung from the car by transverse guides, on which it is free to slide the whole width of the car, and extending thence down through the slot of the conduit. It is provided with a swivel joint, so as to adjust itself to all inequalities of road or conduit. This frame carries two flat steel insulated conductor cores, to the lower ends of which are attached by a spring hinge small contact shoes of chilled cast iron that slide along in contact with the two main conductors. At the upper ends are flexible connections leading to the motor. This plow can be inserted or withdrawn through the slot at will, the spring hinge allowing the contact shoes to straighten out into line with the conductor cores when the plow is pulled upward and the shoes strike the insulating lining with which the slot irons are provided. By no accident, therefore, can anything be left behind in the conduit to obstruct succeeding cars. The plow guides are hung on transverse axes, and are held in a vertical position by a spring catch that gives way when the plow meets an irresistible obstruction, and hence the plow is automatically thrown completely out of the conduit without injury, being also immediately replaceable. The contact shoes will stand weeks of wear, and cost next to nothing. The frame of the plow has wearing guards of hardened steel wherever it can touch the edge of the conduit slot, and these are also readily renewed. Two plows are used on each contact for the sake of absolute reliability, and to prevent flashing at the contact. The connection between the wheels and motor consists of a system of gear wheels and connecting rods, the gears being deadened so as to be quite noiseless. The company makes a completely equipped steel framed truck, with motor, etc., upon which can be placed any car body. These have a wheel base of 6 feet, a standard gauge of 4 feet  $8\frac{1}{2}$  inches, and can be used on curves with a radius of 45 feet. A motor of the Gramme type is used under the car. For long distances the motors are in series, with current constant; for short distances, the motors are put in multiple arc, and a new form of resistance is used.

Such are the main features of the system. Of its eminent practicability there should be no doubt. The question again is one of expense, and I therefore give transcripts furnished me by Mr. R. W. Blackwell, of actual estimates submitted quite recently and now under consideration. The first is for the equipment of existing street railways in the city of New York, three miles, 1,440 feet, double track, minimum headway  $1\frac{1}{2}$  minutes, average speed seven miles per hour, running twenty-four hours per day, very heavy traffic, maximum grade three in 100.

Conduit and conductors, 34,560 feet, at \$3, \$103,680; motor trucks, 37 at \$1,200, \$44,400; 50 horse power dynamos, 12 at \$2,500, \$30,000; steam power plant complete, \$27,750; foundation, \$5,000; engineering, \$3,000—\$213,830.

The annual expense is: Coal, 14 tons per day, at \$3, \$14,330; engineer and assistant, at \$2.50 and \$2 per day, \$1,642.50; firemen, 3 at \$1.50 per day, \$1,642.50; machinists, 2 at \$2 per day, \$1,460; total running expenses, \$20,075. To which should be added interest on construction cost (\$213,830) at 6 per cent, \$12,829.80; and also depreciation of plant at 3 per cent, \$6,414.90; total expense and charges, \$39,319.70.

The second is for a down town cross town road in the city of New York, greatest grade 1 in 12, double track: 12,660 feet conduit (extra heavy), at \$4, \$50,640; 20 motor trucks complete, at \$1,200, \$24,000; six 50 horse power dynamos, at \$2,500, \$15,000; steam plant complete, \$20,000; foundation, \$2,500; engineering, \$2,500—\$114,140.

Of course, I do not represent these figures as those upon which all authorities are agreed, but they have their value as being bids on actual work.

The conduit system of Mr. Schlesinger, in use for four months past by the Union Electric Co. at Philadelphia, with a car running  $9\frac{1}{4}$  miles an hour, has noticeable peculiarities. It consists practically of two conduits, the upper of heavy channel iron for connection, the lower of wood or cement for drainage. To insulate the conductors, an angle iron is riveted to the top flange of the channel iron in such a manner that one of its flanges, pointing downward parallel to the main side of the channel iron, forms one side of the slot. In the inverted trough thus formed, the copper bar conductors are fastened, the contact being on the under side. Against the conductors, pulling upward, rub or press springs, making a firm, close contact under control by means of a frame holding the springs. In Mr. Schlesinger's system, the motor is under the car between the axles, and geared to them by means of chains. The motors are intended to work in multiple arc.

There are other conduit systems, among which I might mention the Van Depoele, used at Toronto, I believe, in 1884, at the exposition. But my object is not so much to describe all the systems as to bring up main features and relative costs. I will therefore, pass on to point out that whereas in the cable system, with its costly conduits, the available power for the cars and passengers reaches only about 25 per cent, in the electric conduit system, requiring for generators, conduit and conductors, etc., but half the outlay necessary on a cable system, the net return of power, as you are well aware, reaches at the minimum from 50 to 60 per cent. Mr. G. W. Mansfield, who has had considerable experience with the Daft company, puts it as being at least 56 per cent. I note, too, that with the use of the Holroyd Smith conduit system, the Blackpool road, England, has reported



earnings of \$1,735 in a week, with a total expense account of \$225, running 2,760 miles, and carrying 44,306 passengers.

A distinguishing feature of the conduit system is that it is the only one with which high potentials can be employed on streets. With it also the power stations can be placed near ample water supply or where rents are low, or can each be given a section of road to operate.

I approach the next and last system on our list, that of storage, with some degree of nervousness. In more than one quarter the man who comes out with a kind word for the secondary battery is set down as either a knave or a fool. I cannot see why he should be regarded as either, although he may perhaps be more than ordinarily sanguine and hopeful. I have myself ridden very comfortably in a street car propelled by storage batteries, so that I know the thing can be done, and I understand that storage is to be extensively used at an early date by the North Metropolitan Tramway Co., in London. At Antwerp, in 1885, after six months' competition with four other cars using either steam or compressed air, the Julien electric storage car took the first prize, awarded by a jury of well-known experts. There were in all twenty-three points of comparison. The Julien car has since been tried in Hamburg, and another has been in operation on the Eighth avenue line in this city. Mr. Widener, of the Philadelphia cable line, has traveled on it and is to try it, being very favorably impressed. But, as he remarked publicly, "The question is as to the cost of maintenance of the cars and the furnishing of motive power." It will be admitted that there are advantages in having each car an independent unit, offsetting the disadvantages of carrying the dead weight of batteries; and that single cars on any road can be taken in hand for change, so that existing rolling stock can be progressively adapted to the new conditions. This involves a smaller initial outlay and gives opportunity to train the present force in its unfamiliar though simple duties. Now, regarding first cost—I have never seen any figures as to the expense of an equipment of a car with storage batteries. It has been said that two sets for an ordinary street car would cost about \$1,500. That seems high. The Julien company states that the cost of the horses for a car more than covers the initial outlay of the change, and I believe that the estimate is also made by the company of a total daily running expense of not to exceed \$5 per car in cities on heavy traffic. As to life of the batteries, those in the Hamburg-Julien car have now been in daily use since April, and they show by test a return of more than 80 per cent of the power with which they are charged. The car is running on regular daily service. In respect to American storage batteries, it may be mentioned that the Electrical Accumulator Co., whose officers have a standing in electrical circles, guarantees two years' life for its new battery and an 80 per cent return of power. The criticism has been made that ordinarily 20 per cent

of the stored energy is retained on each emission, but obviously that is no loss, forming simply 20 per cent of the succeeding charge.

Putting it broadly, the storage system, in spite of its various conversions of energy, has a superiority of at least 25 per cent over cables. Some of you will put it far higher, but as I have said, in the absence of the data of prolonged work, I prefer to put it low.

I think we shall see a number of efforts shortly made in the direction of using secondary batteries for regular work on street cars, and the results will merit our most careful study. There are, moreover, some ingenious propositions for combining the conduit and storage systems, so as to enjoy the benefits of both. Mr. J. M. Pendleton has described a plan of his of this nature, and Mr. Elias Ries, of Baltimore, has also carefully elaborated such a system, in which storage plays an important part.

Here, then, illustrated in a variety of ways and by numerous examples, we have a comparison of electricity with other power for propelling street cars, and an idea is given, very imperfectly, of the wide range of choice that electricity itself offers as to methods and means. Much of what has been said has its direct and favorable bearing on elevated railway traction, as well as on that for underground railways, but the time will not permit me to pursue the subject any further. Many points of discussion arise as to the connection of the car axles with the motor; the use of independent motor cars or of motors on the passenger cars; the types of motors and of conduits or conductors; the potential that is safe under certain conditions; the methods of regulating motor speed; the use of resistances; but all these and others I may leave to you, many of whom are doing practical and creditable work in this field, and who by thus "hitching your wagon to a star" have shown that street cars, if run by electricity, may yet be brought up to the most advanced notions of humanity, comfort, convenience and economy.

All that remains is to press onward and occupy the pre-empted territory that awaits us. As Emerson says: "Our duty is plainly not to throw ourselves across the track, not to block improvement, not to sit still till we are stone; but to watch the uprise of successive mornings and to conspire with the new works of new days." This sentiment may surely be appropriated by modern electricians, who every year put their skill to some severer test, and every year win fresh triumphs. In beginning this street railway work, we may count on a large and profitable travel for some time to come, through the mere novelty of the thing, but as the art improves it will more and more manifest its right to street railway propulsion on the strictest business principles, as well as on every other ground of merit.

Important extensions of the elevated roads in New York will be undertaken at once.

## CORRESPONDENCE.

### Vacuum Brake for Street Cars.

EDITORS STREET RAILWAY JOURNAL:—

I noticed in your paper of March a reference to a vacuum brake now in use on the Brooklyn Bridge and which can be applied to street cars. Will you please let me know how I can get some information on the subject?

G. S.

Full particulars with regard to the Eames vacuum brake as applied to street cars can be had by addressing the Eames Vacuum Brake Co., 123 Oliver street, Boston, Mass. —Eds.

### Distance Between Switches.

EDITORS STREET RAILWAY JOURNAL:—

I shall be glad to receive through your columns the opinion of some of your readers as to the proper distance apart to place switches in a single track road where cars are to be run five minutes headway. Of course I am aware that such conditions as the kind of cars and stock used, and local surroundings, would have a bearing on this question, but approximate figures will be appreciated. My opinion is about 1,300 feet, but I should like to hear the views of others on the question.

R. A. C.

### Heating Street Cars.

EDITORS STREET RAILWAY JOURNAL:—

The question of heating street cars has long been discussed pro and con., both by the public and managers of street railroads in all the Northern cities, where the winters are long and severe. It has been claimed by some that it was unhealthy, and would engender disease, but there seems to be no well founded reason to sustain the assertion, for it is very rarely that a car becomes uncomfortably warm. The entrance and exit of passengers will keep down the temperature, making it difficult to heat the car to a temperature of more than fifty or sixty degrees, which with winter clothing on, is a comfortable temperature, in contrast to the cold, damp atmosphere which is so often experienced in an unheated car, where frequently the windows will be covered with a coating of frost. Warm cars on a cold winter day, experience has shown us, will increase travel and induce many to venture out, who would not otherwise do so.

There have been many devices invented and experiments made, such as heated iron, chemical compounds, etc., but nothing has proved superior to the stove, which takes up but the seat of one passenger, and as now made is not unsightly. On cars that turn at each end of the road, it can be placed on the front platform and covered with galvanized iron, similar to a portable furnace, the heat being admitted to the car through a device placed in the door, like a register. The cost of supplying the fuel is about ten cents a day, a small item compared to the comfort secured to passengers and the corresponding increase in



tendency on the part of street railroads during the past few years to heat their cars in the winter season, and it would seem that the time is near at hand when it will be as customary to warm street cars as it now is to heat the cars on a steam railroad train.

C. C. WOODWORTH,  
Rochester City & Brighton R. R.

### Cable Roads in the United States.

EDITORS STREET RAILWAY JOURNAL:—

I should esteem it very much if you would be so very good as to inform me where I can obtain reliable information relative to the extent to which cable traction is employed in the various cities of the United States, and the results, fiscal and mechanical.

J. C.

London, England.

The roads in the United States on which cable traction is used are as follows:—Clay St. Hill R. R. Co., Sutter St. R. R. Co., California St. R. R. Co., Geary St., Park & Ocean R. R. Co., Market St. Cable Ry. Co. and branches, all of San Francisco, Cal.; Second St. Cable Ry. Co., Los Angeles, Cal.; Chicago City Cable Ry. Co., Chicago, Ill.; Kansas City Cable Ry. Co., Kansas City, Mo.; St. Louis Cable & Western Ry. Co., St. Louis, Mo.; Temple St. Cable Ry. Co., Los Angeles, Cal.; Grand Ave. Cable Ry. Co., Kansas City, Mo.; Corrigan Consolidated St. Ry. Co., Kansas City, Mo.; Omaha Cable Tramway Co., Omaha, Neb.; Oakland Cable Ry. Co., Oakland, Cal.; No. Hudson Co. Ry. Co. (elevated), Hoboken, N. J.

Now building or to be built:—Washington & Jackson St. R. R. Co., San Francisco, Cal.; Philadelphia Traction Co., Philadelphia, Pa.; Third Ave. R. R. Co., New York City; Union R. R. Co., Providence, R. I.; St. Paul St. R. R. Co., St. Paul, Minn.; —St. Co., St. Louis, Mo.; Mt. Adams & Eden Park R. R. Co., Mt. Auburn Cable Ry. Co., and Cincinnati St. Ry. Co., Cincinnati, O.; Nashville St. Ry. Co., Nashville, Tenn.

There are also experiments being made with cheap systems, those which can be built for \$20,000 per mile or less, by the Brooklyn Cable Co., Johnson double rope system; the Chicago West Division, Rasmussen system; Binghamton Cable Ry. Co., Fairchild twin cable system.

We know of no official returns from these roads except from the roads themselves to their stockholders, and our correspondent is respectfully referred to the roads direct. There are other cable roads to be built this spring, the particulars of which have not been made public, and in all probability others will be built that as yet are not determined upon.—Eds.

### Fares in New York.

EDITORS STREET RAILWAY JOURNAL:—

Will you be kind enough to look up the matter of fares charged on the horse railroads in New York during the years from

1866 to 1870, and tell me, either by postal or in your next issue, if during any of the years mentioned there were any roads in the city charging 6 cents? There is a party here who claims that the Grand Street Crosstown line and the Bleecker street line charged 6 cents fare from or about 1867-69.

J. L. D.

In accordance with this inquiry we sent letters to each street railway in New York asking for their rates of fare from the time of the opening of the road, and have received the following replies.—Eds.

EDITORS STREET RAILWAY JOURNAL:—

Replying to your inquiry of 15th inst.—on Dec. 18, 1882, the fare on this company's line was reduced from 6 cents to 5 cents. On that portion of the line above Forty-second street, from its completion in 1871 to August 4, 1878, 8 cents was charged. On that date it was reduced to 6 cents, and on Dec. 18, 1882, to 5 cents, as above.

E. V. W. ROSSITER,

Sec. New York & Harlem R. R. Co.

EDITORS STREET RAILWAY JOURNAL:—

Replying to your favor of yesterday would state that this company has never charged more than 5 cent fares.

THOS. H. McLEAN,

Sec. Twenty-third St. Ry. Co.

EDITORS STREET RAILWAY JOURNAL:—

This company had the right, under its charter, to charge 6 cent fares, and did so for some eight years. On the 1st of January, 1877, we adopted the 5 cent rule. There was a perceptible falling off in the revenue for the first three months, but after that, I believe the effect was to popularize the road. The Fourth avenue line adopted the 5 cent regulation some years later. Mr. William Richardson of Brooklyn has an experience similar to mine. I think he collected 6 cents until about 1875 or 1876. We never charged 8 or 10 cent fare.

D. B. HASBROUCK,

Sec. Houston, West St. & Pavonia Ferry R. R. Co.

EDITORS STREET RAILWAY JOURNAL:—

Replying to your favor of even date herewith, I beg to say we have never charged 6 cent fares on our railroad, and I regret my knowledge of other roads in the city does not enable me to reply to your other queries.

WALTER L. McCORKLE,  
Sec. New York City St. Ry. Co.

EDITORS STREET RAILWAY JOURNAL:—

The Harlem Bridge, Morrisania & Fordham Railway Co. still charges 6 cents on a part of its route. It did charge 8 and 10 cents to Fordham and West Farms up to three years ago.

WILLIAM CAULDWELL,

Sec. Harlem Bridge, Morrisania & Fordham Ry Co.

EDITORS STREET RAILWAY JOURNAL:—

Replying to your favor of 15th inst. We ceased our 6 cent fare Sept. 30, 1870, by receipts. There has been an increasing

ginning 5 cent fares Oct. 1, 1870, and continuing same to present time. We never charged a higher rate of fare than 6 cents, as above mentioned.

C. D. WYMAN,

V. Pres. Central Park, North & East River R. R. Co.

EDITORS STREET RAILWAY JOURNAL:—

In answer to yours of 15th will state that this company started in June, 1874, and never charged more than 5 cent fares. The Twenty-third street company started in December, 1872, and never charged more than 5 cent fares. In regard to the date of the discontinuance of the 6 cent fares, I cannot give you any information, as I was not in the railroad business previous to 1872, but I think it was about 1879 that the Fourth avenue company reduced to five cents. Mr. Skitt can give you the information.

G. W. LINCH,

Sec. Christopher & Tenth St. R. R. Co.

### A Novel Collection of Tram Cars for South America.

EDITORS STREET RAILWAY JOURNAL:—

The writer had the pleasure of seeing the last shipment of a novel and curious order of cars for South America built by the J. G. Brill Company of this city. It is probably the largest order for tram cars even placed at one time, and is certainly a curious collection, and no doubt a few words of description will interest your readers.

The entire order for cars consists of 352, all of which are 16 feet body. They are to run on a tram road of about 100 miles in length and to be drawn by horses.

Some of them are sleeping cars, and one can easily imagine the expression that would flit over the average New Yorker's face at the thought of a hundred mile ride in a sleeping car with horse flesh as the means of propulsion.

The road connects a large number of small towns and cities, and is to be run over the surface of the country in the same way as we would run an ordinary street railway in our own cities. They will take on passengers and freight along the routes same as an ordinary steam road. Your readers would naturally ask here, Why build a tram road, to be run with horses, a hundred miles in length? but when I add that the country through which the road passes is a poor one, and that coal is \$11 per ton and the average horse only \$20 per head, they will easily see that this kind of a road will be more economical than steam.

The equipment comprises almost every kind of a car used by our steam roads. They are as follows:—

Eighty combination first and second-class cars. These cars have a partition through the center dividing them into two apartments for first and second-class passengers. They are arranged to carry baggage on the roof, and have an iron ladder on one side.

Four sleeping cars. These are fitted with two double berths on either side, that is,



upper and lower berths, arranged in about the regulation style of sleeping cars in this country, and are fitted with lavatory, water closet and stoves.

Four double decked open cars. These have seven seats, each with reversible backs, and a circular stairway at each end and top seats, with a seating capacity of 57 passengers for each car.

Twenty platform cars. All of these are the four-wheeled cars.

Twenty gondola cars. These are cars with drop sides.

Six refrigerator cars. These are built on exactly the same principle as the regular refrigerator car used for carrying dressed beef in this country.

Four chicken or poultry cars, built after the style of stock cars, with a series of coops inside.

Eight cattle cars, arranged like the ordinary cattle car of this country.

Four universal dump cars.

Two derrick cars for the lifting of heavy material on and off cars.

Two hundred box cars, like the ordinary box car, with a door on either side.

All of the freight cars as well as the others are arranged with a dasher at either end, and have Brill's patent brake and running gear.

Accompanying this order was an order for the same road of 896 sets of harness and 5 of Hathaway & Robinson's patent turn-tables and sundry other material.

The last of this curious collection is ready for shipment, and the Messrs. Brill are now engaged in loading the steamer which is to convey it to its destination.

Surely the fact of this order gives food for thought, as a lesson from our South American neighbors would not be uninteresting.

The Messrs. Brill are to be congratulated on the successful completion of this large order. Skill and good business-like taste marked every detail of their work.

Philadelphia, Pa. "PUB."

**Broad Distance.—Pavements.—Electric Railways.**

EDITORS STREET RAILWAY JOURNAL:—

I am not one of the broad distance people, but think I can answer J. D. T.'s inquiry. There is no advantage in having the distance between tracks over 4 feet, unless the railway company wish to cover all the street they can, so as to prevent another road being laid on the same street. Four feet is ample, excepting on curves, where the distance between tracks should be at least 4 feet 6 inches. More than that makes unnecessary expense in repairs of paving and removing snow in winter. A good plan where the streets are wide enough is to have the distance between tracks the same as your track gauge, so that in case of a block or excavation on the outer rail of either track, cars would run on a single track in the center of the street. Mr. Moxham's idea that the width between tracks is governed by the width of street, to my mind does not follow, unless,

as he says, the tracks are laid on either side of the street and leave the carriage way in the middle of the street.

**PAVEMENTS.**

In a discussion in your February issue, many ideas and opinions were given as to the best kind of pavement and what was thought best for certain localities. Some I agree with and with some others I beg to differ. Mr. Holmes has it right when he says my motto is "anything but wood," for it has proven so far as I know a humbug, a nuisance and injurious to health.

Granite blocks, average size 4 x 12, are the best for streets of heavy traffic and especially for streets occupied by street railway tracks, but macadam for the horse path of railway tracks is all wrong. Horses traveling in one line continually will plow out the best laid macadam, though it be rolled down as hard as Pharaoh's heart, and in a short time too.

The best and most durable pavement for horse paths is small (uniform in size) cobble stone with one row of long narrow granite blocks placed along the rail; the track is better protected and horses travel with more freedom than on any other stone pavement. I admit that stone pavement is hard on railway horses and they give out in a short time on that account, but no other pavement can be kept up and in shape as well along railway tracks and it is just as essential to the interests of the railway companies that the pavement be kept up even with the tops of the rail as it is for the traffic on the streets, and the track will last twice as long.

Macadam is good and preferable as a rule on carriage roads, but on residence streets and streets of light traffic in towns and cities, I think the pressed asphalt blocks take the lead, noiseless, and when well laid, smooth and durable. The first cost probably would be more, but the saving both in repairs and durability would more than counterbalance the extra cost. I claim that in all cases the best is the cheapest in the end, and certainly less care and trouble.

I hope those Western engineers will not take umbrage at my daring to differ with them. I give you 20 years experience and have been so situated that I could give the question special study, also have the ideas of the best minds in street railway management.

**ELECTRIC RAILWAYS.**

I can give you very little railway news of a definite character at this time. I have a number of projected street roads in hand, but cannot say just when they will be built, nor what motive power will be used. The majority of the companies are waiting to see the result of the application of electricity as a motor. These seem to be a doubt in the minds of many street railway managers, and the projectors of new roads, as to whether any of the systems now on trial are sufficiently perfected to warrant their adoption in place of horse power.

I have recently visited Scranton, Pa., where the Van Depoele Co. have a road in operation; Providence, R. I., where the

Bentley-Knight Co. are operating one; and the Eighth avenue road, this city, where the Julien Co. have a car running nearly every day. I have observed closely the working of these different systems of applying electricity to the propulsion of street cars, have studied their different points, and have come to the conclusion that electricity is the coming motive power for street railways. But, like every innovation and improvement of such magnitude and importance, it will take time to perfect it so that it will be reliable and satisfactory under all circumstances.

When the different electric companies shall have brought their systems to the same degree of perfection and reliability that the cable systems have attained, they will, in my opinion, take the lead.

WM. P. CRAIG.

**An Ammonia Motor.**

The Standard Fireless Engine Co., who have been making experiments in the use of the ammonia motor on a New Orleans railroad for some time past, have recently had a test made by Dr. Albrecht, of the United States Mint at New Orleans. In this report it was stated that the object of the test was to ascertain the expenditure of liquid ammonia necessary to drive a loaded car at a given speed, the construction of the engine, the storage of the ammonia, absorption tanks, and other appliances on the car. In connection with this there was a test made in regard to the expenditure of coal in order to regenerate the ammonia from the absorption tanks. In the report it is stated that on a trip, extending three miles and return, making six miles in all, at an average speed of 14 miles an hour, 1.84 gallons of ammonia was consumed per mile. The expenditure of coal necessary to regenerate the anhydrous ammonia was from 1½ to 2 lbs. for one gallon from the absorption tanks. This included the working of the pump for the cooling water from a driven well at a temperature of 71 degrees Fahr. and the pump for the absorption of ammonia liquid. The very weak liquor from the still is used on the car for new absorption. The cost for regenerating the anhydrous ammonia is the same as for ice works or breweries.

We are also in receipt of the estimate of running 30 cars on the ammonia plan for a year, as follows:

30 cars at \$500 each.....	\$24,000.00
30 engines at \$700 each.....	21,000.00
Stationary plant.....	15,000.00
First cost of ammonia.....	9,600.00
	<b>\$69,600.00</b>
Interest on capital one year.....	\$4,176.00
Coal, 1,825 tons at \$4 per ton.....	7,300.00
Oil, waste, tallow, etc.....	365.00
Tear and wear on machinery and plant.....	8,665.10
	<b>\$20,506.10</b>
Labor, \$17.50 per day.....	6,387.50
25 per cent loss on ammonia.....	2,400.00
Cost of running 30 cars one year.....	29,293.60
Cost of running 30 cars one day.....	80.25
Cost of running 1 car one day.....	2.675
Cost of running 1 car one mile.....	0.03344
Cost of running a round trip, 16 miles, to Carrollton and back, 53½ cents.	

This estimates does not include the drivers' wages.

We intend in a future issue to fully illustrate the details of this engine and give a complete description of its method of action and construction. We therefore defer further data in regard to this matter until that time.





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Boston, Mass., 185 SUMMER STREET, H. M. SWETLAND, Manager.

Philadelphia, 119 So. FOURTH ST., J. H. MCGRAW, Manager.

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### New Advertisements.

THE DAFT ELECTRIC LIGHT CO.  
THE BENTLEY-KNIGHT ELECTRIC RAILWAY CO.  
THE SPRAGUE ELECTRIC RAILWAY AND POWER CO.  
THE JULIEN ELECTRIC CO.  
THE SAFETY ELECTRIC RAILWAY AND POWER CO.  
THE CONNELLY MOTOR CO. show a new system of motive power.  
THE STANDARD FIRELESS ENGINE CO. call attention to the success of their ammonia motor.  
THE STANDARD INDEX AND REGISTER CO. publish an important legal decision.  
LAWRENCE, WILLIAMS & CO. publish a strong testimonial of Gombault's Balsam.  
T. L. BEAMAN shows his new fare-box.  
THE CLINE MANUFACTURING CO. announce a new system of car heating.  
C. B. MILLER publishes a testimonial favoring Magnolia metal.  
W. L. EVERIT shows his car floor.  
THE LEWIS & FOWLER MANUFACTURING CO. call attention to the advantage of buying direct from manufacturers.  
FROST & PETERSON have a new advertisement of car seats and sides.  
THE WASHBURN & MOEN CO. announce their readiness to manufacture wire cables.  
THE J. G. BRILL CO. have new designs of cars.  
EDWARD C. WHITE calls attention to new specialties.  
CLARK'S grooming machine has an interesting description.  
THE MALLINCKRODT BRAKE shows a change of officers.  
THE WALES MANUFACTURING CO. insert flattering testimonials.  
J. C. SAXON has a new advertisement.  
THE JOHN STEPHENSON CO. have a new design for their page.  
THE JORDAN-MILLS CO. announce a new sander.

### NOTICE.

On and after May 1st, the subscription price of the STREET RAILWAY JOURNAL will be \$2 per year. The present price was fixed when the size of the paper was 20 and 24 pages. It is now 80 pages and the paper and press work alone cost more than a dollar a year.

New and present subscribers, who remit before the first of May, will be credited at the rate of one dollar up to the end of their current year. Those who remit after the first of May will be credited at the rate of one dollar a year up to May first, and thereafter at the rate of two dollars a year.

No important strikes have been reported on street railways since those at Boston in February. It is to be hoped that a business so unprofitable to the strikers is becoming unpopular.

The Los Angeles, Cal., Times, which speaks of the electric railway of that city as being a perfect success, says that the only objection ever made to the electric road there is on account of poles. Metal poles, even when poles are used, would largely overcome the objection.

Railroad matters in Boston are so extremely mixed that we are unable to give a clear and definite report of them at the present writing, but it is probable that nearly all the street railway interests in Boston excepting the Consolidated road, will be consolidated under one management, and be in the control of non-resident stockholders.

A street car run by an ammonia engine in New Orleans is reported to cost but \$2.68 per day to run. The engines cost \$700 each, and the central plant \$15,000 for thirty cars. Power is obtained by the expansion of liquid ammonia into gas, which is done without fire. And who knows that the ammonia engine will not cut some figure in this question of the hour—power?

That a mutual insurance organization among street railway companies would be practicable and profitable, there hardly remains a doubt. All that seems to be wanting is some one to take the first step towards acting upon the authority granted by the New York legislature two years ago, or adopting a similar but simpler plan of incorporation and one requiring less capital at the start.

Of the thirty miles of cable road now building by the Chicago City Railway Co. a large proportion is through sections of the city so sparsely settled that there is no hope of the investment being immediately profitable. The wise foresight that has characterized the management of the road leaves not a doubt of the wisdom of such extensions, but reminds one how important in such cases is fair treatment at the

hands of the city authorities. Will the city a few years hence arbitrarily reduce fares or adopt other burdensome measures? Such roads practically create their own traffic.

The extent to which the progress of street railways in the country is due to the untiring efforts of the supply men is not often realized. The Personal Directory of the STREET RAILWAY JOURNAL contains the names of men who have spent many dollars and many days in the effort to replace the bad with the good, or the good with better devices. The thanks of the busy manager are due even, on the one hand, to the visionary inventor and, on the other, to the selfish schemer, to say nothing of those cool, practical, level-headed men who have, for the improvement of street railways, investigated, experimented and spent sleepless nights in hard thought. Such men manifest the truest kind of unselfishness, the kind which does not place its object under an undischargable obligation, but only asks a small share in the benefit conferred. It is at least due to such to give their devices careful consideration.

As long as Mr. Henry George advocated the rights of labor and his peculiar views of the possession of property in a manly and upright manner, he received the attention and consideration of every thinking man, because, however much his ideas differed from those which had been previously held, they were presented in such a way as to command attention and demand respect. But, since he has been in the newspaper business, we fear his head has been a trifle turned by the success he has attained, or else he has not been fortunate enough to bring about him co-operators who were as honest as he appears to be in his own convictions. In order to support their demands and to influence the voters who are most vitally interested in this question, they have resorted, not to pure argument and rational demonstration, but have descended to the slinging of mud and the calling of names.

It is very true that with small minds this method of procedure accomplishes every purpose which a settled argument would accomplish with one more cultivated, but, at the same time, it is to be very seriously doubted whether the people who would be influenced in this way will be the ones who would be the most valuable supporters of his cause, and it would be our advice to him to lay aside such matters as this and conduct the paper in an upright and manly manner, so that it will at least command the attention of the respectable portion of the community.

The latest advices from Paris in regard to the International Exposition of Railway Appliances and Industries to be held there next summer, state that the main building is now well under way and will be completed in ample time for the opening on the first of May. A map of the grounds shows that a belt line of road is to be built, upon



which will be located stations equipped and furnished after the fashion followed by the several European nations. There will be Belgian, English, French, Dutch, Danish, Swedish, Russian, Italian, Austrian, and Swiss stations. A line will also be built across the grounds for experimental tests of street railway motors. Within the building the methods to be followed for the display of exhibits will be novel and valuable. The various national exhibits are to be placed in aisles running lengthwise of the building, and each particular exhibit will be in direct lines crossing the building. So that if a person desires to study any particular national system of railway appliances, it can be done by following the aisle in which the exhibit is placed along the building. If, on the other hand, any particular appliance is to be looked up, we may start upon one side and by going directly across the building see what each nation has to offer in the way of axles, wheels or any other article that may be selected.

The management are pushing matters with the utmost vigor and there is no doubt but that it will prove a great success.

#### Soap.

To secure a clean profit from a street car, an important requirement is soap. As simple as the matter may seem, a large number of street railroad officers overlook the value of cleanliness in a street car as a factor in promoting business. Soap and sand are more necessary to real comfort than varnish and veneer.

Few investments in the apparatus of street cars pay better than clean floor, windows, seats and interior and exterior; but one of those investments is a clean conductor.

There are conductors on certain roads in this country whose filthy appearance we believe would have a greater tendency to drive away business than the worst ramshackly car that will hold together to run, especially if that car be clean.

The conductor is the company's representative to the public in a much more important sense than the Superintendent or the President. It is he who has the care of the car, who waits upon the passenger and who produces upon the public a good or ill impression of the company.

It is not to be expected that he will be a Chesterfield or that he will array himself in broadcloth, but soap is cheap, his person and clothes may be comparatively free from dirt, the ring of tobacco juice around his mouth need not exceed three-quarters of an inch in width, and patches can be substituted for rags.

The passenger does not object to plain clothes, but he would prefer to take his change from clean hands. More than this, there is to a street railway a very important sense in which cleanliness is akin to godliness. Most of us would prefer to trust him who has self-respect enough to keep himself clean. A person who will keep his person free from dirt will be much more likely to keep his moral person free from the filth of stolen money.

#### Personal.

GEORGE M. PULLMAN is in New York City.

GEORGE POOLE, of Poole & Hunt, was in town last week.

GENERAL MANAGER T. C. ROBBINS of Baltimore is dangerously ill.

H. E. TEACHOUT, of Des Moines, was in Newport early last month.

PRESIDENT JOHN B. PARSONS, of the People's Line of Philadelphia, has just married.

A. W. SLEE, St. Louis agent for Richard Vose, has just returned to St. Louis from a two weeks' trip.

RUFUS MARTIN, of Martin & Co., has been in the western part of Illinois and in Iowa for the past two weeks.

FRANCIS HAZLEHURST of Philadelphia has been made President and General Manager of the Highlandtown & Point Breeze road of Baltimore.

E. PACKER, of the Lewis & Fowler Manufacturing Co., has just returned from a trip South, and Mr. L. E. Robert of the same company from a trip West.

Among recent callers at the STREET RAILWAY JOURNAL office have been W. S. Wales, J. B. White, W. L. Everit, Frank Whelan, S. W. Sears, C. B. Fairchild.

Mr. T. H. ROBILLARD, Superintendent of the Montreal City Passenger Railway Co., was recently in the city, looking at some stages for their Montreal requirements.

Mr. JOHN A. BRILL, General Agent for the J. G. Brill Company of Philadelphia, has just returned from an extended Western trip. He reports spring orders as very flattering.

Mr. LEO DAFT, of the Daft Electric Co., made an address at the opening exercises of the Mechanical and Electrical Exhibition now in session in Worcester. The machinery of this exhibition is wholly run by electricity, being, we believe, the first of the kind on record to depend wholly upon that power.

DANIEL F. LEWIS, Treasurer of the Lewis & Fowler Manufacturing Co. and recently elected President of the Brooklyn City Railroad, is 37 years of age. His experience in the street railroad business has been entirely with the Brooklyn City Railroad Co. Beginning with that company some sixteen years ago as clerk, he has advanced through the positions of Assistant Treasurer, Treasurer, Secretary and Treasurer, to that of President. Probably no man of his years occupies so important a street railroad position in this country.

THE REPORT of the directors of the Dublin Tramways Company shows that the recourse to penny fares, from which a temporary loss was suffered immediately after they were introduced, has turned out to be a great benefit, not only to the public but to the shareholders, who have adopted and recommended a dividend of 5½ per cent, free from income-tax.

#### Notes and Items.

Albany, N. Y.

A BILL TO ALLOW CABLES ON STREET ROADS. A bill is now pending in the Legislature, known among horse railroad men as "Deacon Richardson's bill," which has been favorably reported by the Committee on Railroads and has for its purpose to enable horse railroad companies to substitute electric or cable for horse power. The charters of the Brooklyn roads as well as that of the Third Avenue Company of New York forbid these corporations to use steam power. As the Court of Appeals has virtually held that cable traction is steam power, the bill is intended to afford the relief desired. The bill was introduced by Assemblyman Bacon, of Brooklyn, is numbered 521, and is an amendment of the general surface railroad act of 1884. It consists of one section and runs as follows: "Section 12 of Chapter 252 of the laws of 1884 is hereby amended so as to read as follows: Any street surface railway company may, in any case, operate any portion of its road by animal or horse power other than locomotive steam power, which may be consented to by a majority of the property owners obtained in accordance with sections 3 and 4 of this act. But in cities of over 500,000 inhabitants any street surface railroad company may run and operate any portion of its road by electric or cable traction power and lay and construct all the necessary mechanical appliances thereof, upon receiving the consent of a majority in numbers and value of the owners of property obtained and filed in accordance with the provisions of sections 3 and 4 of this act."

Appleton, Wis.

THE APPLETON ELECTRIC ST. RY. CO. is reported in an exchange to be very much gratified with the success of its venture. New cars are being added for small traffic, and they are about to extend their line. The Van Depoele system is used.

THE CHAMPION HORSE NAIL CO. write that many of the street railway companies using their nails find that their "Large Head" Champion Horse Nails are especially adapted to their work, because of the peculiar shape of that style of head for use in machine made shoes.

Atlanta, Ga.

T. G. HEALEY is President of the West End & Atlanta St. R. Co.

THE GATE CITY ST. R. CO. has 2½ miles of track, of 4 ft. 8½ in. gauge, 16 and 50 lb. rails, 7 cars and 28 mules. R. Peters is President, J. W. Culpepper Secretary and Treasurer, and E. C. Peters Superintendent and Purchasing Agent.

Augusta, Ga.

THE AUGUSTA & SUMMERVILLE R. R. CO. will extend their line as follows: From Broad street through Campbell street to Union depot via Walker street to Jackson, out Jackson to Calhoun, up Calhoun to Campbell, and out Campbell to Gwinnett street, making a line of 1¼ miles. Another line will be run from May avenue through Woodlawn to Wrightsboro road, about ¾ mile.

Baltimore, Md.

THE CENTRAL RY. CO. will extend from its western terminus to the Park in the spring. This company has now 186 horses.

THE HIGHLANDTOWN & POINT BREEZE ROAD has been bought by William Horton, Mr. Samuels and others of Philadelphia, and is being put in first-class condition, both as to track, rolling stock, horses, dummy engines, etc. Francis Hazlehurst is now President and General Manager.

MESSRS. POOLE & HUNT report that they have recently shipped cable driving plants



to the Grand Avenue Cable Railway Co. and the Metropolitan Railway Co., both of Kansas City, Mo., and are building two three-ropes driving plants for the Chicago City Railway Co., and one for the Kansas City Cable Railway Co. They are in communication with several parties in New England and the West, who talk of introducing the cable system during the coming summer. They have also built the driving plant for the Park Avenue Cable Railroad of Brooklyn City. One of the street car lines in Baltimore is also talking of substituting cable for horses.

#### Bellaire, O.

THE BELLAIRE ST. R. R. Co. was offered at auction and purchased by Charles D. Haines, of Haines Bros., for the bondholders. They will make the road an entirely new one from one end of the town to the other, and the matter of extending the line up along the river to embrace Martin's Ferry and Bridgeport is contemplated. They will also change the road to an electric road.

#### Birmingham, Ala.

ELECTRIC ROAD. Smith & Eastman have been making surveys for the new road to run three miles from the city out to their real estate near North Birmingham.

THE EAST LAKE LAND Co., which will build from Birmingham to East Lake, has let the contract for building its road, which will be completed by May 1. The distance is about five miles. They will use 40 lb. steel rails, which have been shipped. Four steam motors have been ordered and 8 coaches.

#### Bombay, India.

BOMBAY TRAMWAY Co. The American stockholders met in New York March 1, and decided to reorganize the concern with an increased capital. Secretary Charles Hallett Clark says that Manager Pickering Clark will be in this city in June.

#### Boston, Mass.

A BIG CONSOLIDATION. The most extensive horse railroad combination in the world was successfully accomplished here March 7. It includes the consolidation of three, and possibly the fourth and last, of the local companies. This syndicate of capitalists have gained control of more than 250 miles of track, over which more than 50,000,000 passengers are carried annually. The companies in which a controlling interest has been bought are the Metropolitan, the South Boston, and the Cambridge. The Consolidated road, the only company remaining, does a business about one-fourth as large as the others combined. It is reported that the same syndicate has secured a large block of Consolidated stock, and expects to include that road in the combination before long. The syndicate has an ambition, in the first place, to make electricity the motive power of all the cars. Next there are some interesting projects on hand for developing the suburbs of the city, as there is a big real estate scheme back of the railroad deal. Five gentlemen who are in the scheme have returned from Scranton, where they have examined the electrical road. They were much pleased with it. A few days before the combination it was reported that the Philadelphia Traction Co. was interested in the scheme.

#### Brooklyn, N. Y.

THE BROOKLYN, BUSHWICK & QUEENS Co. R. R. Co. increases to 214 horses since its last report. Otherwise its figures are unchanged.

THE LEWIS & FOWLER MANUFACTURING COMPANY have just made another shipment of registers to the Traction Company of Philadelphia, making 205 in all. They are in use on the roads of that company.

THE BROOKLYN RY. SUPPLY Co. report

that they have had a very good season on the whole in their specialties. Many new roads have been equipped with snow cleaning appliances and they have given universal satisfaction. They are building a number of cars for sanding the tracks for various cities and will publish cuts of same in a few days. They also expect to perfect and build their improved two-horse power street sweepers.

BROOKLYN CITY R. R. Co. Regarding the Flushing avenue extension, to which we referred last month, President Lewis says: "The intention is to run a double track along Flushing avenue to and beyond the city line to Metropolitan avenue in order to form connections with the line on that avenue so as to accommodate passengers wishing to visit the Lutheran Cemetery. These passengers now have to go by way of the Eastern District. We have obtained the permission of property owners beyond the city line and eventually shall extend the tracks to Linden Hill, thus supplying transportation to the settlement and parks in that vicinity and also to Middle Village. There will be through connections from all that growing section to the City Hall, bridge and ferries, an improvement that is much needed."

THE BROOKLYN & SUBURBAN ST. RY. Co. has been incorporated, with a paid-up capital of \$100,000. The proposed road is to be operated by horses or cable power, and to run from Bedford avenue at the Brooklyn city line, south along Rogers avenue through the town of Flatbush and into the town of Flatlands at Flatbush avenue. It is also to have a branch from Rogers avenue along Vernon avenue in the town of Flatbush to the Cemetery of the Holy Cross. Stock is subscribed for by fifteen individuals named in the articles, among whom are George Malcom, the wealthy brewer; William Ziegler, the proprietor of Coney Island Point; William J. Gaynor, County Treasurer Henry H. Adams, James Ryan, Peter Sutter and Patrick McCanna, who are named as the directors for the first year.

BROOKLYN CABLE R. R. Co. The line began making regular trips March 6. The power was supplied by a 250 H. P. engine at Grand and Park avenues. The route is from Broadway, E. D., through Park to Washington avenue, thence to Vanderbilt avenue and Fulton Ferry. The tracks of the De Kalb avenue line are used as far as Washington and Concord streets, thence they are continued to Navy street, and running into Park avenue extend to Broadway. At present the cable portion of the road begins at Grand avenue, though the cable traction will shortly be extended all the way to the ferry in one direction and a mile and a half along Central avenue to Evergreen Cemetery in the other. The company derive their rights from an eighty-nine year lease of a franchise secured from Deacon William Richardson. Its promoters and almost exclusive owners are Thomas L. Johnson, his brother, A. L. Johnson, of Cleveland, and A. J. du Pont. The most important difference between the Johnson system, in use by this company, and those commonly in use, is in the construction of the cable itself. This consists of two three-quarter inch cold wire ropes with a cotton core, laid side by side at a distance of an inch apart, and connected together at every six inches by steel bands, or lugs, and presenting somewhat the appearance of an elongated and extremely narrow rope ladder. It is by means of these lugs and not by any grip of the cable that the cars are propelled. They are the only portion of the cable visible through the iron slit, or slot, at the top of the conduit through which the cable travels. Underneath the center of the car is a

wheel with twelve peculiarly shaped spokes, and when the car is ready to start this wheel is let down until its spokes are caught and turned by the lugs, and in this manner the propelling force for the vehicle is furnished. The rate of speed obtained at present is seven miles an hour, and will ultimately be increased to nine miles. The company will soon have enough cars to dispatch them under three minutes' headway.

#### Burlington, Ia.

THE BURLINGTON ST. R. R. Co. has 3½ miles of track, of 16 and 22 lb. rail, with 22 cars and 10 mules. John Patterson is President and Owner, and C. T. Patterson Secretary, Treasurer and Manager.

#### Cambridge, Mass.

THE CAMBRIDGE ROAD has ordered fifteen more sets of the "Reliable" sand box. The Committee of District Assembly 8,149, Cambridge, March 9 declared the strike off, and the men are at liberty to return to work if they can obtain places. Nearly all the vacancies have been filled with new men, and only very few of the strikers will be taken back by the company.

#### Catsauqua, Pa.

THE BRYDEN FORGED HORSESHOE WORKS are running day and night, largely on street railway work. Among the most prominent roads that have recently adopted the Bryden shoe are the Broadway & Seventh Ave., New York, the Coney Island & Brooklyn, the West Division, the City Passenger, and the North Chicago of Chicago. The Bryden people are making great efforts to meet every want of the street railways, and the increasing popularity of their shoe would seem to indicate that they are meeting with success.

#### Chattanooga, Tenn.

THE CHATTANOOGA ST. R. R. Co. has extended its line about two miles and increased its equipment. Their drivers are using Martin's Change Belt, and seem to like them.

#### Charleston, W. Va.

THE GLENWOOD Co. is incorporated, with a paid-up capital of \$55,400, to lay out a town near the city, and will ultimately construct a road ¼ mile to Charleston and 2 miles through the same. Benjamin Brown is Superintendent.

#### Chicago, Ill.

THE HAZZARD MANUFACTURING Co. of Wilkesbarre has furnished the Chicago City Railway Co. with 750,000 feet of wire rope.

THE CHICAGO CITY RY. Co. are undertaking a large amount of construction work the present season. The extension of the State street cable line from Thirty-ninth street to Sixty-third street is almost ready for operation, the track work being all completed and the machinery going into the slightly and substantial power station at Fifty-second street. This extension gives a straight line double track cable road from Lake street to Sixty-third street, a distance of eight miles, making the longest continuous cable line in the world. It is operated by four cables. Already the material is being delivered for the new cable line on Cottage Grove avenue, which is an extension of the cable line now terminating at Thirty-ninth street, which will be built as far south as Sixty-seventh street and east on Fifty-fifth street to Jackson Park. Work on this has already begun. This will include nine miles of cable track, which, with that already built, will give this enterprising company 35 miles of cable on Jan. 1, 1888. This new line reaches out into a thinly settled territory, where few companies would dare construct a horse line. But the unbounded faith of the City Railway in the cable system as a means of rapid settlement is illustrated in this expenditure of \$1,000,000. The terri-



tory has lain dormant during all these years for the want of suitable transportation, and, now it is to come, property is rising rapidly in value, and buildings springing up everywhere. It will one day, it is thought, be the favorite residence portion of Chicago.

During the past few days the company have accepted an ordinance for additional lines within the city—a cross-town line on Twenty-second street from the river to the lake, and on Twenty-sixth street from Halsted street to Cottage Grove avenue, on Thirty-fifth street from State street to Ullman and north on Ullman to connect with the Thirty-first street line; in the town of Lake for a line on Ashland avenue from Thirty-ninth street to Fifty-fifth street, on Forty-seventh from Ashland avenue to State street, on State and Halsted streets from Sixty-third street to Sixty-ninth street, to be connected by a line on Sixty-ninth street, on Sixty-first street across the viaduct from State street to Wentworth avenue. In Hyde Park an ordinance is pending for a line on Forty-third street from State street to the Illinois Central Railroad and on Sixty-third street from Cottage Grove to the same, and a line on Sixty-first street from State to Cottage Grove avenue.

All these lines are to be double track. To equip them there are now building in the company's extensive shops 180 cars of the latest and best pattern. The new lines to be built this season aggregate some 30 miles of single track.

THE CHICAGO WEST DIVISION RY. CO., says a telegraphic dispatch, has purchased the Chicago Pass. Ry. Co. for \$1,500,000. This will practically combine the railroad system of the West Side under one management. The Passenger Railway was owned largely by City Hall politicians. It has 22 miles in operation.

#### OUR CHICAGO LETTER.

As spring approaches our street railway men are busy preparing for an increase in summer travel; and I learn the West Division Co. are building twenty elegant new open cars and putting their old ones in thorough repair at their own shops, while the other roads of this city have given extensive orders to Pullman and car builders in other places. Mr. Yerkes, of the

#### NORTH CHICAGO R. R. CO.,

has obtained from the City Council the right to extend his new cable lines through the heart of the city by double tracks the whole length of Dearborn street to the Dearborn Railway station on Polk street and by single tracks in Monroe, Randolph, and La Salle streets through the tunnel, and is required to build bridges over the river at Wells street and Dearborn street. The power plant will be located at the corner of Michigan street and La Salle avenue, where a building is already commenced, and it is expected that the cars will be running by next fall.

The South Side Co. have just started up a new pair of immense Wheelock engines to drive their cable machinery at their Twentieth street station, and are having a still larger pair built for their Cottage Grove avenue extension.

The electric business is active.

#### THE VAN DEPOELE CO.

are running their shops extra time on railway work and will soon ship two carloads of car motors and the giant 250 H. P. generator to Montgomery, Ala.

By invitation of Manager Stiles, your correspondent with a party of gentlemen

was present at a trial of this giant dynamo, and witnessed the immense power transmitted through apparently insignificant wires to a dozen or more motors, and felt the strong magnetic attraction, which was sufficient to cause the needle of a compass to point straight at the machine from the farthest corner of a large room.

This company are also getting out apparatus for the street railways at Binghamton, N. Y., Lima, O., and for increase of plants at Appleton, Wis., and Scranton, Pa., and have nearly completed arrangements for building three electric railways in the East, full particulars of which cannot be given at present.

#### THE BIDWELL ELECTRIC & MFG. CO.

have placed an experimental plant on the Lake Front at the head of Madison and Washington streets, where cars will be run for a distance of about thirty rods by the Bidwell electric system, and that portion of Michigan avenue will be lighted by the same current. This will give street railway promoters and capitalists a more satisfactory opportunity to investigate this promising system of propulsion than they have heretofore had.

In addition to all the various cable, electric and steam motors, there comes another scheme struggling for recognition in the shape of an improved spring motor with which an ambitious inventor expects to store up sufficient power in steel springs underneath cars for several miles' running at a "winding up," and with this I will wind up.

March 17.

W. H. B.

#### Chicopee, Mass.

THE CHICOPEE ST. RY. CO. is the name of the new company. Its location has been finally granted; will extend from Chicopee Falls through Chicopee Center to the point where the boundary line between Chicopee and Springfield crosses the River road. It will be about four miles long, of 4 ft. 8½ in. gauge. The capital is \$25,000; and the largest stockholders are Charles D. Haines and George W. Stetsou of New York City.

#### Cleveland, O.

THE ST. CLAIR ST. RY. CO., not hitherto reported in full in our Directory, has 9 miles of 4 ft. 8½ in. track, 10 one-horse and 20 two-horse cars, 150 horses. Officers: President, Charles Hathaway; Vice President, S. S. Lyons; Secretary, Alfred G. Hathaway; Superintendent, A. W. Lynne.

THE STREET RAILWAY SUPPLY CO., among recent orders, have booked the following: They are to equip 10 cars with the Shattuck box and complete gear for the Broadway road, New York, and 15 complete cars with the Shattuck box for J. M. Jones' Sons, West Troy, N. Y. They are driven to the full capacity of their new factory, but are putting in new machinery which will place them in excellent condition to fill all orders.

#### Danville, Va.

EXEMPTION FROM TAXATION is offered by the town for a new road; and L. C. Berkeley, W. N. Ruffin, Albert Gerst and others are raising a bonus.

#### Davenport, Ia.

THE DAVENPORT CITY RY. CO. will lay two miles of new track and add several new cars to their equipment next month.

#### Decatur, Ala.

THE DECATUR LAND, IMPROVEMENT & FURNACE CO. are about to begin the building of a street car line, and expect to have one mile completed in a few weeks.

#### Detroit, Mich.

THE CITY RY. CO. has voluntarily raised

the wages of its employeess. The new rates are \$1.75 per day for conductors and drivers of one-horse cars. The drivers of double cars, who are not obliged to make change, will receive \$1.62½ per diem.

THE FORT & ELMWOOD RY. CO. has now 216 horses.

#### Des Moines, Ia.

THE DES MOINES ST. RY. CO. intend to extend their present line some six miles and work will be begun this spring. H. E. Teachout, the Secretary, was recently in New York, contracting for the necessary supplies.

#### Duluth, Minn.

THE DULUTH ST. RY. CO. will this spring enlarge their barn so as to accommodate 50 more mules. They have now 91 mules.

#### Durham, N. C.

THE DURHAM ST. RY. CO. will have 8 miles of 4 ft. 8½ in. track, 16 lb. rail, 16 cars, and 25 horses and mules. The capital stock is \$25,000. Work was to have begun in March, and the road will be finished by the 15th of May. The list of officers will be found in our Directory of New Roads.

#### East Saginaw, Mich.

THE EAST SAGINAW ST. RY. are making some improvements this spring. They have just ordered 20 more horses and 4 new open cars, which Walter A. Jones is building, making in all 90 horses and 27 cars. C. A. Bartlett is Acting Secretary and A. Bartlett Superintendent.

#### Eau Claire, Wis.

THE EAU CLAIRE ST. RY. CO. has now 5 miles of track, and more will be added as soon as spring opens, making perhaps 8 miles. Their old rail was 27 lb., but a part of this has been taken up and relaid with 42 lb. center bearing steel rail on straight line and 60 lb. grooved steel rail on all curves; and in the future all the steel will be the same. They increase from 70 to 80 horses.

#### Elgin, Ill.

THE ELGIN CITY RY. intend to put down from 1 to 2 miles more track, add 3 cars and 10 head of horses. They have now 2½ miles, of 4 ft. 8½ in. gauge, 25 lb. rail, 4 cars, 18 horses.

#### Elkhart, Ind.

THE CITIZENS' RY. CO. expect to build 1½ miles of track this summer. They have now 7 cars and 25 horses. The officers are: President, F. W. Miller; Vice President, J. W. Ellis; Secretary, C. W. Fish; Treasurer, J. A. Cook; Managing Director, Jas. Kavanaugh.

#### Eufaula, Ala.

THE CITY OF EUFAULA ST. RY. CO. is a new company, with \$25,000 capital. Their line will be 4 miles long, of standard gauge, 20 lb. rail, with 4 regular cars and several excursion flats; and they will have about 12 horses. E. B. Young is President, Geo. McCormick Secretary, and Eli Shorter Treasurer. The capital stock is \$25,000. Work will be commenced about July and the road will be opened in September.

#### Fall River, Mass.

THE GLOBE ST. RY. CO. increases from 40 cars to 51 and from 160 horses to 210.

#### Framingham, Mass.

THE FRAMINGHAM CENTER RY. CO. is a company just organized. The men who are chiefly interested in it are residents of the town. Capital, \$25,000. It will be 2½ miles long, of 4 ft. 8 in. gauge.

THE FRAMINGHAM ST. RY. CO. has been incorporated, with a capital of \$35,000, to build a horse railroad between South Framingham and Framingham Center. There



are 15 incorporators, but most of the stock is owned by Richard S. Brown, Charles D. Haines, George W. Stetson, Andrew G. Haines and Frank W. Stanley, all of New York City. Work will probably begin about the middle of May, and the plan is to have cars running between the two villages as early as July 1. R. S. Brown, the Haines Brothers' civil engineer, is Superintendent of Construction. The company will use Brill cars, and 10 of them will be ordered at the start, some one-horse and some two-horse. The following temporary officers have been chosen: Treasurer, George W. Stetson, of New York; Clerk, Ira B. Forbes, of South Framingham.

**Fitchburg, Mass.**

THE FITCHBURG ST. RY. CO. increases to 9 cars and 35 horses.

**Freeport, Ill.**

THE FREEPORT ST. RY. CO., not hitherto reported in full, has  $4\frac{1}{2}$  miles of 4 ft.  $8\frac{1}{2}$  in. track, 8 cars and 48 horses.

**Fort Scott, Kan.**

THE BOURBON COUNTY ST. R. R. has 3 miles of 4 ft. track, with 16 lb. rail, 5 cars, 22 horses. Officers: President, J. D. Hill; Secretary, C. O. French; Treasurer, J. H. Richards; Superintendent, E. Strong.

**Fort Smith, Ark.**

THE FORT SMITH ST. RY. CO. will lay several miles of new track, and have ordered six new cars, to be built at St. Louis.

**Fort Worth, Tex.**

THE FORT WORTH ST. RY. CO. increases from 73 mules to 89 since its last report.

**Ithaca, N. Y.**

HAINES BROS. will use the Daft system on their road here, under contract with the Safety Electric Railway and Power Co.

**Jacksonville, Ill.**

THE JACKSONVILLE RY. CO., which has not before been reported in full in our Directory, has  $4\frac{1}{2}$  miles of 4 ft.  $8\frac{1}{2}$  in. track, 30 lb. rail, 16 cars and 30 horses. The officers are: President, Wm. S. Hook; Treasurer, Marcus Hook; Secretary, T. J. Hook; Superintendent, B. F. Sibert.

**Junction City, Kan.**

THE NEW COMPANY will begin operations this spring, and will push the line from Junction City to Fort Riley as soon as the company can get a favorable expression from Congress.

**Kansas City, Mo.**

THE METROPOLITAN ST. RY. CO. now operates the Kansas City & Rosedale Street Railway Co. and the Corrigan Consolidated Street Railway Co.

THE GRAND AVENUE RY. CO. are now constructing  $7\frac{1}{2}$  miles of double track cable railway.

**Knoxville, Tenn.**

A CONSOLIDATION of the three lines here is about to be effected, and several extensions are contemplated.

**Lansing, Mich.**

THE LANSING CITY RY. CO., which appears in our Directory this month for the first time, has 3 miles of 4 ft.  $8\frac{1}{2}$  in. track, 30 lb. steel rail, 5 cars and 24 horses. They will put on two more cars April 1. The officers are: President, Stephen G. Clarke, Chicago; Vice President and Treasurer, Harry M. Clarke, Lansing; Secretary, John P. Altgeld, Chicago; Superintendent, Byron E. Clarke, Lansing.

**Lexington, Ky.**

THE LEXINGTON CITY RY. CO.'s drivers went on strike March 1. They ask \$1.50 for a day's work of sixteen hours in place of \$1.15 which they have been receiving. The company has since had cars running under a police guard.

**Lexington, Mo.**

THE LEXINGTON ST. RY. CO. has  $1\frac{1}{2}$  miles of track, of 4 ft. 4 in. gauge, 30 lb. rail, 2

cars, 8 horses. John C. Young is Superintendent. This company has not before been reported in full in our Directory.

**Lincoln, Neb.**

THE CAPITAL CITY ST. RY. CO. has sold out and gone out of existence.

THE LINCOLN ST. RY. CO. increases to 12 miles of 4 ft.  $8\frac{1}{2}$  in. track, 20 lb. steel rail, 24 cars, 150 horses and mules. At the recent election the following Directors were chosen: J. W. Deweese, John R. Clark, A. E. Touzalin (President Chicago, Burlington & Northern R. R. Co.), F. L. Sheldon. The officers are: President, J. W. Deweese; Vice President, John R. Clark; Secretary and Treasurer, C. J. Ernst; Superintendent, William R. Carter.

**Lockport, N. Y.**

THE LOCKPORT ST. R. R. CO. now has 33 horses. Its rail is 42 lbs. to the yard. John Hodge is President and Treasurer, and W. T. Ransom Secretary.

**Logansport, Ind.**

THE LOGANSPORT RY. CO. has now  $2\frac{1}{2}$  miles of track, with 30 lb. rail, and increases its stock to 39 mules.

**Longview, Tex.**

THE LONGVIEW & JUNCTION ST. RY. will make no improvements, as they only need new wheels. They have 16 lb. rail.

**Los Angeles, Cal.**

THE DAFT ELECTRIC ROAD carried here, during the month of February, 14,892 passengers, being an average of over 500 a day. The road runs through a sparsely settled portion of the city, but is said to be very popular.

THE AMERICAN RAPID TRANSIT CO. has been formed, with a capital of \$500,000, headquarters at Los Angeles, for the purpose of building a railroad from Pasadena to Santa Monica, Cal., under the Enos elevated electric railway system.

**Louisville, Ky.**

THE LOUISVILLE CITY RY. CO. increases to 65 miles of track, 5 ft. gauge, 40 to 58 lb. rail, 230 cars and 1,400 mules.

**Madison, Ind.**

THE MADISON ST. RY. CO. has now 4 horses and 11 mules.

**Madison, Wis.**

THE MADISON ST. RY. CO. now has 28 mules.

**Meriden, Conn.**

THE NEW ROAD has been delayed in opening, and the 1st of April is now set for such date. The change of officers reported in our last issue was an error. There has been no change here; our remarks referred to Middletown, Conn.

**Milwaukee, Wis.**

THE CREAM CITY R. R. CO. has been granted a right of way on Brady and Racine streets, in the First ward, and across Huron street bridge to the St. Paul depot, in the Third and Fourth wards. The Board of Public Works will expend \$1,500 on the bridge, which has become "hogged." This company increases from 74 cars to 80 since its last report and from 307 mules to 310; and now has 38 and 52 lb. girder rails and 27 lb. tram rails.

THE MILWAUKEE CITY RY. CO. has been granted a right of way from Third street across State street bridge to Martin street and Broadway, thence south to Michigan and east to Lake and Wisconsin. It gives Second ward residents direct communication with the Northwestern depot, and is an accommodation to the entire west side. The Cream City company at one time contemplated building on Broadway. There was some opposition to the grant, because it will exclude the Cream City company from access to the depot.

**Minneapolis, Minn.**

THE MINNEAPOLIS WEST SIDE ST. RY. CO.

filed articles of incorporation March 11. The incorporators are Randolph Burgess, John T. Byrnes, Albert Chamberlain, H. J. Mitchell and Matthew Walsh, all of Minneapolis. The capital stock is fixed at \$200,000.

THE MINNEAPOLIS ST. RY. CO. within the next six months will extend their Washington avenue line from Twentieth to Thirty-third avenue north, and will build a line on Franklin avenue from the river to Fourth avenue, to Twenty-seventh street, to Hennepin avenue.

**Mobile, Ala.**

THE CITY R. R. CO. has now 60 cars and 200 horses, and has changed its officers as follows: President, O. F. Cawthon; Vice President, A. H. Spira; Secretary, Peter Stark; Superintendent, R. R. Benson.

**Montgomery, Ala.**

THE CAPITAL CITY ELECTRIC RY. has now 11 miles of track, of 4 ft. gauge, 42 lb. rail, 20 cars, electric motors.

**Nashville, Tenn.**

NASHVILLE & EDGEFIELD R. R. CO. The only change is that James H. Yarbrough is now President.

**Newark, N. J.**

THE ESSEX PASSENGER RY. CO. increase from 31 to 50 miles of track, from 107 cars to 138, and from 702 horses to 740.

**Newburgh, N. Y.**

THE NEWBURGH ST. RY. CO. will lay  $2\frac{1}{2}$  miles more track this spring. They have now  $2\frac{1}{2}$  miles, of 4 ft.  $8\frac{1}{2}$  in. gauge, 40 lb. rail, 5 cars, 24 horses. The officers are: President, Rowland F. Hill; Vice President, Sidney W. Hopkins; Secretary and Treasurer, William Morris; General Manager, H. Ives Smith.

**Newburyport, Mass.**

THE PLUM ISLAND ST. RY. CO. will begin work at once. The paving stones, sleepers and iron have arrived. The skating rink at Salisbury beach is being removed to Plum island, and will be fitted into a hall and car house. The road will be about three miles in length and will reach to the Newburyport and Amesbury line.

A NEW INDUSTRY has been started here in the way of a street car manufactory. A new building is being erected in which to put the cars together, the other works having been utilized for other purposes. The new firm will build cars complete, gradually increasing its force as circumstances warrant or demand. They are already building eight open cars, four of which are to run on the new Plum Island road. These will be equipped with the Bemis gear.

**New York, N. Y.**

EDWARD BEADLE will hereafter be the firm of Beadle & Courtney. Mr. Courtney will be the General Agent.

FRANCHISES for surface roads have been granted Haines Bros. at Chicopee, Mass., also at Port Chester and Rye Beach.

THE CENTRAL PARK, NORTH & EAST RIVER R. R. CO. increases its mileage to 26 since its last report. It has now 1,200 horses.

THE SOUTH FERRY RY. CO. is now running two-horse instead of bobtail cars, and reports 6 box and 4 open cars, and 33 horses.

THE NEW YORK UNDERGROUND R. R. CO. has applied to open Lafayette place, and proposes to operate its road under the Bentley-Knight system.

THE THIRD AVENUE R. R. CO. has made formal application for permission to open the streets along its line for the purpose of extending its cable system down Third avenue.

THE FORTY-SECOND ST., MANHATTANVILLE & ST. NICHOLAS AVE. RY. CO. has 18 miles of track, of 4 ft.  $8\frac{1}{2}$  in. gauge, 60 lb. rail,



105 cars, 650 horses. Pres. John S. Foster, Sec. C. F. Naething, Treas. Arthur Leary.

GARDNER & Co. have leased 47 West Forty-second street and expect to fit it up for a general sales-room for their goods. They report business good in the railway line, and are working up to their full capacity.

THE JOHN STEPHENSON Co. is filling orders for various cities in this country, among which are Memphis, Nashville, Birmingham, Brunswick, Louisville and Jacksonville in the South, and others West, North and near by; also for different points in Mexico, the Australias, and South Africa.

THE NINTH AVENUE R. R. Co. reports 50 cars and 500 horses. George Law is President and Lewis P. Foulk Superintendent.

CENTRAL CROSSTOWN R. R. Co. The familiar pea-green bobtail cars which have carried passengers from Union square through Fourteenth street to the Christopher Street Ferry, have been taken off, and in their stead cars like those on Broadway are now running. They are also bobtails, but have wider and more convenient platforms, and they are well lighted at night.

RUFUS MARTIN & Co. have recently introduced some of Brill's patent car appliances. The ratchet brake handle, changeable end light and reversible sign castings have met with much favor and approval. Samples may be seen at their office. Martin & Co. report sales of change boxes to the Fifth Avenue Transportation Co. and a supply equipment to the Orange Street Railway Co.

EIGHTH AVENUE R. R. Co. A public test was made March 4 of the Julien Electric Motor, with which experiments have been made on this line for several months past. The motor ran from the stables at Forty-ninth street and Eighth avenue to One Hundred and Tenth street and back, a distance of about five miles, in 45 minutes. Among those who made the trip were President Lyon, of the Third avenue road; F. P. Osborne, W. A. Harper, William A. Bracken, President of the Julien Company; George E. Montgomery and Dr. Brooks H. Wells. The test was very satisfactory.

THE NORTH & EAST RIVERS RY. Co. is the name of the company that proposes to run a street railway through Fulton and Cortlandt streets, from Fulton Ferry to Cortlandt Street Ferry, to be operated by the Bentley-Knight electric system. The capital is all secured; and the company is only waiting for the franchise to be offered for sale and to see if they can secure it. W. W. Laman is President, and Alexander Hudnut, Ira Perego, David Bangs, Aaron Raymond, J. L. Truman, W. H. McDougal, W. G. Smith, Homer A. Nelson, R. R. Hazard, Robert W. Blackwell, and John T. Fanning are directors. F. W. Childs, who represents the Bentley-Knight Electric Co. is the chief promoter of the enterprise and contractor for the construction of the road. The cost of the road for 40 cars is estimated at \$344,000, against \$162,000 as the cost of a horse road; but while the annual expenses of the latter road approximate \$103,000, that of the electric road is calculated at \$60,000. The projectors believe that this system will solve the problem of transportation in a crowded thoroughfare, and will restore prosperity to the old shopping establishments on Fulton street which have suffered from the diversion of traffic to the bridge.

#### New Orleans, La.

THE AMMONIA ENGINE, built by the Standard Fireless Railway Co., was recently tested by the Napoleon avenue line to Carrollton and is said to have been a success.

Mr. P. J. McMahon is the inventor and patentee of the device.

#### Newton, Mass.

THE NEWTON ELECTRIC R. R.'s location was not granted by the Board of Aldermen of 1886, but was referred to the 1887 Board. It is almost certain that the right will be granted in a few weeks.

#### Newton, Kan.

THE NEWTON CITY ST. RY. Co. is a new company, with the following officers: President, Allen Moore; Vice President, John A. Randall; Secretary, W. G. Oldfield; Treasurer, J. M. Ragsdale. They will lay 3 miles track, and have ordered 6 new cars from Brownell & Wight, of St. Louis.

#### Northampton, Mass.

THE NORTHAMPTON ST. RY. Co. are putting in three new curves and some straight track of the Johnson Steel Rail Co.'s girder rail; J. M. Jones' Sons are building them a new open car, for this season, and they are adding 5 new horses. They report now 9 cars, 35 horses and 3½ miles of track.

#### Omaha, Neb.

THE LAKE MANAWA R. R. Co. has been organized, and propose to run from the dummy depot on Broadway, down Eighth street, and then off in the direction of the lake.

A NEW COMPANY has been organized, under the leadership of E. A. Benson, W. L. McCague and C. E. Mayne, and has received permission to build on Thirty-sixth street, Hamilton street and Institute boulevard; also on Lowe and Mercer avenues to Vista street; also on Leavenworth street, Lincoln place and west of Walnut hill to Institute boulevard. Work has already begun along Lowe avenue, and it is supposed that the threatened injunction will be withdrawn.

#### Oakland, Cal.

SENATOR FAIR's entire cable system here has been sold to the Southern Pacific Railroad, it is understood, for something over \$6,000,000.

#### Orange, N. J.

ORANGE CROSSTOWN & ORANGE VALLEY ST. RY. Co. The President of this new company is Francis M. Epley, of Orange; Secretary, James E. Brown, Elizabeth; Treasurer, Henry W. Pope, Elizabeth.

#### Oneida Village, N. Y.

ONEIDA RY. Co. W. A. Stone is now President of this company.

#### Passaic, N. J.

THE NEW COMPANY, whose road is to run from Garfield to Clifton, through Passaic, expects to begin work in a few days. The opposition to the scheme is reported to be weakening.

#### Pensacola, Fla.

THE PENSACOLA ST. CAR Co. has 3 miles now completed and in operation, and a 3-mile extension will be commenced shortly. Gauge, 4 ft. 8 in. They have 6 cars at present and will have 10 to 15; 30 mules now, will have 50 to 60. Capital, \$100,000. President, A. V. Clubbs; Secretary, W. A. Blount; Treasurer, Thomas C. Watson.

#### Peoria, Ill.

THE EAST BLUFF PEORIA HORSE RY. has been opened for business since Dec. 25, and will be extended ½ mile before May 1. R. R. Bourland is Secretary.

#### Philadelphia, Pa.

THE FIFTH AND SIXTH STS. road of Philadelphia has just adopted the Lewis & Fowler alarm register.

THE HESPTONVILLE, MANTUA & FAIRMOUNT PASS. R. R. Co. increases from 50 to 60 cars and from 480 to 500 horses.

THE CITIZENS' PASS. RY. Co. increases from 420 horses to 470, and has now 86 cars. H. C. Keen is the new Superintendent.

EXCHANGE TICKETS have been adopted by the following roads; also a seven cent exchange ticket: Fifth and Sixth streets, Second and Third streets, Thirteenth and Fifteenth streets, Tenth and Eleventh streets, Race and Vine and Arch streets, and Spruce and Pine streets.

THE FRANKFORD & SOUTHWARK PHILADELPHIA CITY PASS. R. R. Co. increases from 618 horses to 650, and has now 100 cars and 18.10 miles of track. The officers have been changed, and are now as follows: President, John Noblit; Secretary, Thomas S. Harris; Treasurer, R. C. Brewster; Superintendent, T. E. Cox.

THE STREET RAILROADS of Philadelphia have all adopted a five cent fare. This is brought about at this time by the decision on the part of the Traction Company to adopt five cent fares on the first of April. The charter of this company, when granted, compelled a five cent fare, but as it has been operating other lines there was some question as to the application of this privilege.

THE J. G. BRILL COMPANY report on new orders as follows:—"Our foreign business is specially brisk. Have several orders for tram and railway cars for Mexico, and have one or more orders for the following countries in South and Central America: Costa Rica, United States Colombia, Venezuela, Brazil, Paraguay, Argentine Republic and Chili; also for London and Spain. For the United States and Canada we have our full share of work. Are making 30 of our patent cable truck cars for the North Chicago Ry.; 20 for the St. Louis Cable & Western Ry., and trucks for 15 cars; 12 of the 20 cars are to have top seats of our improved pattern. We are also building 15 cable cars for the Third ave., N. Y., and 12 for the Mt. Auburn Ry. of Cincinnati and also for Philadelphia and Pittsburg. Have orders for 20 cars for an electric road in New York; 8 cars for the Van Depoele system in Montgomery; also several cars for Scranton for same system, and more than the usual amount of tram-car orders. We have just completed an additional shop 125 x 150, and although we are crowded with orders our capacity for filling orders is like the capacity of a tram-car—never full, always room for one more."

#### Pittsburg, Pa.

THE PITTSBURG, OAKLAND & EAST LIBERTY PASS. RY. Co. has 160 horses and 22 cars. Thomas S. Bigelow is President and G. W. Elkins General Manager.

#### Portland, Me.

THE PORTLAND R. R. Co. has now 9½ miles of track, 36 cars and 167 horses. This company operates the Ocean street road.

#### Raleigh, N. C.

A FRANCHISE has been obtained by James Graham, who is backed by the Messrs. Pratt, of the Standard Oil Co.

#### Rome, N. Y.

THE ROME CITY ST. RY. Co. will have about five miles of first-class track. The officers are: President, Rowland F. Hill; Vice President, Charles W. Dayton; Secretary and Treasurer, William Moores; Chief Engineer, Samuel McElroy.

#### Saginaw, Mich.

THE CITY OF SAGINAW ST. R. R. Co. increases from 10 cars to 14.

#### Salem, Mass.

THE NAUMKEAG ST. RY. Co. has 24 miles of track. It increases from 50 cars to 83 since the last report and from 140 horses to 275.

#### San Francisco, Cal.

THE POWELL ST. RY. Co., a new cable line, will be 13 miles long.

THE PACIFIC IMPROVEMENT Co., said to be composed of substantially the same capitalists that control the Southern Pacific



has acquired possession of the Geary Street, Park & Ocean Railroad Co., the City Railroad Co. and the Central Railroad Co. A cable road will probably be built from the ferries along East street, curving into Mission, along Mission to Thirty-first avenue. It is also the purpose of the company to extend the Geary street route by the cable system on Point Lobos avenue to connect with Sutro Heights and the Cliff House, and also to develop the Bay district section.

#### St. Catharine's, Ont.

THE ST. CATHARINE'S, MERRITTON & THOROLD ST. RY. Co. contemplate substituting electricity for horses as motive power this summer, and are now investigating the different systems.

#### St. Louis, Mo.

THE ELECTRIC LIGHT & POWER Co., it is stated, will apply their Trippe storage battery system to street car operation in St. Louis at once.

#### OUR ST. LOUIS LETTER.

Street railway matters here at this present time are at a standstill. Of all the bills that were introduced in the Council looking for franchises, not one has as yet been granted. Two enterprises have been knocked in the head—the Tucker elevated, which has "bobbed up serenely" at every session for the last three or four years, and the Seventh street electric elevated.

The City Councilmen are a fair-minded body of men, and appear to be willing to listen to reason. Yet our street railroad friends have to work to head off those who appear to be so anxious to join them in this business. Public benefactors, they are ready to sacrifice themselves to an alarming extent if they can only hold stock in some road that is to be; no matter if it is alongside or overhead of another, they can show so much better in this way their superior qualifications for the business. They can provide accommodations so far ahead of what the old road has done, they can run up and down town so much quicker, and theirs is to be the only line by which the boiling masses are to reach the parks; and if the franchise is only granted and there should happen to be a church within hearing distance of their bell the brakes will be turned on and they won't budge again until the amen has been passed down the aisles. This is St. Louis when she wants a franchise for a street railroad.

Our people are not asleep. Preparations are being actively made for at least three cable lines on roads operated by Messrs. Walsh, Maffit and Maxon, and work will certainly begin before the 1st of May if nothing appears that will be more economical than the cable. If any one who reads what your correspondent says believes he has solved the problem and can prove that his system is better than the cable, he must do it quick in order to get a show here.

John Maxon will have his Julien motor in operation in a few days. Messrs. Brownell & Wight are fitting up the car for him. We all hope of course for success.

ST. LOUIS.

March 16.

#### St. Joseph, Mo.

THE FREDERICK AVE. RY. Co. will lay 2 miles standard gauge steel rail track this year. They have now 1½ miles. The only change in officers since our last report is that J. A. Corby is now General Manager. Schenectady, N. Y.

SCHENECTADY ST. RY. Co. James Graham, the contractor, says that the road, of which more than a mile is already finished, will be completed by the 10th of April. William G. Caw is building the stable and car shed which will be two stories, with 30 stalls. The story and a half car shed will hold five cars. The cars have already been bought.

Best girder rails will be used. The Messrs. Pratt, the oil men, own all the stock and half the bonds.

#### Scranton, Pa.

THE NAYAUG CROSSTOWN R. R. will run out to Dunmore. Capital, \$50,000.

#### Selma, Ala.

THE SELMA LAND IMPROVEMENT & FURNACE Co. will build an electric street railway. Its capital stock is \$3,000,000. R. M. Nelson, W. Ullman and V. T. Vaughan are among the incorporators.

THE SELMA ST. RY. Co. will increase the capital stock and extend the road 2 miles at once. Will probably use dummies or electricity in place of horses as now. They want proposals for 4 miles 20 lb. steel rail and 2 dummy engines.

#### Sheffield, Ala.

THE SHEFFIELD & TUSCUMBIA ST. R. R. Co. will be 6 miles long, of broad gauge, with heavy steel rails, and will have 2 cars at first and more afterwards, to be propelled by a first-class steam dummy. The road will be opened early in April. Capital stock, \$50,000. President, F. D. McMillan; Vice President, J. T. Hull; Secretary, Ed. B. Alman; Treasurer, Jo. H. Nathan.

#### Sioux City, Ia.

THE SIOUX CITY ST. RY. Co. increases to 7 miles of track, 10 cars, 4 horses and 60 mules.

#### South Bend, Ind.

THE SOUTH BEND RY. Co. increases to 16 cars and 60 horses.

#### Springfield, Mass.

THE SPRINGFIELD ST. RY. Co. has acquired possession of the West Springfield St. Ry. Co., and will build the road in a thorough manner. Its petition for extensions in Springfield, including one to the Chicopee line, has been tabled by the Board of Aldermen.

#### Syracuse, N. Y.

THE THIRD WARD RY. Co. have begun building their road on Quince street, so as not to forfeit their franchise. An effort is being made to introduce a bill in the Legislature which will exempt Syracuse from the Cantor bill. If this is successful the company say they will finish the road at once.

THE WALES MANUFACTURING Co.'s works were destroyed by fire March 3rd. A large number of fare-boxes were destroyed, as well as machinery, etc. Mr. Wales writes us, however, that they have already moved into larger and better quarters and will have greater facilities for supplying their customers with the Wales fare-boxes than ever before, and that they will be able to keep up with the increasing demand.

#### Tampa, Fla.

THE TAMPA ST. RY. Co., not hitherto reported in full in our Directory, has 2½ miles of 3 ft. 3 in. track, 25 lb. rail, 7 cars and 2 engines. C. A. Martinez is President, G. T. Chamberlain Secretary and Treasurer and C. E. Purcell Superintendent.

#### Taunton, Mass.

THE SCADDING ST. RY. Co. has been granted a franchise to build 4 miles from corner of Maine and Cedar streets, through Cedar, Grant, School, Purchase, Washington and Bay to Scadding's pond. None but taxpapers can be employed on the road, at \$1.75 a day, and eight hours per day must constitute a day's labor. The managers will go to work at once, and expect to have a good part of the road in running order in a few months.

#### Toledo, O.

THE TOLEDO CONSOLIDATED ST. RY. Co. increases from 225 horses to 255.

THE CENTRAL PASS. R. R. Co. will extend their track 2,000 feet. Since their last report they have increased from 70 to 80 horses.

#### Topeka, Kan.

TOPEKA RAPID TRANSIT ST. RY. Co. will be 12 miles long, of 4 ft, 8½ in. gauge, 40 lb. rail, with 20 to 25 cars and 12 to 15 noiseless steam motors. Work has begun, materials are contracted for, and they expect to get part of their line in operation early in May. Capital stock, \$250,000. Officers: President, John Francis; Vice President, P. G. Noel; Secretary, J. B. Bartholomew; Treasurer, Armin Fassler.

#### Trenton, N. J.

THE CITY RY. Co. will extend its road this summer about four miles through the northern portion of the city, and has issued stocks and bonds for the purpose. The annual report for the year ending Dec. 31 last shows an increase of \$37,253.29 in the construction account; the largest items being: Roadbed—Chambersburg extension, and tracks and curves, Center-street car house, \$12,212.66; real estate, Center-street stable, \$8,408.82; lot for Center-street stable, \$4,500. The company purchased 39 horses during the year at a cost of \$6,930, or an average of \$154.61 per horse; and lost 7, as follows: Colic, 1; lung fever, 1; killed by cars, 1; run away and killed, 1; shot, 2; died in transportation from the West, 1. Jan. 1, 1887, there were 99 on hand, of which 96 were working.

#### Utica, N. Y.

UTICA BELT LINE ST. RY. Co. has been running since Dec. 15; and Dec. 1 leased the street department of the Utica, Clinton & Binghamton R. R.

UTICA & MOHAWK ST. R. R. Co. The report for the six months ending Dec. 31 shows receipts of \$6,323.10 and operating expenses of \$4,665.17. A semi-annual dividend of three per cent was declared. The company reports 8 cars and 11 horses. It contemplates building from Main street up John, to Rutger, to Seymour avenue, to Leah, to Dudley, and thence to St. Agnes' Cemetery. Very little opposition has been shown to the scheme, and the new line may be looked for the coming season.

#### Vincennes, Ind.

VINCENNES ST. RY. Co. has 2½ miles of 4 ft. 8½ in. track, 36 lb. rail, 4 cars and 24 horses. President and Treasurer, Frederick Graeter; Secretary, George W. Graeter.

#### Washington, D. C.

COLUMBIA R. R. Co. has now 23 cars, an increase of 4; and 71 horses, an increase of 15.

#### Waterbury, Conn.

WATERBURY HORSE R. R. Co. has now been running about three months, has 5 miles of track and will build another mile this spring. They increase from 60 cars to 100 since their last report to us.

#### Wichita, Kan.

ORANGE J. CHAPMAN, formerly of the Muscatine St. Ry., Muscatine, Ia., has accepted the management of the Wichita City Ry. Co. This road has 15 miles of track and expects to make large extensions in the spring. The company owns 160 mules and employs a large force of men.

RIVERSIDE & SUBURBAN RY. Co. will be opened within three months.

#### Wilkesbarre, Pa.

COALVILLE PASS. R. R. Co. last year paved with chestnut blocks 3 ft. wide on each side of track ½ mile or more; inside of track is paved with cobble stone.

#### Winfield, Kan.

UNION ST. RY. Co. will build 3 miles this year. It has now 1½ miles. The list of officers has been changed, and is now as follows: President, A. J. Thompson; Secretary, J. R. Clark; Treasurer, John A. Eaton.

#### Yonkers, N. Y.

THE YONKERS R. R. Co. has added 15 horses since its last report, and now has 70.



# 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.

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. J. Dodge, Sec. F. M. Atterholt, Supt. John T. Metlin.

**ALBANY, N. Y.**—Watervliet Turnpike & R. R. Co. 15 m, 4-8½ g, 30-45 lb r, 31 c, 145 h. V. Pres. C. B. Tillinghast, Sec. & Treas. Cantine Tremper, Supt. Amos Free. Offices, 1165 Broadway.

The Albany Ry. 14 m, 4-8 g, 54 c, 232 h. 33-47 lb r. Pres. Supt. and Treas. John W. McNamara, V. Pres. Robt. C. Pruyn, Sec. Jas. H. Manning, Cashier, Wm. W. Dennin, Asst. Supt. Edgar S. Fasset, Accountant, J. N. Murphy. Offices 3 & 5 N. Pearl st.

**ALLEGHENY CITY, PA.**—Federal St. & Pleasant Valley Pass. Ry. 4.8 m, 5-2 g, 50 lb r, 22 c, 160 h and mu. Pres. Wm. McCreery, Sec. R. F. Ramsey, Supt. Wm. J. Crozier. Office, 129 Taggart st.

People's Park Pass. Ry. Co. 5.2 m, 5-2 g, 45 lb r, 10 c, 70 mu. Pres. Wm. McCreery, Sec. R. F. Ramsey, Treas. Jas. Boyle, Supt. Wm. J. Crozier. Office, 129 Taggart st.

**ALLENTOWN, PA.**—Allentown Pass. R.R. Co. 3½ m, 4-8½ g, 19 lbs. r, 3 coaches, 22 h. Pres. Samuel Lewis, Treas. & Sec. Joseph E. Balliet. Supt. A. T. Brown. Office Hamilton st. Capital, \$45,260.

**ALTON, ILL.**—Alton & Up. Alton Horse Ry. Co.

**ALTOONA, PA.**—City Pass. Ry. Co. of Altoona, Pa. 3½ m, 5-3 g, 43 & 45 lbs. r, 17 c, 40 h. Pres. John P. Levan, Sec. & Treas. L. B. Reifsnider, Supt. John J. Buch. Capital, \$68,000.

**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. Leased to Jas. R. Snell.

**ANN ARBOR, MICH.**—(See new roads.)

**APPLETON, WIS.**—Appleton Electric St. Ry. 4½ m, 5 c. Pres. J. E. Harriman, V. Pres. N. B. Clark, Sec. & Treas. Jos. Koffend.

**ASHTABULA, O.**—Ashtabula City Ry. Co. 4 m, 4-8½ g, 40 lb r, 9c, 60 h. Owner & Prop. Jno. N. Stewart.

**ATCHISON, KAN.**—Atchison St. Ry. Co. 9 m, 20 c, 65 h, 4-8½ g, 20-30 lb r. Pres. J. H. Beeson, Treas. H. M. Jackson, Sec. J. P. Adams. Gen. Supt. Geo. W. Carpenter.

Gate City S. R. R. t. Co. 2½ m, 4-8½ g, 16 lb r, 7 c, 26 h. Pres. L. B. Nelson, V. Pres. L. DeGivat, 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.

**ATHENS, GA.**—Classic City St. Ry. Co. 3½ m, 4 g, 16 & 20 lb r, 4 c, 30 mu. Pres. Geo. M. Snodgrass, V. Pres. R. B. Russell, Treas. Lamar Cobb, Supt. J. H. Dorsey.

**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.

Gate City St. R. R. Co. 2½ m, 4-8½ g, 16 & 50 lb r, 7 c, 28 mu. Pres. R. Peters, Sec. & Treas. J. W. Culpepper, Supt. & Pur. Agt. E. C. Peters.

Metropolitan St. R. R. Co. 6 m, 4-8½ g, 20 lb r, 20 c, 84 h. Pres. J. W. Rankin, Sec. J. S. Hanluttu. Office cor. Hunter and Butler sts.

West End & Atlanta St. R. R. Co. Pres. T. G. Healey.

**ATLANTIC, N. J.**—Atlantic City Ry. Co.

**AUBURN, N. Y.**—Auburn & Owasco Lake R. R. Co. 1½ m, 4-8½ g, 28-30 lb r, 4c, 13 h. Pres. D. M. Osborne, Sec. & Treas. C. B. Koster, Supt. B. F. Andrews.

East Genesee & Seward Ave. Ry. Co. 2½ m, 4-8½ g, 30 lb r, 6 c, 25 h. Pres. David M. Osborne, Sec. & Treas. C. B. Koster, Supt. B. F. Andrews.

**AUGUSTA, GA.**—Augusta & Summerville R. R. Co. 6 m, 5 g, 30 lb r, 13 c, 42 h. Pres. Patk. Walsh, Supt. & Sec. Edw. G. Mosher. Auditor, Frank E. Pettit. Office, 513 McKline st.

**AURORA, ILL.**—Aurora City Ry. Co. 5 m, 4-8½ g, 28 lb r, 7 c, 10h, 30 mu. Pres. H. H. Evans, V. Pres. S. W. Thatcher, Sec. A. J. Hopkins, Treas. E. W. Trask, Supt. I. B. Chattle.

**BABYLON, N. Y.**—Babylon Horse R.R. Co. 1½ m, 4-9 g, 60 lb r, 3 c, 3 h. Pres. W. F. Norton, Sec. Jos. M. Sammls, Treas. John R. Reid, Supt. David S. Sammls.

**BALTIMORE, MD.**—Baltimore & Powhatan Ry. Co. 6 m, 5-4½ g, 30 lb r, 4 c, 18 h. Pres. & Treas. E. D. Freeman, Sec. R. B. Clark, Supt. I. M. Ketrick. Office 406 Laurens st.

Baltimore City Pass. Ry. Co. 41 m, 5-4½ g, 46 & 47 lb r, 15 c, 106½ h. Pres. & Supt. Oden Bowie, Supt. car shops J. M. Blundell, Supt. tracks, Boyer Parks. Treas. John Bolgiano, Sec. S. L. Bridge. Office cor. Calvert & Baltimore sts.

Baltimore Union Pass. Ry. Co. 16 m, 5-4½ g, 47 lbs r, 61 c, 391 h. Pres. N. Perrin, Gen. Man. T. C. Robbins, Treas. E. P. D. Cross, Sec. Leon Fender, Asst. to Gen. Man. R. E. Robbins. Office cor. Huntington ave. & Oak st.

Baltimore & Catonsville Ry. Co. 6 m, 5-4½ g, 35 lb r, 15 c, 51 h. Pres. J. C. Robbins, Supt. & Pur. Agt. G. W. Appleby. Office Pratt st. & Frederick av.

Baltimore & Pimlico & Pikesville R.R. Co. Central Ry. Co. 1½ m, 5-4½ g, 40 lb r, 22 c, 2 sweepers, 186 h. Pres. Peter Thompson, Sec. & Treas.

Walter Blakstone. Office cor Preston and Constitution sts.

**CITIZEN'S RY. CO.** 20 m, 5-4½ g, 34 lbs. r, 42 c, 380 h. Pres. Jos. S. Hagarty, Sec. Wm. Hammersley, Supt. C. C. Speed, Treas. S. V. Keen.

Highlandtown & Point Breeze Ry. Co. City Div. 6 m, 5-8 g, 1b r, 15 c, 9 h. Pt. Breeze Div. 3 m, 1 loco, 4c. Pres & Gen. Man. Francis Hazlehurst, of Philadelphia, Treas. Robt. D. Morrison.

North Baltimore Passenger Ry. Co. 21 m, 5-4½ g, 45 lb r, 72 c, 400 h. Pres. Jas. L. McLane, Treas. Dan'l J. Foley, Sec. Thos. J. Wilson.

People's Ry. Co. 13 m, 5-4½ g, 47-45 lb r, 38 c, 200 h. Pres. T. Edw. Hambleton, Treas. Gustavus Ober, Sec. Supt. & Pur. Agt. Wm. A. House, Jr. Office Druid Hill ave. f

York Road R.R. Co.

**BATTLE CREEK, MICH.**—Battle Creek St. Ry. 4 m, 3-6 g, 28 lb r, 8 c, 20 h. Pres. G. L. Beveridge, Chicago, V. Pres. Lucius Clark, S. Bend, Ind., Sec. H. H. Brown, Battle Creek, Treas. H. H. C. Miller, Chicago, Supt. Geo. Wolf, Battle Creek.

**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.

**BEATRICE, NEB.**—Beatrice St. Ry. Co. 4 m, 4-8½ g, 25 lb r, 4 c, 20 h. Pres. J. D. Kilpatrick, Supt. & Purchasing Agt. J. E. Smith.

**BEAVER FALLS, PA.**—Beaver Valley St. Ry. Co. 3½ m, 5-2½ g, 38 lb r, 3 c, 31 h. Pres. M. L. Knight, V. Pres. Col. J. Weyand, Sec. & Treas. J. F. Merriman, Supt. L. Richardson. Office, 1207 7th av., Beaver Falls.

**BELLAIRE, O.**—Bellaire St. R.R. Co. Purchased by Chas. D. Haines, of Haines Bros., for the bondholders.

**BELLEVILLE, ONT., CAN.**—Belleville St. Ry. Co. 1½ m, 3-6 g, 25 lb r, 5 c, 14 h. Pres. D. Lockwood, Sec., Treas. & Man. S. A. Lockwood.

**BELLEVILLE, ILL.**—Citizen's St. Ry. Co. 4½ m, 1-8½ g, 16 lb r, 7 c, 20 h. Pres. D. P. Alexander, Man. & Treas. H. A. Alexander, Sec. J. E. Thomas. Office N. E. cor. Main and High sts.

**BEREA, O.**—Berea St. R. R. Co. 1½ m, 3-6 g, 25 lb r, 2 c, 4 h. Pres. C. W. D. Miller, V. Pres. T. Chinchward, Sec. & Treas. F. I. Pomeroy, Supt. A. W. Bishop.

**BINGHAMTON, N. Y.**—Washington Street & State Asylum R.R. Co. 4½ m, 4 g, 16-35 lb r, 13 c, 23 h. Pres. R. H. Meagley, V. Pres. Geo. Whitney, Sec. Ira J. Magley, Treas. F. E. Ross, Supt. Wm. Whitney, Binghamton Central R.R. Co. 3½ m (3 m. laid.) 3 g, 28 lb r, 6 c, 8 h. Pres. Geo. L. Crandall, V. Pres. Alonzo Everts, Sec. Chas. O. Root, Treas. H. J. Kneeland, Supt. Nelson Stow. Offices 65 Court st d

Binghamton & Port Dickinson R.R. Co. 5 m, 4-8½ g, 20-30 lb r, 10 c, 23 h. Pres. Harvey Westcott, Sec. & Treas. G. M. Harris, Supt. N. L. Osborn. (Leased to Mr. Osborn). Offices 112 State st.

City Ry. Co. 1 m, 4 g, 25 lb r, 2 c, 5 h. Pres. & Man. R. H. Meagley, Supt. Wm. Whitney. Office, 216 Fort 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.

Park Ave. R. R. Co. 1 m, 4 g, 20 lb r. Pres. C. Ross, Treas. F. C. Ross, Sec. C. A. Matthews. Run in connection with the Wade St. R. R.

**BIRMINGHAM, ALA.**—Birmingham St. Ry. Co. 10 m, 4-8½ g, 16 lb r, 24 c, 90 mu. Pres. Geo. L. Morris, Sec., Treas. & Supt. G. J. Stubblefield. Office, cor. 2d av. and 19th st. d

East Lake Land Co. (See New Roads.)

Highland Avenue R. R. 6½ m, 4-8½ g, 30 lb r, 5 c, 28 h. Pres. H. M. Caldwell, Man. W. J. Milner, Supt. J. M. Lens, Eng. H. Schoel. Owners, The Elyton Land Co.

Birmingham & Pratt Mines St. Ry. Co. 5 m, 4-8½ g, 16 lb r, 6 c, 30 h. Pres. and Gen. Man. J. A. Van Hoose, Sec. & Treas. Wm. Berney.

**BLOOMFIELD, N. J.**—Newark & Bloomfield R. R. (See Newark, N. J.)

**BLOOMINGTON, ILL.**—Bloomington & Normal Horse Ry. Co. 5½ m, 4-8½ g, 36 lb r, 10 c, 60 h. Pres. & Proprietor A. H. Moore, Sec. Edw. Sharp.

**BOONE, IA.**—Boone & Roonsboro St. Ry. Co. 1½ m, 3 g, 20 lb r, 3 c, 1 bus, 10 h. Pres. L. W. Reynolds, Treas. Ira B. Hodges, Sec. and Supt. A. B. Hodges. f

Twin City & Des Moines River Motor St. Ry. Co. 6 m, 20 lbs. r, 3-6 g, 2 motors, 3 c. President & Supt. J. B. Hodges, Treas. A. B. Hodges, Sec. S. K. Hunsinger.

**BOSTON, MASS.**—Boston Consolidated St. Ry. Co. 5½ m, 4-8½ g, 48-50 lb r, 37 c, 1800 h. Pres. Chas. E. Powers, Treas. Sam'l Little, Ass. Treas. John H. Studley, Jr., Gen. Supt. Julius E. Rugs. Supt. J. H. Studley, 19 City Square, Charlestown. Capital, \$1,700,000. Office, Tremont row, cor. Pemberton sq.

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Boston & Chelsea R. R. Co. 4.154 m, 4-8½ g, 50-60 lb r. Pres. W. W. Wheelton, Treas. and Clerk, John H. Studley, Jr. (Operated by the Boston Consolidated St. Ry. Co.) f

Albany St. Freight Ry. Co. .93 m, 4-8½ g, 90 lb r, no c, no h. Pres. Chas. L. Pierson, Treas. Geo. F. Child. Office, 439 Albany st.

Lyons & Boston. 37 m, 4-8½ g, 25-48 lb r, 175 c, 748 h. Pres. Amos F. Breed, Treas. & Sec. E. Francis Oliver, Supt. Edwin C. Foster. Office, 214 Broadway, Chelsea, Mass., & 13 Tremont row.

Metropolitan R. R. Co. 83 m, 48 to 54 lb r, 687 c, 2643 h. Pres. C. A. Richards, Sec. Wm. P. Harvey, Treas. Chas. Boardman. Office, 16 Kliby st.

So. Boston Ry. Co. 16 m, 4-8½ g, 50 lb r, 199 c, 970 h. Pres. Chas. H. Hersey, V. Pres. Ezra H. Baker, Sec. & Treas. Wm. Reed, Supt. Daniel Coolidge. Office, 715 Broadway, So. Boston.

Somerville Horse R. R. Co. (Operated by the Boston Consolidated Street Ry. Co.) 5.4 m, 4-8½ g, 48-60 lb r. Pres. Sam'l E. Sewall, Treas. & Clerk, J. H. Studley, Jr. Office, 27 Tremont row. a

Winnimmet R. R. Co. 1.95 m, 4-8½ g, 48 lb r, no c, no h. Pres. Wm. R. Pearmain, Chelsea, Mass. Treas. & Clerk, E. Francis Oliver, Boston. Office, 13 Tremont row. l

**BRADFORD, PA.**—Bradford & Kendall R.R. Co. 1½ m, 4-8½ g, 38 lb r, 3 c, 4 h. Pres. James Brodrey, Sec. Geo. H. Moon, Gen. Man. & Supt. Enos Parsons. Capital, \$12,000.

**BRANTFORD CAN.**—Brantford St. Ry. Co. 4 m, 3-6 g, 25 lb r, 6 c, 20 h. Pres. D. A. Flack, V. Pres. R. A. Pringle, Sec., Treas. & Man. Chas. H. Flack. h

**BRENTHAM, TEX.**—Brenham St. R. R. Co. 2 m, 4 g, 20 lb r, 3 c, 18 mu. Pres. T. J. Pampell, V. Pres. F. Krentzlin, Sec. John A. Randle, Treas. D. C. Giddings, Man. E. B. Randle. Office, Gruber Bldg., North st. l

**BRIDGEPORT, CONN.**—The Bridgeport Horse R.R. Co. 6½ m, 4-8½ g, 42 lb r, 20 c, 90 h. Pres. Albert Eames, Sec. & Treas. F. Hurd, Supt. B. F. Lashar.

Bridgeport & W. Stratford Horse R. R. Co. 3½ m, 4-8½ g, 45 lb r, 10 c, 40 h. Pres. David F. Hulister, Sec. & Treas. Henry D. Drew, Man. Henry N. Beardsley.

**BROCKTON, MASS.**—Brockton St. Ry. Co. 11½ m, 4-8½ g, 35 lb r, 32 c, 130 h. Pres. W. W. Cross, Treas. C. R. Filiebrown. Supt. H. B. Rogers. Office, Main st. j

**BROOKLYN, N. Y.**—Annex St. Ry. Co. (See new roads.)

The Atlantic Avenue R. R. Co. of Brooklyn. 28½ m, (leased and owned). 4-8½ g, 50-60 lb r, 297 c, 1169 h. Pres. William Richardson, Sec. W. J. Richardson, Treas. Newbery H. Frost. Office cor. Atlantic & Third aves.

Broadway R.R. Co. 12 m, 4-8½ g, 50-60 lb r, 199 c, 750 h. Pres. Edwin Beers, Sec. & Treas. Robert Sealey, Supt. Joshua Crandall. Office 21 Broadway, E. D.

Brooklyn Cable R. R. Co. Leases its line from Atlantic Ave. R. R. Co., for 14 per cent of gross receipts. Capital, \$1,000,000. 4

Brooklyn Cross Town R.R. Co. 16 m, 4-8½ g, 50-60 lb r, 72 c, 413 h. Pres. Henry W. Slocum, V. Pres. Ezra B. Tuttle, Sec. M. Joust, Treas. John R. Connor, Supt. D. W. Sullivan. Offices 585 Manhattan ave.

Bushwick R.R. Co. 28 m, 4-8½ g, 45-50 lb r, 172 c, 600 h. Pres. Frank Cromwell, V. Pres. Wm. H. Iusted, Treas. & Sec. S. D. Hollowell, Supt. Wm. M. Morrison. Office 22 Broadway, N. Y.

Brooklyn, Bushwick & Queens County F. R. Co. 11 m, 4-8½ g, 42-47 lb r, 50 c, 214 h. Pres. Geo. W. Van Allen, Sec. Wm. B. Wait, Treas. C. B. Cottrell, Supt. Chas. E. Harris. Office of Pres. & Supt. cor. Nostrand & Park av. b

Brooklyn City R.R. Co. 8½ m, 4-8½ g, 45-64 lb r, 501 close c, 335 open c, 3176 h. Pres. Daniel F. Lewis, V. Pres. Wm. M. Thomas, Sec. H. M. Thompson, Asst. Sec. Francis E. Wrigley, Treas. Cromwell Hadden. Offices, 10 Fulton st. a

Brooklyn City & Newtown R.R. Co. 13½ m, 4-8½ g, 45-60 lb r, 125 c, 400 h. Pres. Col. John N. Partridge, Sec. & Treas. Duncan B. Cannon, Supt. John L. Heins. Office cor. DeKalb & Central aves. d

Calvary Cemetery, Greenpoint & Brooklyn Ry. Co. Coney Island and Brooklyn R.R. Co. 18.3-5 m, 45 lb r, 4-8½ g, 103 c, 344 h. Pres. James Jourdan, Sec. Ed. F. Drayton, Treas. John Williams, Supt. William Farrell. Office cor. Smith & Huntington sts.

Coney Island, Sheephead Bay & Ocean Avenue R. R. Co. 2½ m, 4-8½ g, 4 c. Pres. A. A. McClemer, V. Pres. Daniel Mone, Sec. John McMahon, Sheepshead Bay, Treas. Horace Valkulyh. Office 16 Red Hook Lane.

Crosstown Line, Hamilton Ferry to Bridge.

Grand St. & Newtown R.R. Co. 13½ m, 4-8½ g, 50-60 lb r, 72 c, 250 h. Pres. Martin Joost, Sec. & Treas. Wm. E. Horwill, Supt. Walter G. Howey. Office 394 Kent ave. l

Grand Street, Prospect Park & Flatbush R.R. Co. 11½ m, 4-8½ g, 50 lb r, 75 c, 220 h. Pres. Jno. L. Partridge, Sec. Duncan B. Cannon, Treas. Chas. Creffields, Supt. Jno. L. Heins. Offices Franklin Ave. and Prospect Place.

Greenpoint & Lorimer St. R. R. Co. 5½ m, 4-8½ g, 50 lb r, 36 c, 183 h. Pres. Geo. W. Van Allen, Sec. Wm. B. Wait, Treas. C. B. Cottrell, Supt. Chas. E. Harris. Office, cor. Nostrand and Park aves.

Prospect Park & Flatbush R.R. 3 m, 4-8½ g, 34 lb r, 70 c, 360 h. Pres. Loftis Wood, Sec. & Treas. Sam'l Parkhill, Supt. Loftis Wood. Offices 45 Broadway.

South Brooklyn Central R.R. Co. 8½ m, 4-8½ g, 60 lb r, 42 c, 193 h. Pres. Wm. Richardson, Sec. Wm. J. Richardson, Treas. N. H. Frost, Supt. James Ruddy. Offices, Atlantic & 3d aves.

The New Williamsburg & Flatbush R. R. Co. 17½ m, 4-8½ g, 47-50 lb r, 78 c, 278 h. Pres. Geo. W. Van Allen, 54 Ann st., New York, Sec. W. B. Wait, 34th st. & 9th ave., New York, Treas. C. B. Cottrell, 8 Spruce st., N. Y. City, Supt. Chas. E. Harris, Nostrand & Park aves., Brooklyn. j

Union Ry. Co. (See new roads.)

Van Brunt St. & Erie Basin R.R. Co. 3 m, 4-8½ g, 45 lb r, 7 c, 24 h. Pres. John Cunningham, Sec. & Treas. Edmund Terry. Offices, 264 Van Brunt st.

**BRUNSWICK, GA.**—Brunswick St. R.R. Co.

**BUFFALO, ILL.**—See Mechanicsburg, Ill.

**BUFFALO, N. Y.**—Buffalo St. R.R. Co. 17½ m, 4-8½ g, 50 lb r, 96 c, 511 h. Pres. Henry M. Watson, V. Pres. P. Pratt, Sec. S. S. Spaulding, Treas. W. H. Watson, Supt. Edward Edwards.

Buffalo East Side St. R.R. Co. 28.7-8 m, 4-8½ g, 42 lb r, 47 c, 218 h. Pres. S. S. Spaulding, V. Pres. Joseph Churchyard, Sec. H. M. Watson, Treas. W. H. Watson, Supt. Edward Edwards. Office 346 Main st.

**BURLINGTON, IA.**—Burlington St. R.R. Co. 3½ m, 4-8½ g, 16-22 lb r, 9 c, 22 h. Pres. & owner, John Patterson, Sec. Treas. & Man. C. T. Patterson. Office 1401 summer st. a

Union St. Ry. Co. 8½ m, 4-8½ g, various r, 20 c, 80 h. Pres. Geo. A. Duncan, Sec. & Treas. & Supt. F. G. Jones. a

**BURLINGTON, VT.**—Winooski & Burlington Horse Ry. Co. 3½ m, 4-8 g, 25 lb r, 7 c, 24 h. Pres. W. A. Woodbury, V. Pres. F. C. Cunnedy, Supt. K. B. Walker, Treas. L. E. Woodhouse, Clerk, G. W. Walls. Office, Winooski ave.

**CAIRO, ILL.**—Cairo St. Ry. Co. 2 m, 3-6 g, 25 lb r, 4 c, 12 h. Pres. J. A. Goldstine, V. Pres. C. V. Neff, Supt. & Treas. Thos. Lewis, Sec. H. Schuler. 2

**CAMBRIDGE, MASS.**—Cambridge R. R. Co. 51-59 m, 4-8½ g, 50 lb r, 255 c, 1,28 h. Pres. Prentiss Cummings, Treas. & Clerk Franklin Perow, Exec. Com. I. M. Spelman, P. Cummings, O. S. Brown, Clerk of Directors, O. S. Brown, Supt. Wm. A. Bancroft.

**CAMDEN, N. J.**—Camden & Atlantic St. Ry. Camden Horse R.R. Co. 9 m, 5-1 g, 35-52 lb r, 26 c,



85 h. Pres. Thos. A. Wilson, Sec. Wilbur F. Rose, Treas. & Supt. John Hood. Office 1125 Newton ave.  
**CANTON, O.**—Canton St. Ry. Co. 4 1/2 m, 4 g, 28 lb r, 11 c, 58 h. Pres. & Treas. G. E. Cook, Sec. John F. Clark, Supt. O. S. Stanton. Office 4 E. 7th st.  
**CAPE MAY, N. J.**—Cape May & Schellenger Landing Horse R. R.  
**CARTHAGE, MO.**—  
**CEDAR RAPIDS, IA.**—Cedar Rapids & Marlon Ry. 13 1/2 m, 4-8 1/2 g, 23-30-35 lb r, 20 c, 44 h. Pres. W. Greene, V. Pres. A. J. McKean, Sec. N. B. Consigny, Treas. G. Greene, Supt. Wm. Elsom. Office, 11 N. Second st.  
**CHAMPAIGN, ILL.**—Champaign R.R. Co. Urbana & Champaign St. R.R. Co. (See Urbana.)  
**CHATTAHOON, CAN.**—  
**CHARLESTON, S. C.**—Charleston City Ry. Co. 8 1/2 m, 4-8 1/2 g, 38 lb r, 32 c, 110 h. 1 mu. Pres. Jno. S. Riggs, Sec. and Treas. Evan Edwards, Asst. Treas. Frank Whilden, Supt. Jno. Mohlenhoff. Office 2 Broad st. h  
 Enterprise R.R. Co. 15 m, 5 g, 42 lb r, 29 pass. c, 10 freight c, 95 h. Pres. A. F. Ravenel, Sec. & Treas. U. E. Hayne, Supt. T. W. Passalacqua.  
 Middle Street Sullivan Island Ry. Co. 2 1/2 m, 4-8 1/2 g, 20 lb T r, 7 c, 14 mu. Pres. B. Callaghan, Sec. & Treas. Frank F. Whilden, Supt. B. Buckley. Office 2 Broad st.  
**CHATTANOOGA, TENN.**—Chattanooga St. R. R. Co. 12 m, 4-8 1/2 g, 25-45 lb r, 25 c, 120 h. Pres. and Treas. J. H. Warner, Sec. C. R. Gaskill. 3  
**CHESTER, PA.**—Chester St. Ry. Co. 7 1/2 m, 5-2 1/2 g, 47 lb r, 14 c, 66 h. Pres. Richard Peters, Jr., Treas. Sam'l H. Seeds, Sec. & Manager E. M. Cornell.  
**CHICAGO, ILL.**—Chicago City Ry. Co. 90 m, 4-8 1/2 g, 45-63 lb r, 697 c, 1,600 h, cable doing work of 2,500 h. Pres. C. B. Holmes, Sec. H. H. Windsor, Treas. T. C. Pennington, Supt. C. B. Holmes. Office 2,020 State st.  
 Chicago West Division Ry. Co. 45 1/2 m, 4-8 1/2 g, 40 r, 638 c, 3,325 h. Pres. J. R. Jones, Sec. George L. Webb, Supt. De Witt C. Cregler. Office, 59 State st.  
 Chicago & Hyde Park St. — m, — g, — lb r, — c, — h. Pres. Douglas S. Clarke.  
 Crosstown Pass. Ry. Co. (See New Roads.)  
 North Chicago City R.R. Co. 45 m, 4-8 1/2 g, 45 lb r, 375 c, 1,800 h. Pres. & Gen. Supt. V. C. Turner, V. Pres. Chas. T. Yerkes, Sec. & Treas. Hiram Crawford, Asst. Supt. Fred L. Threedy, Supt. Horse Dept. Robt. Atkins, Purch. Agt. John W. Roach, Master Mechanic J. Miller.  
**CHILLICOTHE, O.**—Chillicothe St. R.R. Co. 1 1/2 m, 3 g, 16 lb r, 7 c, 10 h. Pres. E. P. Safford, Sec. A. E. Wenis, Treas. William Polanek, Supt. Ewel McMartin.  
**CINCINNATI, O.**—Cincinnati Inclined Plane Ry. Co. 6 1/2 m, 5-2 1/2 g, 43 lb r, 25 c, 140 h. Pres. Geo. A. Smith, Sec. & Supt. James M. Doherty, Tr. J. S. Hill. Cincinnati St. Ry. Co. 96m, 5-2 g, 42-32 lb r, 250 c, 2,000 h. Pres. Jno. Kilgour, V. Pres. Albert G. Clark, Treas. R. A. Dunlap, Sec. & Auditor Jas. A. Collins, Supt. Jno. Harris, Pur. Agt. B. F. Haughton. Office second floor of Apollo Building. 2  
 Columbia & Cincinnati St. R.R. Co. 3 1/2 m, 3 g, 40 lb r, 6 c, 3 dummy c. Pres. & Auditor C. H. Kilgour, V. Pres. John Kilgour, Treas. & Sec. A. H. Meler, Mt. Lookout, O. Office Station C. a  
 Mt. Adams & Eden Park Inclined R.R. Co. 7 m, & 8 m cable, 5-2 1/2 g, 42 lb r, 20 c, 40 cable c, 175 h. Pres. G. B. Kerper, Sec. J. R. Murdoch, Supt. R. P. Alley. Office, head of Mt. Adams Incline. a  
 Price Hill Inclined Plane R.R. Co. 8-13 m, 5-6 g, 60 lb r, 4 c. Pres. M. W. Oliver, Gen. Man. Rees E. Mc Duffie, Sec. & Treas. Geo. T. McDuffie. a  
 So. Covington & Cincinnati. (See Covington, Ky.)  
**CLARKSVILLE, TENN.**—Clarksville St. Ry. Co. 2 m, 4-8 1/2 g, 16 lb T-r, 4 c, 16 mu. Pres. John F. Shelton, Sec. & Treas. John W. Faxon. Capital, \$6,250. Office, Farmers' & Merchants' Nat. Bank.  
**CLEVELAND, O.**—The Brooklyn St. R.R. Co. 12 1/2 m, 4-8 1/2 g, 52 lb r, 70 c, 402 h. Pres. Tom. L. Johnson, V. Pres. A. J. Moxham, Sec. J. B. Hoefgen, Treas. John McConnell, Supt. A. L. Johnson. Office 1,301 Pearl st.  
 Broadway & Newburg St. R.R. Co. 11.4 m, 4-8 1/2 g, 43 lb r, 26 c, 165 h. Pres. Joseph Stanley, V. Pres. H. E. Andrews, Sec. & Treas. E. Fowler, Supt. J. J. Stanley. Office 1373 Broadway.  
 Superior St. R.R. Co. 15 m, 4-8 1/2 g, 45 lb r, 46 c, 265 h. Pres. Frank De Hl. Robinson, V. Pres. John Koch, Sec., Treas. & Supt. J. H. Robinson, Jr.  
 The East Cleveland R.R. Co. 20 1/2 m, 4-8 1/2 g, 45 lb steel r, 110 c, 517 h. Lines, Euclid ave. & Prospect st.; Cedar ave.; Garden st. Pres. A. Everett, V. Pres. Chas. Wason, Sec. & Treas. H. A. Everett, Supt. E. Duty. Offices, 1154 Euclid ave. 3  
 Woodland Avenue & West Side St. R.R. Co. 40 m, 4-8 1/2 g, 43-45 lb r, 140 c, 630 h. Pres. M. A. Hanna, V. Pres. C. F. Emery, Sec. & Pur. Agt. J. B. Hanna, Gen. Supt. George G. Mulhner. Office, cor. Pearl and Detroit sts. a  
 South Side St. R.R. Co. 3 1/2 m, 3 g, 40 lb r, 8 c, 60 h. Pres. Tom L. Johnson, Supt. A. L. Johnson, Sec. & Treas. J. B. Hoefgen. Office 1301 Pearl st. 2  
 St. Clair Street Ry. Co. 9 m, 4-8 1/2 g, 40 lb steel r, 10 one-h. & 20 two-h. c, 150 h. Pres. & Treas. Chas. Hathaway, V. Pres. S. S. Lyons, Sec. Alfred G. Hathaway, Supt. A. W. Lynne. Office, 814 St. Clair st. a  
**CLIFTON, CAN.**—Niagara Falls, Wesley Park and Clifton Tramway Co. 3 1/2 m, 4-8 1/2 g, 30 lb r, 8 c, 46 h. Pres. J. H. Mooney, 280 B'way, N. Y. Treas. John N. Hayward, 52 B'way, N.Y. Sec. John H. Bache, Niagara Falls, Ont.  
**CLINTON, IA.**—Lyons & Clinton Horse R.R. Co. (See Lyons.)  
**COLUMBIA, S. C.**—Columbia St. Ry. 4 1/2 m, 4-8 1/2 g, 30 lb r, 6 c, 18 h. Pres. J. S. Pierson, New York, V. Pres. H. M. Pierson, New York, Treas. W. E. Lawton, New York, Sec. E. M. Cole, 32 Liberty st. New York. Capital, \$50,000.  
**COLUMBUS, GA.**—Columbus St. R.R. Co. 3 m, 4-8 1/2 g, 16 lb r, 6 c, 25 h. Pres. Cliff B. Grimes, Sec. L. G. Schuessler, Treas. N. N. Curtis, Supt. J. A. Gabourgh.  
**COLUMBUS, O.**—Columbus Consolidated St. R.R. Co. 25 m, 5-2 g, 35-52 lb r, 97 c, 333 h. Pres. A. D. Rodgers, V. Pres. H. T. Chittenden, Sec. & Treas. E. K. Stewart, Supt. J. H. Atcherson. a

Glenwood & Greenlawn St. R.R. Co. 4 1/2 m, 3-6 g, 24 lb r, 11 c, 19 h. Pres. A. D. Rodgers, V. Pres. B. S. Brown, Sec. R. R. Rickly, Treas. S. S. Rickly, Supt. Jonas Willcox. Office 9 S. High st.  
**CONCORD, N. H.**—Concord Horse R. R. Co. 7 1/2 m, 3 g, 34 lb r, 9 c, 15 h, 2 steam motors. Pres. & Supt. Moses Humphrey, Treas. H. J. Crippin, Clerk E. C. Hoag.  
**CORTLAND, N. Y.**—Cortland & Homer Horse R.R. Co. 4 m, 4-8 1/2 g, 25-30 lb r, 5 c, 15 h. Pres. Chas. H. Garrison, Troy, N. Y. V. Pres. E. Mudge, Sec. & Treas. S. E. Welch, Supt. B. B. Terry. Office 25 N. Main st. f  
**COUNCIL BLUFFS, IA.**—Council Bluffs St. R.R.  
**COVINGTON, KY.**—So. Covington & Cincinnati St. Ry. Co. 17 1/2 m, 5-2 1/2 g, 43 lb r, 46 c, 296 h. Pres. E. F. Abbott, Sec. J. C. Benton, Treas. G. M. Abbott.  
**COVINGTON, GA.**—W. C. Clark & Co. (see new roads.)  
**DALLAS, TEX.**—Dallas City & Dallas St. R.R. Co. 6 m, 4-8 1/2 g, 25-30 lb r, 12 c, 84 mu. Pres. R. A. Ferris, Sec. John H. Gaston, Supt. C. E. Keller. Office, 1219 Main st. h  
 Commerce & Ervay St. R.R. 1 1/2 m, 4-8 1/2 g, 20 lb r, 5 c, 24 mu. Pres. A. C. Ardrey, Sec., Treas. & Man. H. W. Keller.  
**DANVILLE, ILL.**—Citizens' St. Ry. Co. 4 1/2 m, 4 g, 20 lb r, 8 c, 41 m. Pres. Wm. P. Cannon, V. Pres. & Gen. Man. Wm. Stewart, Sec. & Treas. Adam R. Samuel.  
**DAVENPORT, IA.**—Davenport Central St. Ry. Co. 3 m, 4-8 1/2 g, 20 lb r, 14 c, 21 h, 15 mu. Pres. Whit. M. Grant, V. Pres. W. L. Allen, Treas. J. B. Fieldar, Sec. O. S. McNeil, Supt. J. W. Howard. k  
 Davenport City Ry. Co. 3 1/2 m, 4-8 1/2 g, — lb r, 14 c, 46 h. Pres. C. S. Watkins, Sec. and Treas. S. D. Bowden.  
**DAYTON, KY.**—Newport & Dayton St. Ry. Co. 2 m, 5-2 1/2 g, 41 lb r, 9 c, 36 h. Pres. & Supt. W. W. Bean.  
**DAYTON, O.**—Dayton St. R.R. Co. 7 1/2 m, 4-8 1/2 g, 44 lb r, 24 c, 80 h and mu. Pres. J. W. Stoddard, V. Pres. H. S. Williams, Sec. C. A. Cralghead, Supt. A. W. Anderson. 5  
 Fifth St. R. R. Co. 7 m, 4-8 1/2 g, 45 lb r, 18 c, 68 h. Pres. A. Thomas, Sec. D. B. Corwin, Treas. R. I. Cumlin, Supt. J. M. B. Lewis. Office, 7 E. 3d st.  
 Oakwood St. Ry. Co. 6 m, 4-8 1/2 g, 38 lb r, 14 c, 56 h. Pres. Charles B. Clegg, Sec. H. V. Perrine. V.  
 The Wayne & Fifth St. R. R. Co. 4 1/2 m, 4-8 1/2 g, 38 lb r, 10 c, 35 h. Pres. Geo. W. Shaw, Sec. & Treas. Eugene Waitchet, Supt. N. Routzahn. Office, 29 Wayne st. k  
**DECATUR, ILL.**—Decatur & North Park St. Ry. Co. Atty. Geo. Brown. 4  
 Citizens' Street R.R. Co. 2 m, 4-8 1/2 g, 20 lb T r, 9 c, 43 h & mu. Pres. D. S. Shellabarger, Sec. W. L. Shellabarger, Treas. & Gen. Man. W. L. Ferguson. a  
**DENISON, TEX.**—Denison St. Ry. Co. 3 m, 3-6 g, 16 lb r, 5 c, 22 mu. Pres. C. A. Walterhouse Supt. S. A. Robinson.  
**DENVER, COL.**—Denver City Ry. Co. 24m, 3-6 g, 16 lb r, 64 c, 332 h. Pres. Geo. H. Holt, 10 Wall st. New York City, Sec. G. D. Lhuillier, 10 Wall st., New York City, Treas. & Man. G. E. Randolph.  
 Denver Tramway Co. 4 m, 3-6 g, 16 lb r, 8 c. Run by electricity. Pres. Rodney Curtis, V. Pres. John J. Riechman, Sec. Wm. G. Evans.  
**DES MOINES, IA.**—Des Moines St. R. R. Co. 12 m, 3 g, 25-30-38-52 lb r, 18 c, 125 h. Pres. W. McCain, V. Pres. C. W. Rogg, Sec. F. A. Sherman, Treas. G. B. Hippee.  
 Des Moines Broad Gauge St. Ry. Co. Pres. G. Van Ginkel, Sec. H. C. Teachout, Treas. John Weber.  
 Capital City St. Ry. Co. 5 m, 4-8 1/2 g, 6 c, 30 h. G. Van Ginkel, Sec. H. C. Teachout, Treas. J. Weber. Des Moines & Sevestopol St. Ry. Co. (See Sevestopol, Ia.)  
**DETROIT, MICH.**—Fort Wayne & Elmwood Ry. Co. 9.1 m, 4-8 1/2 g, 45 lb r, 33 c, 216 h. Pres. H. B. Brown, V. Pres. Edward Kanter, Sec. N. W. Goodwin, Treas. E. S. Helmenan, Supt. Geo. S. Hazard. Office, 129 Griswold st. a  
 Dix Electric Ry. Co. 2 1/2 m, 3 c, electric motors.  
 Detroit City Ry. 30 m, 4-8 1/2 g, 40-43 1/2 lb r, 130 c, 700 h. Includes Jefferson Ave. line, Woodward Ave. line, Michigan Ave. line, Gratiot Ave. line, Brush St. line, Cass Ave. line, Congress & Baker line. Pres. Sidney D. Miller, Treas. George Hendrie, Sec. James Heugh, Gen. Supt. Robert Bell, M. M. John Willis. Office, 12 Larned st. W. 4  
 Grand River St. Ry. Co. 6 1/2 m, 4-8 1/2 g, 45 lb r, 15 c, 160 h. Pres. & Treas. Jos. Dalley, Sec. J. W. Dalley, Supt. C. M. Dalley. c  
 Highland Park Ry. Co. 3 m, 4-8 1/2 g, 42 lb r for 1/2 m in city limits, outside 35 lb T r, 2 c, electric motors. Pres. and Treas. Frank E. Snow, Sec. F. Woodruff. Capital, \$50,000. Office, 92 Griswold st.  
**DOVER, N. H.**—Dover Horse R.R. Co. 5 m, 3 g, 30 lb r, 4 c, 14 h. Directors, Chas. H. Sawyer, Jas. E. Lothrop, C. W. Wiggins, Harrison Haley, Frank Williams, Treas. Harrison Haley.  
**DUBUQUE, IA.**—Dubuque St. R.R. 7 m, 4-8 1/2 g, 55 lb r, 21 c, 65 h. Pres. J. A. Rhonberg, Sec. & Treas. B. E. Linehan, Supt. J. J. Linehan. Office Couler ave.  
**DULUTH, MINN.**—Duluth St. Ry. Co. 5 1/2 m, 3-6 g, 35-45 lb r, 15 c, 91 mu. Pres. Sam'l Hill, V. Pres. T. P. Wilson, Sec. & Treas. A. S. Chase, Supt. T. W. Hoopes. d  
**EAST OAKLAND, CAL.**—Oakland, Brooklyn & Fruitvale R.R. Co. 2 m, 5-6 g, 35 lb r, 4 c, 26 h. Pres. & Treas. H. Tubbs, Sec. W. C. Mason, Supt. Jas. Dixon, Pur. Agt. J. Reed. Office, 301 Central ave.  
**EAST SAGINAW, MICH.**—East Saginaw St. Ry. 8 m, 4-8 1/2 g, 30 and 40 lb r, 23 c, 70 h. Pres. Walter A. Jones, Acting Sec. C. A. Bartlett, Supt. A. Bartlett.  
**EAST ST. LOUIS, ILL.**—East St. Louis St. R.R. Co.  
**EASTON, PA.**—The Easton & So. Easton Passenger Ry. Co. 1 1/2 m, 5-2 1/2 g, 45 lb r, 4 c, 20 h. Pres. H. A. Sage, Sec. & Treas. H. W. Cooley, Supt. Elsha Burwell, So. Easton. Capital, \$29,562. Office, 348 Northampton st.  
 The West End Passenger Ry. Co. 1 1/2 m, 5-2 1/2 g, 45 lb r, 6 c, 20 h. Pres. H. A. Sage, Sec. & Treas. H. W. Cooley, Supt. Samuel Berry.  
**EAU CLAIRE, WIS.**—Eau Claire St. Ry. Co. 5 m,

4-8 1/2 g, 27 lb, 42 lb center bearing steel, and 60 lb grooved steel r, on all curves, 16 c, 80 h. Pres. A. G. Bradstreet, New York, V. Pres. Geo. B. Shaw, Eau Claire, Sec. & Treas. Weston Lewis, Gardiner, Me. h  
**ELGIN, ILL.**—Elgin City Ry. 2 1/2 m, 4-8 1/2 g, 25 lb r, 4 c, 18 h. Pres., Sec., Treas. Supt. & Owner, B. C. Payne. 4  
**ELIZABETH, N. J.**—Elizabeth & Newark Horse R.R. Co. 14 m, 5-2 1/2 g, 4-10 g, 30 lb r, 24 c, 74 h. Pres. & Treas. Jacob Davis, Sec. & Supt. John F. Pritchard, Elizabeth St. Ry. Co. Pres. & Supt. Amos Clark, Sec. & Treas. John P. Earl. 4  
**ELKHART, IND.**—Citizens' Ry. Co. 4 1/2 m, 4-8 1/2 g, 30 lb r, 7 c, 25 h. Pres. F. W. Miller, V. Pres. J. W. Ellis, Sec. C. W. Fish, Treas. J. A. Cook, Man. Director, Jas. Kavanagh, Office, 101 N. Main st. b  
**ELMIRA, N. Y.**—The Elmira & Horseheads Ry. Co. 10 m, 4-8 1/2 g, 25-30-40 lb r, 18 c, 34 h. Pres. & Treas. George M. Diven, V. Pres. Geo. W. Hoffman, Sec. Wm. S. Kershner, Supt. Henry C. Silsbee. Officers 212 E. Water st. k  
**EL PASO, TEX.**—El Paso St. Ry. Co. 6 m, 4-8 1/2 g, 20-30 lb r, 18 c, 40 mu. Pres. B. H. Davis, Vice Pres. J. P. Crosby, Treas. C. R. Morehead, Sec. & Supt. H. W. Marks. Offices, Seventh st.  
**EMPORIA, KAN.**—Emporia City Ry. Co. 3 1/2 m, 3-6 g, 20 lb r, 8 c, 24 h. Pres. Van R. Holmes, Treas. A. F. Crowe, Sec. & Man. J. D. Holden.  
**ENTERPRISE, MISS.**—Enterprise St. Ry. Co. 1 1/2 m, 3-6 g, 24 lb r, 2 c, 6 h. Pres. John Kampe, V. Pres. E. B. Gaston, Sec. & Treas. J. W. Gaston.  
**ERIE, PA.**—Erie City Passenger Ry. Co. 7 1/2 m, 4-8 1/2 g, 45 lb r, 20 c, 67 h. Pres. Wm. W. Reed, Treas. Wm. Spencer, Sec. W. A. Demorest, Supt. Jacob Berst.  
**EVANSVILLE, IND.**—Evansville St. Ry. Co. 12 m, 4-8 1/2 g, 27 lb r, 32 c, 220 mu. Pres. John Gilbert, Sec. & Treas. W. S. Gilbert, Supt. Wm. Bahr. Office, Merchants National Bank. a  
**FALL RIVER, MASS.**—Globe St. Ry. Co. 16 m, 4-8 1/2 g, 35-40-45-47 lb r, 51 c, 210 h. Pres. Frank S. Stevens, Treas. F. W. Brightman, Sec. M. G. B. Swift, Supt. John H. Bowker, Jr. Office, 182 N. Main st. j  
**FAIR ROCKAWAY, N. Y.**—Village Ry. Co. 1 m, 4-8 1/2 g, 47 lb r, 5 c, 10 h. Pres. C. A. Cheever, Treas. D. L. Haight, Sec. J. S. Auerbach, Supt. Rufus Martin. Office, 13 Park row, New York. 10  
**FITCHBURG, MASS.**—Fitchburg St. Ry. Co. 3 1/2 m, 4-8 1/2 g, 35 lb r, 9 c, 35 h. Pres. H. A. Willis, V. Pres. H. J. Wallace, Treas. B. F. Wallis, Sec. H. C. Hartwell, Supt. Wesley W. Sargent. Office, 131 Main st. f  
**FORT SCOTT, KAN.**—Bourbon County St. R. R. Co. 3m, 4 g, 16 lb r, 5 c, 22 h. Pres. J. D. Hill, Sec. C. O. French, Treas. J. H. Richards, Supt. E. Strong. 4  
**FORT SMITH, ARK.**—Fort Smith St. Ry. Co. 2 m, 3-6 g, 28 lb r, 5 c, 16 mu. Pres. Sam'l M. Loud, Sec. & Treas. Geo. T. Sparks. h  
**FORT WAYNE, IND.**—Citizens' St. R.R. Co.  
**FORT WORTH, TEX.**—Fort Worth St. Ry. Co. 7 1/2 m, 4 g, 25-38 lb r, 16 c, 89 mu. Pres. K. M. Vanzandt, Treas. W. A. Huffman, Supt. J. T. Payne. 4  
**FRANKFORT, N. Y.**—Frankfort & Ilion Street Ry. Co. 2 1/2 m, 5 g, 4 c. Pres. A. C. McGowan, Frankfort, Sec. D. Lewis, Ilion, Treas. P. Remington, Ilion, Supt. Fredk. Gates, Frankfort.  
**FREDONIA, N. Y.**—Dunkirk & Fredonia R.R. Co. 3 1/2 m, 4-10 g, 25 lb r, 5 c, 9 h. Pres. Wm. M. McKinstrey, Sec. & Treas. M. N. Fenner, Supt. Z. Elmer Wheelock.  
**FREPORT, ILL.**—Freeport St. Ry. Co. 4 1/2 m, 4-8 1/2 g, 9 c, 48 h. Pres. Jacob Krohn, V. Pres. F. C. Platt, Sec. W. G. Barnes, Treas. John B. Taylor, Supt. H. T. Warner. a  
**FULTON, N. Y.**—Fulton & Oswego Falls St. Ry. Co. 6,000 ft, 4 8 1/2 g, Glibbon's metallic stringer and r, 4 c, 8 h. Pres. Joseph Walker, Jr., V. Pres. N. N. Stranahan, Sec. and Treas. Chas. Lyman. Capital, \$15,000. Office, 15 Broad st., New York. i  
**GAINSVILLE, FLA.**—Gainsville St. Ry.  
**GAINSVILLE, TEX.**—Gainsville St. Ry. Co. 2 1/2 m, 3-6 g, 17 lb r, 4 c, 12 h. Pres. C. N. Stevens, V. Pres. J. T. Harris, Sec. & Treas. F. R. Sherwood.  
**GALESBURG, ILL.**—College City St. Ry. Co. 5 m, 4-8 1/2 g, 18-20-35 lb r, 7 c, 20 h. Pres. L. W. Sanborn, V. Pres. A. S. Hoover, Supt. Sec. Geo. S. Clayton.  
**GALVESTON, TEX.**—Galveston City R.R. Co. 25 m, 4-8 1/2 g, 30 lb r, 80 c, 225 mu. Pres. Wm. H. Sinclair, Sec. & Treas. T. J. DeMerritt, Supt. M. J. Keenan. Office, cor. Twenty-first & 1 sts.  
 Gulf City St. Ry. & Real Estate Co. 13 1/2 m, 4 g, 25-30 lb r, 32 c, 81 mu. Pres. J. H. Burnett, Sec. P. S. Wren, Treas. F. D. Allen. Office P. O. st., bet. 23d & 25d. i  
**GARDEN CITY, KAN.**—Garden St. Ry. Co.  
**GLENS FALLS, N. Y.**—Glens Falls, Sandy Hill & Fort Edward St. R. R. Co. Pres. Henry Crandall, Sec. & Treas. T. S. Coodidge, Supt. Albert V. Brayton.  
**GLOUCESTER, MASS.**—Gloucester City R. R. 4 m 4-6 g, 35 lb r, 10 c, 90 h. Pres. Morris C. Fletcher, V. Pres. Walter A. Jones, Sec. D. G. Pearson, Treas. F. W. Homans. Office, Railroad ave. k  
 Gloucester St. Ry. Co. Pres. & Supt. Morris C. Fitch, V. Pres. Walter A. Jones, Treas. Francis W. Homans, Sec. David S. Presson.  
**GRAND RAPIDS, MICH.**—Street Ry. Co. of Grand Rapids, Mich. 1 1/2 m, 4-8 1/2 g, 25-40 lb r, 29 c, 190 h. Pres. W. J. Hayes, Cleveland, O., V. Pres. L. H. Withey, Grand Rapids, Treas. C. G. Swensberg, Grand Rapids, Sec. I. M. Weston, Grand Rapids, Supt. A. Bveler, Grand Rapids. Office, cor. Washington & Indiana sts.  
**GREENBUSH, N. Y.**—North & East Greenbush St. Ry. Co. 1 1/2 m, 4-8 1/2 g, 4 c, 12 h. Pres. & Treas. A. Bleekerbanks, Supt. J. Gascolgne. 1  
**GREEN CASTLE, IND.**—Green Castle City St. Ry. Co. 2 m, 4-8 1/2 g, 23 lb r, 3 c, 12 h. Pres. & Supt. D. Rogers, Sec. James S. Nutt, Treas. Ralph Rogers.  
**GREENVILLE, S. C.**—Greenville City Ry. Co. 1 m 5 g. — lb r, 5 c, 20 h. Proprietors, Gilreath & Harris.  
**HALIFAX, N.S.**—Halifax St. Ry. Co. (Lim.) 7 m, 4-8 1/2 g, 45-60 lbs. r, 15 c, 65 h. Pres. John Bothwell, Sec. & Treas. H. K. Adams, Supt. John C. Conlan, Office, Room 39, Drexel Building, New York, and Halifax, N.S.  
**HAMILTON, O.**—The Hamilton St. Ry. Co. 4 m,



# The Julien Electric Company.

OFFICE, 120 BROADWAY, N. Y

FACTORY, CAMDEN, N. J.

## Electric Street Cars on Secondary Battery Principle.

EDMOND JULIEN, Engineer, of Brussels, Belgium, is the inventor both of the Traction System and Secondary Battery System of this company. The present car is the result of six years of unceasing experiments, carried on at his works in Brussels and on the streets of that city, at great cost.

The leading principle of Mr. Julien's System has been the application of an Electric Motor and Batteries to the present existing rolling stock of street railways, and to construct a car so simple in its management that the drivers and conductors at present in charge of horse cars may take to the new service as easily as to the old. Mr. Julien, after running an Electric Car on the Rue de la Loi in Brussels, during the years 1884 and 1885, and ascending a grade of 5 per cent on that street, put his car in service at the Antwerp International Exhibition of Mechanical Traction in May, 1885, and ran it daily a distance of 57 miles, sometimes drawing an ordinary street car, both cars filled with passengers, and in competition with steam and compressed air motors; and the jury, consisting of eminent Engineers from England, Germany, France and Belgium, awarded Mr. Julien the First Prize and Diploma of Honor for the best System of Mechanical Traction for street cars.

At the end of this Exhibition, Mr. Julien placed two cars on the streets of Hamburg, and afterwards added a third. Those cars have now been running since February, 1886. They each make 69 miles a day and in one place over a 4 per cent grade, carrying passengers; and, although the municipal requirements of Hamburg were very exacting, yet the Electric car has so satisfactorily met them, that it has been adopted in that city. Readers are requested to write to Hamburg to satisfy themselves. The batteries used upon these cars were examined by the municipal officers two months ago, and were found in as perfect condition as when they were first put in the cars.

In April, 1886, Mr. Julien closed a contract with all the Brussels street railways, whereby they have agreed to adopt his System and to put 107 cars in use in Brussels. They are now ready to put three lines of Mr. Julien's system in service, if they have not already done so. The street railways at Rio Janeiro have also adopted Mr. Julien's system.

Last June, Mr. Julien placed two of his cars in service on the Champs Elysees under the supervision of ten members of the International Society of Electricians of France, M. Fontaine at the head. They did service between the Place de la Concorde and the Palais de l'Industrie during the entire summer, and, at the end of the Exhibition, were awarded a first prize and Diploma of Honor. Mr. Julien's Batteries were also put in competition there with those of Faure and Plante under the supervision of Mr. Hospitalier, an eminent Electrician; and Mr. Julien was awarded the first prize and a Diploma of Honor. The Faure and Plante batteries received a third prize and silver medal. Mr. Julien's car, which is now exhibited on Eighth Avenue, New York City, is working its way into favor and has been so adapted to the new conditions arising from sharp curves and an irregular track, as to travel easily at a rate of eight and one-half (8½) miles an hour and carrying a full load.

### COST.

The cost of Installation of Mr. Julien's System is about the same as that of horse system. It is, in all probability, less; and, once installed, the expense of maintaining it is, of course, much less. In Brussels, this expense has been found, after an examination, covering a period of nearly a year, by a committee of Street Car men, to be a little over Three Dollars (\$3.00) a day for each car. In this country, the expense will not exceed Four Dollars (\$4.00) per day. From our observations on the Eighth Avenue line, it will be less than that on that line, owing to the favorable nature of the grades. The cost of horse traction is deemed to be at least Seven Dollars (\$7.00) a day. We speak, of course, of two-horse cars.

The manipulation of the System is far easier than that of the horse system. Each car will require about three horse power in the way of steam engine, so that a road maintaining, say, 40 cars, would require three 60 horse power engines, one engine being in reserve. The dynamic power required is the same. Each car will require about three tons of battery; this will enable the car to be run about 80 miles a day with but one change of battery. It requires

about eight hours to charge each battery. The three tons will be divided into two batteries, one being charged while the other is being used on the car. The batteries are ranged on either side of the car on benches; when the car comes in from service and its batteries are exhausted, it is run up between empty benches, which are on a level with the panels of the car, the panels are let down and the batteries are easily drawn out on greased rods. Adjoining the empty benches are the benches with the charged batteries, which take the place of the discharged ones.

Mr. Julien's batteries being made on a new principle—that is, *inoxidizable support plates*—are found to have an unlimited life and to be capable of being run up to a very high intensity without any injurious effect. In heavy grades, and going around curves, the current may be run up to 70 amperes without any fear of injury to the battery. As all Electricians know, Mr. Julien's is the only battery that can pretend to stand so high an intensity. Yet it may be seen every day on the Eighth Avenue road. The motor required for a large car will vary, according to the grades of the road, from 7 to 10 horse power. We do not consider it economical to overcome long grades of more than 5 per cent, though of course the car may be made to overcome much higher grades than this, especially for short distances. Curves should be at least 40 feet radius, although, on the Eighth Avenue road, we are compelled to run around curves of only 29 feet radius; yet there is an element of danger to the gearing of the car in so short a curve.

Next to Mr. Julien's motor, which is especially adapted, by its simplicity, for use on a Street Car, the Electrical Regulator is worthy of admiration. It is placed at either end of the car and controls so effectively and so methodically the application of power that an ordinary driver may learn the use of it with entire success in less than a few hours. Of course, railroads using this Company's cars will be enabled to light their stables with the Secondary battery employed in the service; the cars are, of course, lighted from the same batteries. One company now adopting Mr. Julien's System are undertaking to light the streets along which the cars will run from their stables, thereby reducing the cost of their installation by getting a profit from the City.



3 g, 28 lb r, 11 c, 12 h. Pres. James F. Griffin, Sec. O. V. Parrish, Treas. H. L. Morey, Supt. J. C. Bigelow.

**IANPAL, MO.**—Hannibal St. Ry. Co. 2 m, 4-8½ g, 36 lb r, 6 c, 22 h. Pres. & Supt. M. Doyle, Sec. & Treas. James O'Hern.

**HARRISBURG, PA.**—Harrisburg City Passenger Ry. Co. 5 m, 5-2½ g, 42-47 lb r, 26 c, 65 h. Pres. H. A. Kelker, V. Pres. Daniel Epplly, Sec. John T. Ensminger, Treas. R. F. Kelker, Supt. S. B. Reed. Capital, \$62,500. Office, 27 South 2d st.

**HARTFORD, CONN.**—Hartford & Wethersfield Horse R.R. Co. 12 m, 4-8½ g, 45 lb r, 49 c, 250 h. Pres. & Treas. E. S. Goodrich, Sec. Geo. Sexton.

**HAVERHILL, MASS.**—Haverhill & Groveland St. Ry. Co. 13.7 m, 4-4½ g, 30-35 lb r, 36 c, 131 h. Pres. Jackson B. Sweet, Treas. John A. Colby. Office 3 Water st.

**HELENA, ARK.**—Helena St. Ry. Co.

**HELENA, MON.**—2¼ m, 4-8½ g, 38 lb r, 5 c. Pres. C. W. Cannon, V. Pres. J. B. Wilson, Sec. & Treas. L. A. Walker.

**HERKIMER, N. Y.**—Herkimer & Mohawk St. Ry. Co. 1½ m, 4-8½ g, 25 lb r, 3 c. Pres. J. M. Ansmen, Sec. 40ab Small, Treas. H. D. Alexander.

**HOBOKEN, N. J.**—North Hudson County Ry. Co. 16½ m, 4-7 g, 50-60 lb r, 116 c, 630 h. Pres. John H. Bonn, Sec. F. J. Mallory, Treas. Fredk. Mickel, Union, Supt. Nicholas Goetz, Union.

**HOLYOKE, MASS.**—Holyoke St. Ry. Co. 3½ m, 4-8½ g, 35 lb r, 13 c, 45 h. Pres. Wm. A. Chase, Treas. C. Fayette Smith, Supt. H. M. Smith.

**HOT SPRINGS, ARK.**—Hot Springs R.R. Co. 3 m, 4 g, 25 lb r, 11 c, 30 h. Pres. S. W. Fordyce, Sec. C. E. Maurice, Supt. J. L. Butterfield.

**HOUSTON, TEX.**—Houston City St. Ry. Co. 14 m, 4-8½ g, 30-30-40 lb r, 40 c, 118 mu. Pres. Wm. H. Sinclair, Gaveston, V. Pres. & Gen. Man. H. P. MacGregor, Houston, Supt. Henry Freund, Houston, Sec. & Treas. E. H. Bailey, Houston. Office, 90 Travis st.

**HUTCHINSON, KAN.**—Hutchinson St. Ry. Co. 2 m, 4-6 g, 20 lb r, 4 c, 24 h. Pres. A. L. Forsha, V. Pres. John Severance, Treas. S. W. Campbell, Sec. Fred. A. Forsha. Office, 5 North Main st.

**ILION, N. Y.**—Frankfort & Ilion St. Ry. Co. 2½ m, 5 g, 25 lb r, 6 c, 6 h. Pres. A. C. McGowan, V. Pres. P. A. Skiff, Sec. John A. Giblin, Treas. J. L. McMillan, Supt. J. J. Hannahs.

**INDIANAPOLIS, IND.**—Citizens' St. Ry. Co. 35 m, 4-8½ g, 33-38-40-52 lb r, 70 c, 550 mu. Pres. A. W. Johnson, Indianapolis, Treas. Tom L. Johnson, Cleveland, O. Sec. A. A. Anderson, Indianapolis, Man. W. T. Steele, Indianapolis, Auditor P. Woodrige, Louisville, Ky. Office 80 W. Louisiana st.

**JACKSON, MICH.**—Jackson City Ry. Co. — m, — g, — lb r, 11 c, 40 h. Pres. Hiram H. Smith, Treas. Samuel Hopewell, Gen. Supt. Henry H. Smith.

**JACKSON, MISS.**—Jackson City R. R. 1½ m, 5 g, 3c, 9 mu. Pres. P. W. Peoples, Sec. & Tr. J. B. Bradford.

**JACKSON, TENN.**—Jackson Street Ry. Co.

**JACKSONVILLE, FLA.**—Pine St. R.R. Co. 2½ m, 5 g, 25 lb r, 4 c, 18 m. Pres. S. B. Hubbard; V. Pres. J. M. Schumacher; Treas. J. C. Greeley; Sec. & Man. H. S. Ely.

Jacksonville St. Ry. Co. 2½ m, 5 g, 25 lb r, 10 c, 36 m. Pres. H. S. Haines, Savannah, Ga., V. Pres. & Sec. Geo. R. Foster, Treas. W. P. Hardee, Savannah, Ga., Supt. G. W. Haines.

**JACKSONVILLE, ILL.**—Jacksonville Ry. Co. 4½ m, 4-8½ g, 30 lb r, 16 c, 30 h. Pres. Wm. S. Hook, Sec. T. J. Hook, Treas. Marcus Hook, Supt. B. F. Sibert.

**JAMAICA, N. Y.**—Jamaica & Brooklyn R.R. Co. 10 m, 4-8½ g, 56-60 lb r, 29 c, 56 h. Pres. Aaron A. Degrauw, Sec. Martin J. Durea, Treas. Morris Fosdick, Supt. Wm. M. Scott.

**JAMESTOWN, N. Y.**—Jamestown St. Ry. Co. 4m, 4-8½ g, 30-42 lb r, 13 c, 39 h. Pres. J. B. Ross, V. Pres. F. E. Gifford, Treas. A. N. Broadhead, Supt. G. E. Matby, Sec. & Atty. C. R. Lockwood.

**JANESVILLE, WIS.**—Janesville St. Ry. Co. Pres. Stephen G. Clarke, Chicago.

**JERSEY CITY, N. J.**—Jersey & Bergen R. R. Co. 28 m, 4-10 g, 47-60 lb r, 80 c, 624 h. Pres. Chas. B. Thurston, V. Pres. Wm. Keeney, Treas. C. B. Place, Sec. Warren E. Dennis, Newark, Supt. Thos. M. Sayre. Office, 1 Exchange Place.

**JOHNSTOWN, N. Y.**—The Johnstown, Gloversville & Kingsboro Horse R.R. Co. 4 m, 4-8½ g, 26 lb r, 6 c, 16 h. Pres. James Younglove, V. Pres. R. Fancher, Sec. & Treas., J. McLaren.

**JOHNSTOWN, PA.**—Johnstown Pass. R.R. Co. 7¼ m, 5-3 g, 41-43 lb r, 13 c, 76 h. Pres. James McMillen, Sec. B. L. Yeagley, Treas. W. H. Rosensleet, Jr., Supt. D. J. Duncan. Capital, \$100,000.

**JOLIET, ILL.**—Joliet City Ry. Co. 3½ m, 4-8½ g, 30 lb Johnson T. R, 16 c, 30 h. & mu. Prop. J. A. Henry, Supt. A. Bischan, Treas. J. Hulsizer.

**JOPLIN, MO.**

**KALAMAZOO, MICH.**—Kalamazoo St. Ry. Co. 3 m, 4-8 g, 35 lb r, 30 c, 50 h. Pres. Fred Bush, V. Pres. Wm. Dewing, Sec. & Treas. R. S. Jackson Man. J. W. Boynton. Office, 123 Main st.

**KANSAS CITY, MO.**—Kansas City Cable Ry. Co. 8 m, 4-8 g, 45-56 lb r, 26 grip c, 40 pass. c. Pres. Wm. J. Smith, Sec. W. H. Lucas, Chf Eng. Chf. Wise, Supt. F. A. Tucker. Office, S. E. cor. Ninth & Washington sts.

Corrigan Consolidated St. Ry. Co. 20 m, 4-1 g, 30 lb r, 80 c, 350 h. Pres. Bernard Corrigan, Gen. Man. Thos. Corrigan, Sec. Jas. T. Kelley. Operated by Metropolitan St. Ry. Co.

Grand Avenue Ry. Co. 8 m, 4-8 g, 40 lb r, 15 c, 75 h. Pres. C. F. Morse, V. Pres. and Gen. Man. W. H. Holmes, Sec. & Atty. D. B. Holmes, Engineers, Knight & Bouticon, Auditor, T. J. Fry, Supt. C. F. Holmes. Capital stock, \$1,200,000. Office, 15th & Grand av.

Kansas City Electric Ry. Co. 1 m, 4-8½ g, heavy girder r, 8 c, 4 electric motors (Henry system). Pres. W. W. Kendall, V. Pres. Hugh L. McElroy, Sec. & Treas. Warren Watson. Office, 1139 E. 5th st. Capital, \$10,000.

Kansas City & Rosedale St. Ry. Co. Operated by the Metropolitan St. Ry. Co.

Metropolitan St. Ry. Co. 11½ m, 4-4-8½ g, 66 c, Pres. C. F. Morse, V. Pres. Geo. H. Nettleton, Sec. W. J. Ferry, Treas. A. W. Armour, Supt. E. J. Law-

less. Engineers. Knight & Bouticon, Gen. Counsel Pratt, Baumbach & Ferry, Auditor & Cashier, R. J. McCarty. Capital \$1,250,000.

**KEOKUK, IA.**—Keokuk St. Ry. Co. 4 m, 4-8½ g, 27 lb steel r, 12 c, 40h. Pres. Jas. H. Anderson, Sec. Wm. E. Anderson.

**KINGSTON, ONT., CAN.**—Kingston St. R.R. Co. ¾ m, 3-6 g, 9 lb r, 10 c, 36 h. Pres. Robert Carson, Sec. & Treas. F. Sargent, Man. William Wilson.

**KNOXVILLE, TENN.**—Knoxville St. R.R. Co. 2 m, 4-8½ g, 22 lb r, 5 c, 2 hacks, 30 h. Pres. A. P. Chamberlain, Sec., Treas. Supt. T. L. Beaman.

Mabry Bell Ave. & Hardee St. Ry. Co. 4 m, 4-8½ g, 4 c, 29 h. Pres. R. N. Hood, Sec. B. L. Smith, Supt. & Man. M. E. Thompson.

Market Sq. & Asylum St. Ry. Co. 2 m, 5 g, 22 lb r, 3 c, 18 h. Pres. Peter Kern, Sec. W. B. Henderson, Treas. W. H. Shmonds, Supt. L. O. Rogers. Office, 148 Gay st.

**LACONIA, N. H.**—Laconia & Lake Village Horse R.R. 2¼ m, 3 g, 34 lb r, 5 c, 20 h. Pres. A. G. Folsom, Sec. J. P. Hutchinson, Treas. Edmund Little, Man. Bela S. Kenniston.

**LA CROSSE, WIS.**—La Crosse City Ry. Co. 5½ m, 4-8 g, 40 lb r, 15 c, 70 h. Pres. B. E. Edwards, V. Pres. Geo. F. Gund, Treas. Fred Tillman, Sec. Jas. T. Daggett, Supt. (North Division), Peter Valter, Supt. (South Division), Geo. F. Smith. Office 222 Main st.

**LAFAYETTE, IND.**—Lafayette St. Ry. 2¼ m, 4-8½ g, 35 lb r, 6 c, 38 h. Pres. B. Caldwell, LaFayette, Sec. & Treas. E. G. Jones, Decatur Ill., Supt. F. Greer, LaFayette.

**LAKE CITY, FLA.**—Lake City St. Ry. Co.

**LAMPASAS SPRINGS, TEX.**—Lampasas City Ry. Co. 3¼ m, 4-8½ g, 22 lb r, 6 c, 15 h. Receiver, — Maddox.

**LANCASTER, PA.**—Lancaster & Millersville St. Ry. Co.—m, 4-8½ g, 30 lb r, 4 c, 14 h. Pres. J. C. Hager, V. Pres. H. S. Shirk, Sec. & Treas. Chas. Dennes. Lancaster City St. Ry. Co. 1.1 m, 5-2 g, 38 lb r, 6 c, 4 h. Pres. W. D. Sprecher, Treas. J. H. Baumgardner, Sec. Thos. B. Cochran, Man. J. B. Long. Gen. Office, 129 North Queen st.

**LANSING, MICH.**—Lansing City Ry. Co. 3 m, 4-8½ g, 30 lb steel r, 5 c, 24 h. Pres. Stephen G. Clarke Chicago, V. Pres. & Treas. Harry M. Clarke, Lansing, Sec. John P. Altgeld, Supt. Byron E. Clarke, Lansing.

**LARCHMONT, N. Y.**—Larchmont Manor Co. 1½ m, 4-8 g, 25 lb r, 2 c, 10 h. Pres. C. H. Murray, Sec. E. E. Flint, Treas. T. H. French, 38 East Fourteenth st. N. Y. City, Supt. W. H. Campbell.

**LAWRENCE, KAN.**—Lawrence Transportation Co. 5½ m, 4-1 g, 35 lb r, 8 c, 34 h. Pres. H. Tisdale, Sec. W. H. Bangs.

**LAWRENCE, MASS.**—Merrimack Valley Horse R.R. Co. 6¼ m, 4-8½ g, 48 lb r, 20 c, 70 h. Pres. Wm. A. Russell, V. Pres. Jas. Walton, Methuen, Clerk & Treas. James H. Eaton, Supt. A. N. Kimball, Lawrence.

**LEWISTON, ME.**—Lewiston & Auburn Horse R.R. Co. 10 m, 4-8½ g, 32 lb r, 20 c, 60 h. Pres. Frank W. Dana, Treas. Charles C. Corbett, Supt. J. E. Fairbanks, Clerk, H. C. Little.

**LEXINGTON, KY.**—Lexington City Ry. Co. 8 m, 4-10 g, 20 lb r, 20 c, 85 h. Pres. & Treas. R. B. Metcalf, V. Pres., Man. & Sec. Albert Cross, Supt. Bert Cross.

**LEXINGTON, MO.**—Lexington St. Ry. Co. 1½ m, 4-4 g, 30 lb r, 2 c, 8 h. Supt. John C. Young. Office, 124 Main st.

**LIMA, O.**—Lima St. Ry. & Power Co. Pres. B. C. Faurot.

**LINCOLN, NEB.**—Lincoln St. Ry. Co. 12 m, 4-8½ g, 20 lb steel r, 24 c, 150 h. and mu. Pres. J. W. Dewese, V. Pres. John R. Clark, Sec. & Treas. C. J. Ernst, Supt. Wm. R. Carter.

**LITTLE ROCK, ARK.**—Little Rock St. Ry. Co. 5 m, 5-10 g, 36 lb r, 9c, 50 mu. Pres. T. J. Darragh, Sec. & Treas. F. C. Reed, Supt. J. A. Garrett.

Citizens' St. Ry. Co. 5 m, 4-10 g, 20-25 lb r, 22 c, 80 h. Owned and operated by Little Rock Street Railway Co. Same offices.

**LOCKPORT, N. Y.**—Lockport St. R. R. Co. 3½ m, 4-8½ g, 42 lb r, 8 c, 33 h. Pres. & Treas. John Hodge, Sec. W. T. Ransom, Atty. E. M. Ashley. Office, 19 & 20 Hodge Opera House Bldg.

**LOGANSPOUT, IND.**—Logansport Ry. Co. 2½ m, 4g, 30 lb r, 6 c, 39 mu. Pres. Frank G. Jaques, Sec. M. Jaques, Supt. Wm. P. Jaques. Office, Urbana, Ill.

**LONDON, CAN.**—London St. R.R. Co. 5 m, 4-8½ g, 30 lb r, 12 c, 30 h. Pres. V. Cronyn, Sec. Jas. H. Flock, Supt. Henry Thos. Smith.

**LONG ISLAND CITY, N. Y.**—Steinway & Hunter's Point R. R. Co. 30 m, 4-8½ g, 47 lb r, 68 c, 225 h. Pres. Wm. Steinway, Steinway Hall, N. Y. City. V. Pres. Henry A. Cassebeer, Jr., Steinway P. O., Long Island City, N. Y. Sec. & Treas. Chas. F. Trethar, Steinway Hall, N. Y. City. Supt. Chas. J. Campbell. Offices Steinway Hall, N. Y.

Dutch Kills & Hunter's Point R.R. — m, — g, — lb r, — c, — h Pres. R. J. Gleason.

Long Island City & Newtown Ry. Co. 4½ m, 4-8½ g, 45-55 lb r, 25 c, 60 h. Pres. Isaac Buchanan, N. Y. City, Sec. G. S. Crawford, Brooklyn, N. Y., Treas. Patrick J. Gleason, Supt. Michael Conway. Offices 112 Front st.

**LONGVIEW, TEX.**—Longview & Junction St. Ry. ¾ m, 3-6 g, 16 lb r, 2 c, 4 h. Pres. F. T. Rembert, Sec. R. B. Levy, Treas. F. S. Whaley, Supt. C. W. Booth.

**LOS ANGELES, CAL.**—Boyle Heights R.R. Co. Central R.R. Co. and the Sixth & San Fernando St. R.R. Co. 7 m, 3-6 g, 16 lb r, 13 c, — h. Pres. E. T. Spencer, Sec. F. X. Palmer, Supt. J. A. Fairchild.

City & Central St. Ry. Co. 4½ m, 3-6 & 4-8 g, — lb r, 2 g cars, 167 h. Pres. I. W. Hellman, Sec. Fred Harkness, Supt. Wm. Hawks.

Los Angeles & Aliso Ave. St. R.R. Co. Main St. & Agricultural Park Ry. Co. 8 m, 3-6 g, 16 lb r, 12 c, 49 h. Pres. W. J. Broderick, Sec. Arthur C. Taylor, Treas. The Farmers and Merchants' Bank, Supt. Wm. Hawks. Office, 6 Commercial st.

Second St. Cable Ry. Co. 6 c and 6 grip c. Pres. Jesse Garnell, Sec. & Man. Edw. A. Hall, Eng. and Supt. — Kibble.

Temple St. Cable Ry. Co. 1½ m, 3-6 g, 16 lb r, 8 c.

Pres. P. Beaudry, Sec. F. Woods, Supt. Col. A. H. Wands.

**LOUISVILLE, KY.**—Kentucky St. Ry. Co. 5 m, 5-2 g, — lb r, 22 c — h. Pres. T. J. Minary, Sec. & Treas. Thos. Donigan.

Central Pass. R.R. Co. 49 m, 5 g, 52 lb r, 150 c, 750 h, Pres. B. DuPont, V. Pres. Thos. J. Minery, Sec. T. C. Donigan. Office 18 Walnut st.

Crescent Hill Ry. Co. 3 m. Leased and operated by Central Pass. R. R. Co.

Louisville City Ry. Co. 65 m, 5 g, 40 to 58 lb r, 230 c, 1,400 mu. Pres. Maj. Alexander Henry Davis, Syracuse, N. Y., V. Pres. St. John Boyle, Sec. & Treas. R. A. Watts, Supt. H. H. Littell. Office, 13th and Main sts.

**LOWELL, MASS.**—Lowell Horse R.R. Co. 7.7 m, 4-8½ g, 28-33-45 lb r, 33 c, 125 h. Pres. Wm. E. Livingston, Gen. Man. J. A. Chase.

Lowell & Dracut St. Ry. Co.

**LYNCHBURG, VA.**—Lynchburg St. R.R. Co. 2¼ m, 5-1 g, 20-26 lb r, 6 c, 31 h. Pres. & Treas. Stephen Adams, Supt. William M. Payne. Office 811 Main st.

**LYONS, IA.**—Clinton & Lyons Horse Ry. Co. 4½ m, 3-8 g, 19-30 lb r, 15 c, 40 h. Pres. D. Joyce, V. Pres. & Man. R. N. Rand.

**MACON, GA.**—Macon & Suburban St. R.R. Co. 10 m, 5 g, 20 lb r, 20 c, 90 mu. Pres. John S. Bransford, Nashville, Tenn., Sec. and Supt. Jno. T. Voss. Office, Elm st.

**MADISON, IND.**—Madison St. Ry. Co. 2½ m, 4 g, 15 lb r, 7c, 4 h, 11 mu. Pres. & Supt. Jacob Wendel, V. Pres. & Treas. Peter F. Robinus, Sec. John K. Weyer. Office, 1026 Walnut st.

**MADISON, WIS.**—Madison St. Ry. Co. 2½ m, 3 g, 23 lb r, 8 c, 28 mu. Pres., D. K. Tenney, Sec. & Treas. B. W. Jones, Supt. A. R. Kentzler. Office, Williamson st.

**MANCHESTER, N. H.**—Manchester Horse R.R. 7m, 3 g, 27-34 lb r, 14 c, 60 h. Pres. S. N. Bell, Treas. G. F. Smyth, Clerk J. A. Weston, Supt. A. Q. Gage. Office Depot st.

**MANKATO, MINN.**—Mankato St. Ry. Co. 2m, 3-6g, 27 lb steel r, 3 c, 12 h. Pres. and Man. W. M. Farr, Sec. and Treas. John C. Noe, Capital, \$50,000; office, 313 So Front street.

**MARSHALLTOWN, IA.**—3 m, 4 g, 25 lb r, 7 c, 20 h. Pres. B. T. Frederick, Treas. T. E. Foley, Sec. C. C. Gillman, Supt. A. E. Shorthall.

**MARYSVILLE, CAL.**—City Pass. R.R. Co.

**MAYSVILLE, KY.**—Maysville St. Ry. & T. Co. 3 m, 20 lb r, 4-8½ g, 6 c, 32 mu. Pres. L. W. Robertson, Sec. & Treas. W. S. Frank.

**MECHANICSBURG, ILL.**—Mechanicsburg & Buffalo Ry. Co. 3½ m, 3-10 g, 16 lb r, 3 c, 4 mu. Pres. J. N. Fullenweider, Treas. A. T. Thompson, Sec. H. Thompson.

**MEMPHIS, TENN.**—Memphis City R.R. Co. 18 m, 5 g, 38-40 lb r, 80 c, 320 h. Pres. R. Dudley Frayser, V. Pres. Thos. Barrett, Sec. James Frost, Treas. S. P. Read Jr. Supt. W. F. Shippey. Office 474 Main st.

**MERIDEN, CONN.**—Meriden Horse R.R. Co. 5 m, 4-8½ g, 35 lb r, 12 c, 80 h. Pres. G. R. Curtis, Sec. & Treas. Chas. L. Rockwell, Supt. Dan'l Barker.

**MERIDIAN, MISS.**—Meridian St. Ry. Co. 2 m, 4-8 g, 16 lb r, 5 c, 17 mu. Pres. Geo. S. Covert, V. Pres. and Sup. J. L. Handley, Treas. J. A. Kelly, Sec. R. M. Houston.

**MICHIGAN CITY, IND.**—Citizens' St. Ry. Co. 2 m, 4-8½ g, 30 lb r, 4 c, 16 h. Pres. Wm. G. Knight, V. Pres. John Lyons, Sec. Jacob D. Henderson, Treas. Jerry H. Knight. Office West Washington st., South Bend, Ind.

**MIDDLETOWN, CONN.**—Middletown Horse R.R. Co. 2 m, 6c, 36 lb r, 30h. Pres. John M. Douglas, Sec. & Treas. J. K. Guy, Supt. Walter Baldwin. Office 166 Main st.

**MIDDLETOWN, O.**—Middletown Horse R.R. Co. Middletown & Madison St. R.R. Co. 2 m, 5-9 g, — r, 4 c, 8 h, Pres. C. F. Gunkel, Sec. and Treas. E. W. Gunkel, Supt. T. C. Reed.

**MILLERSVILLE, PA.**—Lancaster & Millersville St. R.R. Co. (See Lancaster, Pa.)

**MILWAUKEE, WIS.**—Cream City R.R. Co. 17 m, 4-8½ g, 38 & 52 lb girder r, 27 lb tram r, 80 c, 319 mu. Pres. Winfield Smith, V. Pres. Christian Preusser, Treas. Ferdinand Kuehn, Sec. Wm. Damkoehler, Gen. Man. D. Atwood, Supt. H. J. C. Berg. Office, 440 E. Water st.

Milwaukee City Ry. Co. 30 m, 4-8½ g, 27 lb iron & 45 lb steel r, 81 c, 410 h. Pres. Peter McGeeoch, Sec. & Treas. Geo. O. Wheatcroft. Office 209 West Water st. West Side St. Ry. Co. Pres. Washington Becker Sec. Thos. J. Durnin, Supt. A. McNaughton.

**MINNEAPOLIS, MINN.**—Minneapolis St. Ry. Co. 62 m, 3-6 g, 27-35-45 lb r, 186 c, 773 h, 226 mu. Pres. Thos. Lowry, V. Pres. C. Morrison, Treas. W. W. Herrick, Sec. C. G. Goodrich, Supt. D. W. Sharp.

**MOBILE, ALA.**—City R.R. Co. 17½ m, 5-2 g, 35 lb T-r, 60 c, 200 h. Pres. O. W. Cawthon, V. Pres. A. H. Spira, Sec. Peter Stark, Supt. R. R. Benson. Dauphin & Lafayette Ry. Co. 2 m, 5-2½ g, 40 lb r, 9 c, 10 h, 12 m. Pres. D. P. Bestor, V. Pres. & Sec. G. Y. Overall, Treas. & Acting Sec. Jas. W. Gray, Pur. Agt. & Man. J. B. Robertson.

Mobile & Spring Hill R.R. Co. 8 m, 5-2½ g, 35 lb r, 15 c, 35 h, 1 dummy. Pres. Daniel McNeill, Sec. & Treas. C. F. Sheldon, Man. F. Ingate.

**MOHAWK, N. Y.**—Mohawk & Ilion R.R. Co. 1½ m, 4-8½ g, 30 lb r, 4 c (contract for motive power). Pres. O. W. Bronson, V. Pres. C. W. Carpenter, Sec. H. D. Alexander, Treas. R. M. Devendorf, Supt. O. W. Bronson.

**MOLINE, ILL.**—Moline Central St. Ry. Co. 2½ m, 4-8½ g, 30 lb r, 3 c, 10 h. Pres. P. H. Wessel, V. Pres. M. Y. Cady, Sec. W. R. Moore, Treas. C. F. Hemenway.

Moline & Rock Island St. Ry. Co. 5 m, 4-8½ g, 20 lb r, 8 c, 40 h, 2 steam motors. Pres. & Treas. Eugene Lewis, Sec. I. M. Buford, Gen. Man. Geo. W. French, Supt. Jas. Cazatt.

**MONTGOMERY, ALA.**—Capital City Electric Ry. 11 m, 4 g, 42 lb r, 20 c. Electric motors. Pres. E. B. Joseph, Gen. Man. J. A. Gaboury, Treas. Thos. E. Hannon.

**MONTREAL, CAN.**—Montreal St. Ry. Co. 30 m, 4-8½ g, 80 c, 80 sleighs, 40 buses 700 h. Pres.



# THE SPRAGUE ELECTRIC RAILWAY & MOTOR CO.

16 and 18 Broad Street, New York City.

*This Company is the Owner of Patents 313,247, March 3, 1885; 315,180 and 315,181, April 7, 1885; 324,891, Aug, 25, 1885, and Twenty-six Others, Issued to Frank J. Sprague, for the Transmission of Power by Electricity.*

These Patents are fundamental, and cover the only possible methods of automatically operating constant speed motors on constant potential circuits, and also a complete system of electric railroads, as now being demonstrated in New York. Suits for damages will be promptly brought against infringers.

*The Sprague Motors have been formally adopted for use on the Edison Circuits, and they are being introduced on these and also on Westinghouse, Brush-Swan, Thomson-Houston and United States Circuits, in New York, Chicago, Boston, Des Moines, Elgin, Oskaloosa, Pittsburg, Chester, Williamsport, Lancaster, Shamokin, York, Detroit, Topeka, Cincinnati, Springfield, New Brunswick, Fall River, New Bedford, Milford, Taunton, Lawrence, Woonsocket, Fort Meyer, Waterbury, Annapolis, St. Louis, Abilene, Pawtucket, Syracuse, Canada, the Argentine Republic, Italy, Germany, and Japan.*

This company has recently increased its capitalization, and has ample means to undertake any desirable contract for the transmission of power for any purpose, under suitable guarantees. The company now possess the best facilities for manufacture of any motor company in the world. Arrangements are about to be made with the Edison Machine Works to manufacture and carry in stock large numbers of standard machines, and a special factory—the only experimental factory devoted exclusively to that work in existence—has recently been started in New York, and is equipped with the finest tools that are made.

**At present there are being operated in Boston nearly fifty motors, varying from 1-2 to 15 horse power, and from these motors is derived a revenue to the local Edison Company of an amount equal to 10 per cent of their recent capital, of which four-fifths is profit.**

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

Correspondence invited, and estimates furnished for complete Central Stations or Special Transmissions up to 1,000 horse power on the basis of limited or exclusive rights.

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

This system offers the following advantages:—

*Greatly Increased Traction.*

*Entire Freedom from Disagreeable Noises.*

*Most Compact, Simple and Powerful Form of Motor.*

*Greatest Return for Given Amount of Coal Burned.*

*Absence of all Ropes, Belts, Sprocket-Wheels and Chains.*

*No Useful Room in the Car taken up by the Motor.*

*Use of Single Sets of Brushes for both Directions of Driving.*

*Impossibility of an Accident at any Point of the Line Interfering with the Operation of the Remainder of the Road.*

We are prepared to furnish exact estimates for the cost of equipping and operating any road, provided complete details—on blanks which will be furnished by this company—are supplied to us.

**New York Office, Western Union Cable Building, 16 & 18 Broad St,  
Boston Office, 55 Oliver St.**



Jesse Joseph, V. Pres. Alex. Murray, Sec. & Man. Ed. Lusher, Supt. T. H. Robillard. 3  
**MOULTRIEVILLE, S. C.**—Middle St. & Sullivan's Landing Ry. 2½ m, 4-8½ g, 20 lb r, 7c 4 h. Pres. B. Callahan, Treas. B. Buckley. 3  
**MT. VERNON, N. Y.**—Mt. Vernon St. Ry. Co. Mount Vernon & East Chester R.R. Co. 3½ m, —g, —r, 7 c, 30 h. Pres. Wm. A. Butler, V. Pres. Thos. Nichols, Sec. Jas. T. Byrne, Treas. Benj. L. Weithelmer, Office, 261 Broadway, N. Y.  
**MUSCATINE, IA.**—Muscatine City Ry. Co. 3½ m, 3-6 g, 21 lb r, 7 c, 34 h. & mu. Pres. Peter Musser, V. Pres. W. Hoffman, Sec. T. R. Fitzgerald, Treas. S. M. Hughes. 4  
**MUSKEGON, MICH.**—Muskegon Ry. Co. 4½ m 1-6 g, 20 lb r, 8 c, 17 h, 9 mu. Pres. F. A. Nims, V. Pres. Chas. Merriam, Boston, Mass., Sec. Thomas Munroe, Treas. G. R. Sherman, Supt. Wm. McLaughlin. 4  
**NASHUA, N. H.**—Nashua St. Ry. Co. 2 m, 3 g, 33 lb r, 8 c, 22 h. Pres. John A. Spalding, Clerk, R. D. Barnes, Supt. Q. A. Woodward, Office, Kinsley St.  
**NASHVILLE, TENN.**—Nashville & Edgefield R.R. Co. Fatherland Street Railway Co. North Edgefield and Nashville St. R.R. Co., one management. 5 m, 5 g, 16-20-32 lb r, 21 c, 100 mu. Pres. Jas. H. Yarbrough, Sec. & Treas. H. B. Stubblefield, Supt. D. Deaderick. 4  
 McGawcock & Mt. Vernon Horse R.R. Co. 7½ m, 5 g, 16-20-32-32 lb r, 25 c, 140 h. & mu. Pres. John P. White, V. Pres. B. F. Wilson, Sec. & Treas. H. B. Stubblefield, Supt. Danzigerfield Deaderick. 4  
 South Nashville St. R. R. Co. 4½ m, 5 g, 16-20-32 lb r, 10 c, 68 h. Pres. W. M. Duncan, Sec. & Supt. C. L. Fuller, Office cor. So. Franklin and Cherry sts. 4  
**NATICK, MASS.**—Natick & Cochituate St. Ry. 3 m, 4-8½ g, 35 lb r, 7 c, 17 h. Pres. Harrison Harwood, Supt. Geo. F. Keep, Clerk Frank Hayes.  
**NEW ALBANY, IND.**—New Albany St. Ry. Co. 6 m, 4-11½ g, 25 lb r, 15 c, 55 h. & mu. Pres. Geo. T. Vance, Treas. Letitia V. Vredenburg, Supt. & Pur. Agt. Wm. L. Timberlake. Office cor. Vincennes and Spring sts.  
**NEWARK, N. J.**—Newark & Bloomfield St. R.R. Co. Consolidated with Essex Pass. Ry. Co. Essex Pass. Ry. Co. 50 m, 5-2½ g, 47 lb r, 138 c, 740 h. Pres. S. S. Battin, Sec. T. F. Kirk, Supt. H. F. Totten, Paymaster, W. L. Mulford, Office, 786 Broad St.  
 Newark & Irvington St. Ry. Co., 7 m, 5-2½ g, 47 lb r, 25 c, 130 h. Pres. S. S. Battin, Sec. W. L. Mulford, Supt. H. F. Totten. Office 786 Broad St. 4  
**NEWARK, O.**—Newark St. Ry. Co. Pres. Stephen G. Clarke, Chicago. 4  
**NEW BEDFORD, MASS.**—New Bedford & Fairhaven St. Ry. Co. 9.78 m, 4-8½ g, 35-45 50 lb r, 46 c, 161 h. Pres. Warren Ladd, Treas. A. G. Pierce, Clerk, Edw. T. Pierce. 4  
 Acushnet St. R.R. Co., 8 m, 4-8½ g, 35 lb r, 38 c, 153 h. Pres. & Supt. Chas. E. Cook, Sec. & Treas. A. P. Smith. 4  
**NEW BRITAIN, CONN.**—New Britain Tramway Co. 3½ m. Pres. Lorin F. Judd. Capital \$23,000. 2  
**NEW BRUNSWICK, N. J.**—New Brunswick Horse R.R. 4 m, 4-8½ g, 40 lb r, 5 c, 20 h. Pres. F. M. Delano, Treas. Carroll Sprigg. 4  
**NEWBURGH, N. Y.**—Newburgh St. Ry. Co. 2½ m, 4-8½ g, 40 lb r, 5 c, 24 h. Pres. Rowland F. Hill, V. Pres. Sidney W. Hopkins, Sec. & Treas. Wm. Morris, Gen. Man. H. Ives Smith. President's office, 3 Broad St., New York. 4  
**NEWBURYPOR, MASS.**—Newburyport & Amesbury Horse R.R. Co. 6.13 m, 12 c, 54 h. Pres. W. A. Johnson, Treas. N. H. Shepard, Sec. Geo. H. Stevens, Lessee, E. P. Shaw. 4  
**NEW HAVEN, CONN.**—Fair Haven & Westville R.R. Co. 10 m, 4-8½ g, 50 lb r, 28 c, 207 h. Pres. H. B. Ives, Sec. & Treas. L. Candee, Supt. Walter A. Graham. Office 786 Chapel St. 3  
 New Haven & Centreville Horse R.R. Co. 2½ m, 4-8½ g, 42 lb r, 8 c, 42 h. Trustee Cornelius Pierpont, Office, 1 Broadway. 2  
 New Haven & West Haven R.R. Co. (See West Haven).  
 State Street Horse R.R. Co. 2½ m, 4-8½ g, 43 lb r, 6 c, 40 h. Pres. C. A. Warren, Sec. & Treas. C. C. Blatchley, Office 16 Exchange Bldg. 4  
 Whitney Ave. Ry. Co. 2½ m, 4-8½ g, 25 lb r, 3 c, 20 h. Pres. Geo. H. Watrous, Sec. George D. Watrous, Treas. Eli Whitney, Jr., Lessee J. A. Davis. 4  
**NEW MARLBORO, O.**—Kankaport R.R. Co.  
**NEW ORLEANS, LA.**—Canal & Claiborne St. R.R. Co. 13 m, 5-2½ g, 37 lb r, 40 c, 200 h. Pres. E. J. Hart, Sec. & Supt. Jos H. DeGrange. 4  
 Crescent City R.R. Co. 26 m, 5-2½ g, 35-45 lb r, 90 c, 400 h. Pres. Frank Roder, Sec. & Treas. Jno. J. Juden, Supt. A. V. Smith. 4  
 Orleans R.R. Co. 9½ m, 5-2½ g, 35 lb r, 32 c, 155 h. & mu. Pres. & Supt. H. Larque, Sec. & Treas. P. Cougot, Office, cor. White & LaHarpe sts. 4  
 St. Charles St. R.R. Co. 15 m, 5-2½ g, 35 lb r, 61 c, 366 m. Pres. & Supt. Alden McLellan, Sec. V. Riviere, Operates 3 lines. Office cor. Carondelet & 88th sts. 4  
 New Orleans & Carrollton R.R. Co. 8 m, 4-8½ g, 30-45 lb r, 65 c, 200 h, 19 engines. Pres. Wm. Benthuyssen, Sec. Walter F. Crouch, Supt. C. V. Halle. 4  
 New Orleans City & Lake R.R. Co. 60 m, 5-2½ g, 46 lb r. Pres. J. A. Walker, Sec. W. E. Leverich, Supt. F. Wintz. Office, 103 Canal St. 2  
**NEWPORT, KY.**—Newport St. R.R. Co.  
**NEW ROCHELLE, N. Y.**—New Rochelle & Pelham R. R. Co. 10 m, 4-8½ g, 38 lb r, 8 c, 30 h. Pres. W. R. Bergholz, Sec. & Treas. Eugene Durnin. 4  
**NEWTON, KAN.**—Newton St. Ry. Co.  
**NEWTON, MASS.**—Newton St. R. R. Co. (See New Roads). 4  
**NEW YORK, N.Y.**—Ninth Ave. R.R. Co. 16 m, 4-8½ g, 60 lb r, 50 c, 500 h. Pres. Geo. Law, Sec. & Treas. James Affleck, Supt. Lewis P. Fouk. Offices, Ninth Ave., cor. 54th St. 4  
 Broadway & Seventh Ave. R.R. Co. 16 m, 4-8½ g, 47-60 lb r, 227 c, 2240 h. Pres. Henry Thompson, Sec. & Treas. Thos. F. Ryan, Supt. Henry A. Newell, Office 761 Seventh ave. 4  
 Central Crostown R.R. Co. 5-22 m, 4-8½ g, 52 lb r,

45 c, 241 h. Pres. Geo. S. Hart, V. Pres. A. Cammack, Sec. & Treas. Milton I. Masson, Office 365 Ave. A.  
 Central Park, North & East River R.R. Co. 26 m, 4-8½ g, 60 lb r, 162 c, 1,200 h. Pres. G. H. Scribner, V. Pres. C. D. Wyman, Sec. H. Scribner, Treas. J. L. Valentine, Supt. W. N. A. Harris, Office, Tenth Ave., 53d & 54th st. 4  
 Chambers St. & Grand St. Ferry R. R. Pres. H. Thompson.  
 Christopher & Tenth St. R.R. Co. 5 m, 4-8 g, 45 lb r, 47 c, 290 h. Pres. Jacob Sharp, Treas. W. T. Hatch, Sec. & Supt. G. W. Lynch, Office, 168 Christopher St. Dry Dock, East Broadway & Battery R.R. Co. 18½ m, 4-8½ g, 60 lb r, 185 c, 1102 h. Pres. William White, Auditor E. T. Landon, Sec. & Treas. Richard Kelly, Supt. Fred F. White, Offices, 605 Grand St. 4  
 Eighth Ave. R.R. Co. 20 m, 4-8½ g, 60 lb r, 112 c, 1155 h. Pres. Geo. Law, Sec. & Treas. James Affleck, Supt. H. B. Wilson, Office, Eighth Ave. & 50th St. 4  
 Forty-second Street & Grand Street Ferry R.R. Co. 10½ m, 8-4 g, 64 lb r, 50 c, 500 h. Pres. Chas. Curtis, Sec. & Treas. E. S. Allen, Supt. John M. Calhoun, Office, 653 W. 42d St.  
 Forty-second St., Manhattanville and St. Nicholas Avenue Ry. Co. 18 m, 4-8½ g, 60 lb r, 105 c, 650 h. Pres. John S. Foster, Sec. C. F. Naething, Treas. Arthur Leary, Office, 118 E. 42 St. 4  
 Harlem Bridge, Morrisania & Fordham Ry. Co. 16.37 m, 4-8½ g, 45-60 lb r, 65 c, 316 h. Pres. and Supt, H. Spratley, V. Pres. Wm. Remsen, Sec. & Treas. Wm. Cauldwell, Office, Third ave, near 170 St. 4  
 Houston, West Street & Pavonia Ferry R.R. Co. 112-3 m, 4-8½ g, 60 lb r, 50 c, 450 h. Pres. Henry Thompson, Sec. & Treas. Daniel B. Hasbrouck, Office, 415 E. 10 St. 4  
 Jerome Park R.R. 1-2-3 m, 4-8½ g, 50-56 lb r. Pres. Leonard M. Jerome, Sec. Fred A. Lovcraft, Treas. Theodore Moss, Office, cor. 5th ave. & 23d St.  
 New York City St. Ry. Co. 10 m, (not in operation). Pres. Loomis L. White, Sec. W. L. McCorkle, Treas. Wm. L. Skidmore.  
 New York & Harlem R.R. Co. 17 m, 4-8½ g, 60-75 lb r, 172 c, 1,570 h. Pres. C. Vanderbilt, V. Pres. C. C. Clarke, Sec. & Treas. Ed. V. W. Rositter, Supt. Alfred Skitt, Pur. Agt. P. S. Bemis, Office, Grand Central Depot. 4  
 Sixth Ave. R.R. Co. 9½ m, 4-8½ g, 60 lb r, 109 c, 1250 h. Pres. Frank Curtiss, Sec. and Treas, Henry S. Moore, Supt. Edw. E. Moore, Office, 758 6th ave. 2  
 South Ferry Ry. Co. 1½ m, 4 8½ g, 60 lb r, 6 box 4 open c, 33 h. Pres. Henry Hart, Sec. & Treas. Albert L. Elias, Supt. Chas. H. Meeks, Office, 20 Whitehall St. 4  
 St. Nicholas & Crosstown R. R. Co. (See New Roads).  
 The Second Ave. R.R. Co. 28 m, 4 8½ g, 60 lb r, 316 9cars, 1750 h. Pres. W. Thorn, V. Pres. J. Wadsworth, Sec. & Treas. J. B. Underhill, Office Second Ave. cor. 95th St.  
 The Third Ave. R. R. Co. 28½ m, 4-8½ g, 60 lb r, 360 c, 2100 h. Pres. Lewis Lyon, 739 Madison ave., Sec. Alfred Lazarus, 436 W. 61st St., Treas. John Beaver, 211 E. 112th St., Supt. John H. Robertson, 307 E. 65th St. 4  
 Twenty-third St. R.R. Co. 14 m, 4 8½ g, 54 lb r, 102 c, 692 h. Pres. Jacob Sharp, Sec. Thos. H. McLean, Treas. Lewis May, Act-Supt. George Ferry, Office 621 West 23d St.  
**NAGARA FALLS, N. Y.**—Niagara Falls & Suspension Bridge Ry. Co. 3½ m, 4-8½ g, 38-42 lb r, 10 c, 40 h. Pres. Benj. Flagger, V. Pres. A. Cluck, Sec. W. J. Mackay, Man. & Treas. A. Schoellkopf. 4  
**NORFOLK, VA.**—Norfolk City R. R. Co. 3½ m 5-2 g, 43 lb r, 20 c, 67 h. Pres. John B. Whitehead, Sec. & Treas. H. C. Whitehead, Supt. E. W. Savage. 4  
**NORTH ADAMS, MASS.**—Hoosac Valley St. Ry. Co. 6 m, 4-8½ g, 40 lb r, 10 c, 29h, 2 steam motors. Pres. Wm. B. Baldwin, V. Pres. L. W. Cronkrite, Sec. & Treas. S. Proctor Thayer, Manager G. W. Lincoln.  
**NORTHAMPTON, MASS.**—Northampton St. Ry. Co. 3½ m, 4-8½ g, 32 lb r, 9 c, 35 h. Pres. Oscar Edwards, Sec. M. H. Spaulding, Treas. & Sup. E. C. Clark. 4  
**NORWALK, CONN.**—Norwalk Horse Ry. Co. 1¼ m, 4-10 g, 42 lb r, 7 c, 19 h. Pres. & Supt. James W. Hyatt, Sec. Edw'n G. Hoyt. 4  
**NORWICH, CONN.**—Norwich Horse R.R. Co.  
**OAKLAND, CAL.**—Alameda, Oakland & Piedmont R.R.  
 Berkley Villa R.R.  
 Broadway & Piedmont St. R.R. Co.  
 Brooklyn & Fruitvale R. R. 2½ m, 5 c, 18 h. Pres. E. C. Sessions, Sec. W. W. Gill. 2  
 Fourteenth St. R.R. Co. 8 m, 5 g, 25-40 lb r, 10 c, 46 h. Pres. & Supt. Walter Blair, Sec. P. J. Van Lobe, Office, 524 14th St. 4  
 Oakland R.R. Co.  
 Oakland, Brooklyn & Fruitvale R. R. Co. (See East Oakland).  
**OGDEN CITY, UTAH.**—Ogden City Ry. Co. 3 m, 4-8½ g, 20 lb r, 4 c, 20 h. Pres. L. W. Shurtliff, V. P. & Supt. O. P. Arnold, Sec. & Treas. H. S. Young. 4  
**OGDENSBURG, N. Y.**—Ogdensburg St. Ry. Co. 5 m, 4-8½ g, 25 lb r, 6c, 18 h. Pres. W. H. Daniels, Treas. W. A. Egert, Sec. W. H. Daniels.  
**OLEAN, N. Y.**—Olean St. Ry. Co. 1½ m, 3-6 g, 25 lb r, 3 c, 7 h. Pres. & Supt. M. B. Fobes, Sec. & Treas. M. W. Barse, Asst. Sec. John Fobes, Office, Union St. 4  
**OMAHA, NEB.**—Omaha Horse Ry. Co. 18 m, 4-8½ g, 30, 35 & 40 lb r, 40 c, 350 h. Pres. Frank Murphy, V. Pres. Guy C. Barton, Sec. J. E. Wilber, Treas. W. W. Marsh, Supt. W. A. Smith, Office 1504 Farnam St. 4  
**OMAHA, NEB.**—Cable Tramway Co. of Omaha, 4 m, 4-8-1-2 g, 58½ lb r, 10 c, each with grip; operated by cable. Pres. S. R. Johnson, V. Pres. L. B. Williams, Sec. and Treas. C. E. Yost, Chief Engineer Robert Gulham. Capital stock, \$300,000. General office, 103 South 13th St. 4  
**ONEIDA VILLAGE, N. Y.**—Oneida Ry. Co. 2 m, 4-8½ g, 47 lb r, 3 c, 6 h. Pres. W. A. Stone, Sec. & Treas. W. E. Northrup, Supt. Chas. Bonta. 4  
**OSHKOSH, WIS.**—Oshkosh St. R. R. Co. 3½ m, 4-8½ g, 27 lb r, 9 c, 24 h. Pres. Leander Choate, V. Pres. F. Zentner, Sec. & Treas. J. Y. Hull, Sup. F. L. Thompson.

**OSWEGO, N. Y.**—Oswego St. Ry. Co. 2½ m, 4-8½ g, 45 lb r, 3 c, 23 h. Pres. Jas. F. Johnson, V. Pres. R. J. Oliphant, Sec. Haynes L. Hart, Treas. Robt. G. Post, Gen. Man. James O'Connor.  
**OTTAWA, ONT.**—Ottawa City Passenger Ry. Co. 5 m, 4-8½ g, 30 lb r, 9 c, 40 h. Pres. Thomas C. Keefe, V. Pres. R. Blackburn, Sec. James D. Fraser, Office, New Edinburgh, Ottawa. 4  
 Ottawa St. Ry. Co.  
**OTTUMWA, IA.**—Ottumwa St. R.R. Co. 2 m, 3-6 g, 27 lb r, 4 c, 2 h, 14 mu. Pres. J. M. Hedrick, Sec. & Treas. H. L. Hedrick, Supt. C. M. Hedrick. Mineral Springs St. Ry. 1 m, 3½ g, 16 lb T r, 1 c 4 h. Owner, L. E. Gray.  
**PALATKA, FLA.**—Palatka St. Ry. Co.  
**PARIS, TEX.**—Paris Ry. Co. 2½ m, 4-8½ g, 22 lb T r, 3 pass. 4 ft c, 11 mu. Pres. D. F. Latimer, Sec. & Supt. C. G. Caviness, Treas. W. D. Latimer. 4  
**PATERSON, N. J.**—Paterson & Passaic R.R. Co. 7 m, 4-10 g, 33 lb r, 16 c, 28 h. Pres. John N. Terhune, Treas. John J. Brown, Sec. E. S. Brown, Supt. M. O'Rourke, Asst. Supt. A. T. King. 2  
 Paterson City Ry. Co. 8½ m, 4-8½ g, 35 lb r, 10 c, 40 h. Pres. Garrett Platten, Treas. H. Romalne, Sec. Albert A. Wilcox, Supt. M. Pettigrew. 4  
**PAWTUCKET, R. I.**—Pawtucket St. Ry. Co. 8 m, 54 lb r, 4 g, 24 c, 100 h. Pres. A. B. Chace, V. Pres. & Gen'l. Man. D. F. Longstreet, Treas. E. N. Littlefield. Office Broad St.  
**PENSACOLA, FLA.**—Pensacola St. Car Co. 3 m, 4-8 g, 6 h, 30 mu. Pres. A. V. Cluffs, Sec. W. A. Blount, Treas. Thos. C. Watson, Capital, \$100,000. Office, 100 E. Government St. 4  
**PEORIA, ILL.**—Central City Horse Ry. Co. 10 m, 4-8½ g, 40 & 60 lb r, 40 c, 90 h. Pres. & Gen. Man. H. R. Woodward, Sec. & Treas. E. Callender, Supt. John Strong. Office 2011 N. Adams St.  
 Central Horse & Cable R. R. Co. 3 m, 4-8½ g, 30 & 40 lb r, 9 c, 22 h. Pres. & Gen. Man. H. R. Woodward, Sec. Jos. Elder, Treas. E. Callender, Supt. John Strong. Office, 2011 N. Adams St.  
 East Bluff Peoria Horse Ry. Co. 1 m, 4-8½ g, 30-40 lb r, 4 c, 24 h. Pres. N. Giles, Sec. R. R. Bourland, Treas. M. E. Culver, Capital, \$11,000. 4  
 Fort Clark Horse Ry. Co.—m,—g,—lb r,—c,—h.—Pres. J. H. Hall.  
 Peoria Horse Ry. Co. 6 m, 4-8½ g, 40-60 lb r 14 c 60 h. & mu. Pres. & Gen. Man. H. R. Woodward, Sec. & Treas. E. Callender, Supt. John Strong.  
**PETERSBURG, VA.**—Petersburg St. Ry. 3½ m, 4-8½ g, 42 lb r, 9 c, 40 h. George Beadle, Prop. 3  
**PHILADELPHIA, PA.**—Citizens Pass. Ry. Co. 10½ m, 5-2 g, 45-47 lb r, 86 c, 470 h. Pres. John McCarthy, Sec. & Treas. J. G. Adams, Sup. H. C. Keen, Office, n w cor. 12th and Susquehanna ave. Capital, \$192,500. 4  
 Empire Pass. Ry. Co. 8½ m, 5-2 g, 45 lb r, 32 c, 250 h. Pres. James McManes, Sec. and Treas. John I. Adams, Office, n w cor. 12th st. and Susquehanna av. Frankford & Southwark Phila. City Pass. R.R. Co. 18.10 m, 5-2 g, 47 lb r, 100 c, 8 650 h. Pres. John Noblit, Sec. Thos. S. Harris, Treas. R. C. Biewster, Supt. T. E. Cox. Capital, \$750,000. Office, 2501 Kensington ave. 4  
 Germantown Pass. Ry. Co. 29½ m, 5-2½ g, 47 lb r, Cars and horses, leased. Pres. Craig D. Ritchie, Sec. & Treas. Lewis S. Renshaw. Office, 1,001 Chestnut St. 4  
 Green & Coates R. R. Co. (Leased to People's Pass. Ry. Co.) Pres. Moses A. Dropsie, Sec. & Treas. Lewis S. Renshaw. Office N. W. cor. 10th. and Chestnut sts.  
 Hestonville, Mantua & Fairmount Pass. R.R. Co. 20 m, 5-4½ g, 45 lb r, 60 c, 500 h. Pres. Charles H. Lafferty, Sec. & Treas. W. C. Foster, Office, 4,300 Lancaster ave. 4  
 Lehigh Ave. Pass. Ry. Co. Pres. John Lamson, Sec. Chas. A. Porter, Treas. John L. Hill. [Track not laid.] Lombard & South Sts. Pass. Ry. Co. 10 m, 5-2 g, 43 lb r, 51 c, 276 h. Pres. John B. Parsons, Sec. & Treas. Thos. C. Barr, Supt. J. H. Fresh. Office, 2509 South St. 4  
 People's Pass. Ry. Co. 45 m, 5-2 g, 47 lb r, 125 c, 1153 h. Pres. John B. Parsons, Sec. & Treas. Jno. C. Desaleat, Gen. Supt. Chas. S. Whiting, Office, 8th & Dauphin sts. 4  
 Philadelphia City Pass. Ry. Co. 12,417 m, 5-2½ g, 47 & 78 lb r, 132 c, 708 h. Pres. Wm. W. Colket, Sec. & Treas. T. W. Pennypacker. (Leased to W. Phila. Pass. Ry. Co.) 4  
 Philadelphia Traction Co. 109 m, 5-2½ g, 47 lb r, 694 c, 2608 h. Pres. W. H. Kemble, V. Pres. F. A. B. Widener & W. L. Elkins, Sec. & Treas. D. W. Dickson, Office, n w cor. 41st and Haverford sts. 4  
 Philadelphia & Darby Ry. Co. 6½ m, 5-2½ g, 42 lb r, road leased. Pres. C. L. Borte, Sec. and Treas. Wm. W. Colket. Office, 202 Walnut pl. Leased to Phila. City Pass. Ry. Co.  
 Philadelphia & Gray's Ferry Pass. R.R. Co. 101-3 m, 40 c, 200 h. Pres. Matthew Brooks, Treas. J. C. Dawes, Sec. J. Crawford Dawes, Supt. Patrick Lovett, Office, 36th St. and Gray's Ferry Rd.  
 Ridge Avenue Ry. Co. 15 m, 5-1 g, 47 lb r, 63 c, 350 h. Pres. E. B. Edwards, Sec. & Treas. Wm. S. Blight, Supt. Wm. Myers 4  
 Second & Third Sts. Pass. Ry. Co. 37 m, 116 c, 669 h. Pres. Alexander M. Fox, Treas. William F. Miller, Sec. Charles D. Matlack, Supt. David W. Stevens.  
 Seventeenth & Nineteenth Sts. Pass. Ry. Co. 7½ m. Pres. Matthew S. Quay, Sec. & Treas. John B. Peddie. [Leased to Philada. Traction Co.]  
 Thirteenth & Fifteenth Sts. Pass. Ry. Co. 14 m, 5-2 g, 43 lb r, 73 c, 452 h. Pres. Thos. W. Ackley, Sec. & Treas. Alex. Rennick, Supt. Wm. P. Cooper. 4  
 Union Pass. Ry. Co. 70 m, 348 c, 1,724 h. Pres. Wm. H. Kemble, Sec. & Treas. John B. Peddie, Supt. Jacob C. Petty. (Leased to Phila. Traction Co.)  
 West Philadelphia Pass. Ry. Co. 18½ m, 5-2½ g, 47 lb r, 122 c, 112 h. Pres. Peter A. B. Widener, Sec. & Treas. D. W. Dickson, Supt. Jas. T. Gorman, Office, cor. Haverford & 41st sts. (Leased by the Phila. Traction Co.) 2  
**PHILLIPSBURGH, N. J.**—Phillipsburgh Horse Car R. R. Co. 2½ m, 4-8 g, 35 lb r, 4 c, 13 h. Pres. Daniel Runkle, Sec. & Treas. James W. Long. 4  
**PITTSBURGH, PA.**—Central Pass R.R. Co. 6 m,

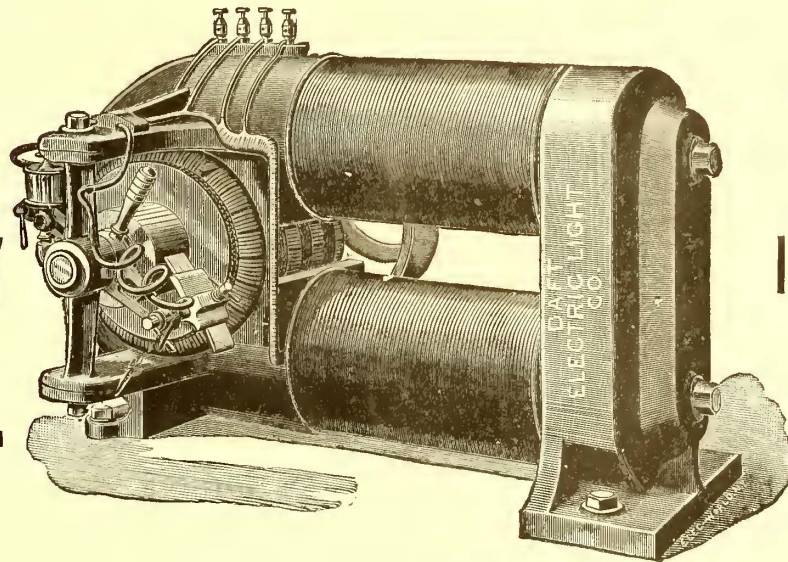


# THE DAFT ELECTRIC LIGHT CO.

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Is now manufacturing the DAFT SELF-REGULATING MOTOR from 1-4 to 50 horse power FOR ALL CIRCUITS, arc or incandescent, with all the necessary appliances for proper distribution from central light or power stations. The motors of this Company are in each case guaranteed to deliver the

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This Company is also prepared to promptly EQUIP STREET or other ROADS with ELECTRIC MOTORS, SUBTERRANEAN CONDUITS, OVERHEAD CONDUCTORS or ANY OTHER FORM of CONDUCTIVE SYSTEM which local conditions may demand, and IS NOW ENGAGED IN THE EQUIPMENT OF SEVERAL ELECTRIC RAILROADS, HAVING, in one case, GRADIENTS WHICH HAVE NEVER BEFORE BEEN SURMOUNTED by ELECTRIC TRACTORS, and involving a DISTRIBUTION OF GREATER POWER than ANY ELECTRIC RAILROADS YET BUILT, HERE OR ELSEWHERE. The Installations ARE PROVIDED WITH COMPLETE APPLIANCES FOR INSURING SAFETY, ECONOMY AND CONVENIENCE OF OPERATION.

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5-2½ g, 45 lb r, 16 c, 100 h. Pres. Geo. I. Whitney, Sec. & Treas. F. L. Stephenson, Supt. R. G. Herron. 4  
 Citizens' Pass. Ry. Co. 16½ m, 5-2½ g, 47 lb r, 40 c, 337 h. Pres. Jno. G. Holmes, Sec. C. M. Gormley Supt. Murry Verner. Treas. Jas. J. Donnell, Capital, \$200,000.  
 Federal St. & Pleasant Valley Pass. Ry. Co. 5½ m, 5-2 g, 45 lb r, 22 c, 165 h. Pres. Wm. McCreery, Sec. R. F. Ramsey, Treas. James Boyle, Supt. Wm. J. Crozier, Allegheny City. Office, 129 Taggart st., Allegheny City. a  
 People's Park Pass. Ry. Co. 2 m, 5-2½ g, 45 lb r, 10 c, 75 h. Pres. Wm. McCreery, Sec. R. F. Ramsey, Treas. James Boyle, Supt. Wm. J. Crozier, Allegheny City.  
 Pittsburgh, Allegheny & Manchester Pass. Ry. Co. 10 m, 5-2½ g, 46 lb r, 44 c, 261 h. Pres. Chas. Atwell, Sec. & Treas. Chas. Selbert, Supt. James C. Cotton. Office, Market & Liberty sts. a  
 Pittsburgh, Oakland & East Liberty Pass. Ry. Co. 11 m, 5-2½ g, 47 lb r, 22 c, 160 h. Pres. Thos. S. Biegelow, Gen. Man. G. W. Elkins, Sec. John G. Tragardh, Treas. A. W. Mellon, Supt. H. M. Cherry. e  
 Pittsburgh Union Pass. R.R. Co. 10 m, 5-2½ g, 46 lb r, 29 c, 130 h. Pres. Chas. Atwell, Sec. Chas. Selbert, Treas. J. J. Donnell, Supt. James C. Cotton. a  
 Pittsburgh & Birmingham Pass. R.R. Co. 3½ m, 5-2½ g, 45-47 lb r, 20 c, 177 h. Pres. W. W. Patrick, Sec. C. B. Agnew, Treas. John G. Holmes. k  
 Pittsburgh & West End Pass. Ry. Co. 7 m, 5-2½ g, 40 lb r, 13 c, 73 h. Pres. & Treas. John C. Reilly, Sec. Thomas S. Biegelow, Supt. William J. Burns. a  
 Pittsburgh & Wilksburg St. Ry. Co. a  
 Second Avenue Pass. Ry. Co. 5 m, 5-2 g, 47 lb r, 8 c, 40 h. Pres. Geo. Fawcett, Sec. Jas. F. Fawcett, Treas. W. J. Fawcett. Office, 2d ave. a  
 South Side Pass. R.R. Co. 5 m, 5-2½ g, 45 lb r, 12 c, (only 6 h use), 40 h. Pres. D. Z. Brickell, Treas. W. T. Wallace, Supt. W. M. Rosborough. Office, 2,136 Sarah st. e  
 Transverse Pass. Ry. Co. 6¼ m, 5-2 g, 52 lb r, 39 c, 243 h. Pres. C. L. Magee, V. Pres. C. H. Klopfer, Sec. & Treas. Wm. R. Ford, Supt. Miller Elliot.  
 Wilksburg & East Liberty Ry. Co. (See new roads.)  
**PITTSBURGH, PA.**—Pittsburg St. Car Co. 1¼ m, 5-2g, 42 lb r, 2 c, 6 h. Pres. Isaac Everitt, Sec. Eug. W. Mulligan, Treas. M. W. Morris. e  
**PLYMOUTH, MASS.**—Plymouth & Kingston St. R. R. Co. (See new roads.)  
**PORT HURON, MICH.**—Port Huron St. Ry. Co. 6½ m, 4-8½ g, 7 c, 22 h. Pres. Jno. P. Sanborn, V. Pres. Frank A. Beard, Sec. Treas. & Man. J. R. Wastell.  
 Port Huron Electric St. Ry. Co. 4 m, 4 c.  
**PORTLAND, ME.**—Ocean St. R.R. Co. Operated by Portland R. R. Co.  
 Portland R.R. Co. 9½ m, 4-8½ g, 35-45 lb r, 36 c, 167 h. Pres. H. J. Libby, Treas. & Gen. Man. E. A. Newman. Office, 484 Congress st. 4  
**PORTLAND, ORE.**—Portland St. Ry. Co. 2 m, 3-6 g, 25-42 lb r, 11 c, 40 h. Pres. D. P. Thompson, Sec & Supt. C. K. Harbaugh.  
 Multnomah St. Ry. Co. 2½ m, 3-6 g, 30 lb r, 19 c, 65 h. Pres. A. N. King, Sec. E. A. King.  
 Transcontinental St. Ry. Co. 7 m, 3-6 g, 38 lb r, 15 c, 65 h. Pres. Walter F. Burrell, D. W. Wakefield, Sec., Tyler Woodward, Supt.  
**PORTSMOUTH, O.**—Portsmouth St. R. R. Co. 2 m, 3-6 g, 18 lb r, 4 c, 10 h. Pres. James Skelton, Treas., Sec. & Supt. E. A. Reed.  
**POTTSVILLE, PA.**—People's Ry. Co. 9½ m, 16c, 56h.  
**POUGHKEEPSIE, N. Y.**—City R. R. Co. 4 m, 4-8½ g, 35-42 lb r, 11 c, 39 h. Pres. Geo. B. Adriance V. Pres. & Treas. Hudson Taylor, Sec. A. B. Smith, Supt. C. M. Davis. Office 491 Main st. f  
**PROVIDENCE, R. I.**—Union R.R. Co. 53 m, 4-8½ g, 47-54 lb r, 230 c, 1,300 h. Pres. Jesse Metcalf, V. Pres. & Gen. Man. D. F. Longstreet, Sec. and Treas. C. A. Babcock.  
**PUEBLO, COL.**—Pueblo St. Ry. Co. 4  
**QUEBEC, CAN.**—Quebec St. Ry. Co. 3 m, 4-8½ g, 45 lb r, 9 c, 46 h. Pres. Chas. St. Michel, Quebec, V. Pres. G. R. Renfrew, Quebec, Sec., Treas. & Supt. Samuel Moore.  
 St. John St. Ry. Co. Lim. 1½ m, 4-8½ g, 35 lb r, 4 c, 23 h. Runs 4 'buses out 4 m. from city limits. Pres. Jos. W. Henry, V. Pres. A. Robertson, Sec. & Man. W. W. Martin.  
**QUINCY, ILL.**—Quincy Horse Ry. & Carrying Co. 6 m, 5 g, 71 lb r, 21 c, 118 mu. Pres. Lorenzo Bull, Sec. C. H. Bull, Supt. E. K. Stone.  
**RACINE, WIS.**—Belle City St. Ry. Co. 4 m, 4 g, 30 lb r, 9 c, 40 h. Pres. John T. Fish, Sec. & Treas. J. C. Dodge, Gen. Man. Geo. B. Hathaway. Office, 716 Park ave. d  
**RALEIGH, N. C.**—Raleigh St. Ry. Co. 7½ m, 4-8½ g, 16 T steel r, 6 c, 36 mu. Pres. Geo. M. Snodgrass, Sec. & Supt. J. F. Scott, Treas. R. T. Gray, Atty. F. H. Busbee. Capital stock, \$25,000.  
**RAPID CITY, DAK.**—Rapid City St. Ry. Co. 1½ m, 4 g, lb r, 2 c, 4 h. Pres. Fred T. Evans, Sec. & Treas. G. Schnasse. a  
**READING, PA.**—Reading City Pass. Ry. Co. 2 1-5 m, 5-2½ g, 45 lb r, 19 c, 44 h. Pres. B. F. Owen, V. Pres. Jas. L. Douglass, Sec. & Treas. H. A. Muhlenberg, Supt. J. A. Riggs.  
 Perkiomen Ave. Pass. Co. 2 1-5 m, 5-2½ g, 46 lb r, 13 c, 41 h. Pres. Chas. Brenner, Sec. & Treas. Isaac Hiestler, Supt. John B. Houp.  
**RED OAK, IA.**—Red Oak St. R.R. Co. 1½ m, 4-2½ g, flat r, 2c, 2h, 2 mu. Pres. J. W. Judkins, V. Pres. G. West, Sec. F. M. Byrket, Treas. & Supt. F. O. Judkins.  
**RICHMOND, IND.**—Richmond City Ry. Co. 3 m, 8 g, 9 lb r, 10 c, 30 h. Pres. J. C. Shaffer, V. Pres. Jos. Ruliford, Treas. H. I. Miller, Supt. F. M. Francisco.  
**RICHMOND, ILL.**—Richmond St. R.R. Co.  
**RICHMOND, VA.**—Richmond City Ry. Co. 7½ m, 4 8½ g, 30-40 lb r, 42 c, 185 h. Pres. J. L. Schoolcraft, Treas. Walter Kidd, Man. C. M. Bolton, Supt. Charles Selden. a  
 Richmond & Manchester Ry. Co. 3½ m, 4-8½ g, 38 lb r, 5 c, 26 h. Pres. J. E. Taylor, V. Pres. J. Bryan, Sec. & Treas. Jackson Brandt, Supt. B. R. Selden. a  
 Richmond Union Pass. Ry. Co. (See new roads.)  
**ROCHESTER, N. Y.**—Rochester City & Brighton R.R. Co. 37 m, 4-8½ g, 25-30-45 lb r, 142 c, 596 h, Pres. Patrick Barry, Sec. C. C. Woodworth, Treas. C. B. Woodworth, Supt. Thomas J. Brower.

Citizens' St. Ry. Co. Pres. Wm. H. Jones, Sec. & Treas. J. E. Pierpont, Supt. S. A. Green.  
**ROCKFORD, ILL.**—Rockford St. Ry. Co. 6-2-5 m, 4-8½ g, 30 lb r, 13 c, 52 h, 16 m. Pres. Anthony Haines, V. Pres. L. Rhodes, Sec. Miss A. C. Arnold, Treas. N. E. Lyman, Supt. Fred. Haines.  
**ROCK ISLAND, ILL.**—Rock Island & Milan St. Ry. Co. 5½ m, 4-8½ g, 20-30-42 lb r, 8 pass c, 6 ft. c, 7 h, 2 motors. Pres. & Supt. Bally Davenport, Sec. E. H. Hurst, Treas. J. F. Robinson. 2  
**RONDOUT, N. Y.**—Kingston City R. R. Co. 3 m, 4-8½ g, 40 lb r, 8 c, 40 h. Pres. James G. Lindsley, V. Pres. S. D. Coykendall, Sec. & Treas. Peter E. Schoonmaker, Auditor, Oscar L. Eastman. 3  
**RUTLAND, VT.**—Rutland St. Ry. Co. 8 m, 4-8½ g, 20 lb r, 8 c, 30 h. Pres. M. Quin, Sec. John N. Woodfin, Treas. A. H. Tuttle, Supt. M. McKeogh. Office, 7½ Centerst. g  
**SACRAMENTO, CAL.**—Sacramento City Ry. Co. 12 1-2 horse and 10 2-horse c. Prop. R. S. Carey, Supt. Geo. W. Carey.  
**SAGINAW, MICH.**—City of Saginaw St. R. R. Co. 2½ m, 4-8½ g, 42 lb r, 14 c, 50 h. Pres. David H. Jerome, V. Pres. Geo. F. Williams, Sec. & Treas. Geo. L. Burrows, Supt. Fred G. Benjamin. Office, 311 Court st. 4  
**SALEM, MASS.**—Salem & Danvers St. Ry. Co. 12 m, 4-8½ g, 35-45 lb r, 24 c, 117 h. Pres. Benj. W. Russell, Sec. & Treas. G. A. Vickery, Asst. Supt. David N. Cooke.  
 Naumkeag St. Ry. Co. 24 m, 4-8½ g, 35-45 lb r, 83 c, 275 h. Pres. Chas. Odell, Clerk Joseph F. Hickey, Treas. Henry Wheatland, Supt. Willard B. Ferguson. a  
**SALINA, N. Y.**—Woodlawn and Butternut St. Ry. Co.  
**SALT LAKE CITY, UTAH.**—Salt Lake City R.R. Co. 13 m, 4-8½ g, 20 lb r, 16 c, 106 mu. Pres. John Taylor, Sec. David McKenzie, Treas. James Jack, Supt. Orson P. Arnold. d  
**SAN ANTONIO, TEX.**—San Antonio St. Ry. Co. 16 m, 4 g, 38 lb r, 41 c, 145 mu. Pres. A. Belknap, San Antonio, V. Pres. F. W. Pickard, N. Y. City, Treas. J. Withers, San Antonio, Sec. E. R. Norton, Supt. John Cobb. 2  
 Prospect Hill St. Ry. Co.  
**SANDUSKY, O.**—Sandusky St. Ry. Co. 4 m, 4-8½ g, 32 lb r, 7 c, 23 h. Pres. Chas. V. Olds, Sec. & Treas. A. C. Moss, Supt. Clark Rude. a  
**SAN FRANCISCO, CAL.**—California Street Cable R. R. Co. 7 m, 3-6 g, 27 c, 25 dummies, 4 h. Pres. Chas. Mayne, V. Pres. Robt. Watt, Sec. T. W. Hinchman, Treas. A. Borel, Supt. J. W. Harris. Office, 1435 California st. f  
 Central R. R. Co. 12 m, 5 g, 45 lb r, 31 c, 290 h, Pres. Chas. Main, V. Pres. S. C. Biegelow, Treas. A. J. Gunnison, Sec. C. V. LeBreton, Supt. J. F. Clark.  
 Clay St. Hill R. R. Co. 2 m, 3-6 g, 30 lb r, 11 c, 12 dummy cars. Pres. Joseph Britton, V. Pres. Chas. Mayne, Treas. Henry L. Davis, Sec. Chas. P. Campbell. Office, s w cor. Clay & Leavenworth sts. h  
 Geary St. Park & Ocean R.R. Co. 9½ m, (5½ m cable, 4½ m steam) 5 g, 45 lb r, 39 c. Pres. Daniel Meyer, V. Pres. R. F. Morrow, Treas. S. C. Biegelow, Supt. Johnson Reynolds, Sec. John N. Syme.  
 Market St. Cable Ry. Co. 12¼ m, 4-8½ g, 37-38 lb r, 18-2 c, 2 motors, 82 h. Pres. Leland Stanford, V. Pres. Chas. F. Crocker, Treas. N. T. Smith, Sec. J. L. Willcutt, Supt. H. D. Morton. Office, Fourth and Townsend streets.  
 North Beach & Mission R. R. Co. 16 m, 5 g, 4 lb r, 50 two h. cs. and 14 one h. cs. Pres. Albert Meyer, Sec. H. W. Hathorne, Treas. Wm. Alvord, Supt. M. Skelly. Office, 4th & Louisa sts. h  
 Ocean Beach Ry. Co. (operated by Market St. Cable Ry. Co.) 2 m. Pres. Leland Stanford, V. Pres. Chas. F. Crocker, Treas. N. T. Smith, Sec. J. L. Willcutt, Supt. H. D. Morton.  
 Omnibus R. R. & Cable Co. 18 m, 5 g, 40-45 lb r, 60 c, 390 h. Pres. Gustav Sutro, V. Pres. D. Skein, Sec. G. Ruegg, Supt. M. M. Martin. Office 727 Howard st. f  
 Park & Ocean R. R. Co. 4.62 m, 35 and 40 lb r, 4-8½ g, 7 dummy engines, 16 pass. c, 6 flat and section c. Pres. Chas. F. Crocker, V. Pres. Timothy Hopkins, Treas. N. T. Smith, Sec. J. L. Willcutt, Supt. H. D. Morton.  
 Potrero & Bay View R.R. Co. 1½ m, 5 g, 35 lb r, 10 c, 43 h. Pres. Leland Stanford, V. Pres. Chas. Crocker, Treas. N. T. Smith, Sec. J. L. Willcutt, Supt. H. O. Rogers.  
 Powell St. R. Ry. Co. (see new roads.)  
 Sutter St. R.R. Co. 5½ m, 4-11 g, 35-45 lb r, 40 c, 180 h. Pres. R. F. Morrow, Sec. A. K. Stevens, Treas. M. Schmitt, Supt. James McCord.  
 Telegraph Hill R.R. Co. 1,560 ft., 4-8½ g, 45 lb r, 2 c, — h. Pres. Gustave Sutro, V. Pres. C. Kohler, Sec. & Supt. Chas. J. Werner. Suspended operations. Cable taken up and stored away.  
 The City R.R. Co. 11 m, 5 g, 45 lb r, 72 c, 280 h. Pres. R. B. Woodward, V. Pres. Geo. E. Raum, Sec. M. E. Willis, Treas. Jas. H. Goodman, Supt. William Woodward, Master Car Builder, Frank O. Landgram.  
**SAN JOSE, CAL.**—San Jose & Santa Clara R.R. Co. 8½ m, 4-8 and 3 g wide g, 40 lb r, narrow g, 20 lb r, 25 c, 75 h. Pres. S. A. Bishop, V. Pres. W. S. McMurtry, Treas. Jacob Rich, Sec. E. M. Rosenthal, Man. Wm. Fitts. Office, 20 W. Santa Clara st.  
 First St. R. R. & Willow Glen R. R. 4½ m, 3 g, 20 lbs. r, 6 c, 80 h, Jacob Rich, Sole Owner. Sec. E. M. Rosenthal. Office, 20 Santa Clara st.  
 First St. & San Pedro St. Depot R.R. Co.  
 North Side Horse R.R. Co. 2½ m, 3 g, 16 lb r, 3 c, 10 h. Pres. & Man, Jacob Rich, Sec. E. M. Rosenthal, Treas. S. A. Bishop.  
 Willow Glen R.R. 7½ m, 3 g, 20 lb r, 8 c, 30 h. Sole owner Jacob Rich, Sec. E. M. Rosenthal. Office 20 W. Santa Clara st.  
**SANTA BARBARA, CAL.**—Santa Barbara St. R.R. Co. 1 m, 3-6 g, 3 c, 8 mu. Pres. A. W. McPhall.  
**SARNIA, CAN.**—Sarnia St. Ry. Co. 5 m, 4-8 g, 32 lb r, 2 c, 9 h. Pres. J. F. Lester, Sec. & Treas. Thos. Symington, Supt. Henry W. Mills. Office, Canadian Block. c  
**SAUGATUCK, CONN.**—Westport & Saugatuck Horse R.R. Co. (See Westport, Conn.)  
**SAVANNAH, GA.**—City & Suburban Ry. Co. 18½ m, 5 g, 16-30 lb r, 49 c, 110 h, 3 engines. Pres. J. H. Johnson, Asst. J. W. Aley, Treas. E. Schmidt.

Coast Line R.R. Co. 7 m, 5 g, 30 lb r, 17 c, 37 h. Pres. Geo. Parsons, New York, Sec., Treas. & Gen. Man. R. E. Cobb, Savannah.  
**SAYRE, PA.**—Sayre St. Ry. Co. Pres. Howard Elmer. (See new roads.)  
**SCRANTON, PA.**—People's St. Ry. Co. 9½ m, 4-8½ g, 25-52 lb r, 19 c, 70 h. Pres. Wm. Matthews, Sec. & Treas. J. C. Platt.  
 Scranton Suburban Ry. Co. 2½ m, 4-8½ g, 52-40 lb r, 3 c, operated by electricity. Pres. Edward B. Sturges, Treas. T. F. Torrey, Sec. Geo. Sanderson. 1  
**SEARCY, ARK.**—Searcy & West Point R.R. Co. 8 m, 4-8½ g, 20 lb r, 7 c, 6 mu. Pres. A. W. Yarnell, Sec. W. H. Lightle, Treas. Jasper Hicks.  
**SEATTLE, W. T.**—Seattle St. Ry. Co. 3½ m, 4-8½ g, 35 lb r, 5 c, 20 h. Pres. F. H. Osgood, Sec. Geo. Klinebar.  
**SEDALIA, MO.**—Sedalia St. Ry. Co. 2½ m, 4-10 g, 22 lb r 4 c 25 h. Pres. Joseph D. Sicher, V. Pres. Louis Deutsch, Treas. F. H. Guenther, Sec. Chas. S. Conrad.  
**SELMA, ALA.**—Selma St. R.R. Co. 2½ m, 5 g, 20 lb r, 5c, 8 h. Pres. H. L. McKee, Sec. J. F. Brown. g  
**SENECA FALLS, N. Y.**—Seneca Falls & Waterloo R.R. Co. 7 m, 4-8½ g, 40 lb r, 4 c, dummies. Pres. & Treas. Geo. H. Stayner, Asst. C. H. Williams, V. Pres. & Gen. Man. Charles D. Haines, Supt. A. G. Haines, Sec. Henry S. Ives.  
**SEVASTOPOL, IA.**—Des Moines & Sevastopol St. R.R. Co. 1½ m, 4 g, 36 lb r, 2 c, 12 h. Pres. G. Van Ginkel, Sec. G. C. Van Ginkel, Treas. John Weber. Office, Main st.  
**SHERMAN, TEX.**—Sherman City R.R. Co. 3½ m, 5 g, 20 lb r 7 c, 32 mu. Pres. C. W. Batsell, Treas. J. M. Batsell, Sec. C. W. Batsell, Jr.  
**SHREVEPORT, LA.**—Shreveport City R.R. Co. 1½ m, 4-4 g, 46 lb r, 6 c, 14 h. Pres. Peter Youree.  
**SILVER CLIFF, COL.**—Silver Cliff St. R.R. Co.  
**SIOUX CITY, IA.**—Sioux City St. Ry. Co. 7 m, 4 g, 30 lb r, 10 c, 4 h, 60 mu. Pres. Fred. T. Evans, V. Pres. D. A. Magee, Sec. & Treas. Fred Evans, Jr. a  
**SOUTH BEND, IND.**—South Bend Railway Co. 7 m, 4-8½ g, 35 lb r, 16 c, 60 h. Pres. Jacob Woolverton, Treas. Lucius Clark, Sec. W. G. George, Supt. Will Miller. a  
 South Bend and Mishawaka St. Ry. Co.  
**SOUTH CHICAGO, ILL.**—Chicago Horse & Dummy R.R. 5 m, 4-8½ g, — lb r, — c, — h. Pres. D. L. Huff, Treas. A. C. Calkins, Sec. E. R. Bliss. [Not in operation.]  
 South Chicago City Ry. Co. 4 c, 8 h. Pres. Andrew Rehm, Sec. & Supt. A. Krimtal, Treas. H. Shearer.  
**SOUTH PUEBLO, COL.**—Pueblo St. R.R. Co.  
**SPRINGFIELD, ILL.**—Citizens' St. R. R. Co. 9½ m, 3 6 g, 20-36 lb r, 29 c, 100 h. Pres. J. H. Schrick, Treas. Frank Reisch, Sec. Chas. F. Harman.  
 Springfield City Ry. Co. 7 m, 4-8½ g, 90 mu. & h. Pres. A. L. Ide, Treas. Wm. Ridgely, Sec. Geo. Brinkerhoff.  
**SPRINGFIELD, MASS.**—Springfield St. Ry. Co. 9½ m, 4-8½ g, 35 lb r, 39 c, 158 h. Pres. John Olmsted, Auditor L. E. Ladd, Clerk Gideon Wells, Treas. A. E. Smith, Supt. F. E. King, Office, 1 Main st. a  
**SPRINGFIELD, MO.**—Citizens' Ry. Co. of Springfield and No Springfield, 7 m, 4-8½ g, 33-40 lb r, 15 c, 28 h, 48 mu. Pres. R. C. Kerens, V. Pres. B. F. Hobart, Sec. and Treas. A. M. Longwell, Supt. F. B. Smith, EX-Com. H. F. Denton, L. H. Murray, C. B. McAfee. Office, North Springfield. 3  
**SPRINGFIELD, O.**—Citizens' St. R. R. Co. 11½ m, 4 g, 30 lb r, 30 c, 145 h. Pres. D. W. Stroud, V. Pres. H. S. Bushnell, Treas. Ross Mitchell, Sec. F. S. Penfield. a  
**STAMFORD, CONN.**—Stamford Horse R. R. Co. 5½ m, 4-8½ g, 10 c, 40 h. Pres. F. M. Delano, Treas. Phillip Richardson, Supt. A. H. Lombard. 3  
**STATEN ISLAND, N.Y.**—Staten Island Shore Ry. Co.  
**ST. CATHARINE'S, ONT.**—St. Catharines, Merritt & Thorold St. Ry. Co. 5½ m, 4-8½ g, 30 lb r, 8 c, 33 h. Pres. E. A. Smyth, Sec. A. P. Friesman, Supt. E. A. Smyth. b  
**ST. JOHN, N. B.**—St. John St. Ry. Co. 7 m, 4-8½ g, 45-40 lb r, 15 c, 65 h. Pres. John R. Bothwell, Sec. & Treas. John J. Pyle. Office Room 39 Drexel Building, New York, and St. John, N. B.  
**ST. JOSEPH, MO.**—Citizens' St. R.R. Co. 3 m, 4-8½ g, 28 lb r 14 c, 56 mu. Pres. Richard E. Turner, Sec. & Treas., Arthur Kirkpatrick, Supt. John F. Merriam. 2  
 Frederick Ave. Ry. Co. 1½ m, 3 g, 16 lb r, 6 c, 17 h. Pres. Thos. E. Tootle, V. Pres. Winslow Judson, Sec. W. D. B. Mutter, Treas. Thos. W. Evans, Supt. S. R. Owen, Gen. Man. J. A. Corby. d  
 Union Ry. Co. 8½ m, 4-8½ g, 20, 30 & 52 lb r, 29 c, 110 h. Pres. Seymour Jenkins, Sec. & Treas. A. Steinacker, Supt. Chas. S. Wilson. c  
**ST. LOUIS, MO.**—Baden & St. Louis R.R. Co. 3½ m, 4-9½ g, — lb r, 7 c, 22 h. Pres. George S. Case, V. Pres. William Z. Coleman, Supt. H. Nelson. c  
 Benton Bellefontaine Ry. Co. 5m, 4-10 g, 52 lb r, 30 c, 230 h. Pres. Chas. Parsons, V. Pres. Sec., Treas. & Supt. Robert McCulloch. Office, 4238 N. 20th st. d  
 Cass Avenue & Fair Grounds Ry. Co. 8½ m, 4-9½ g, 69 lb r, 34 c, 278 h. Pres. Julius S. Walsh, V. Pres. Jas. Campbell, Sec. Edw. Walsh, Jr., Supt. M. J. Moran. Office, 2900 Cass ave. e  
 Citizen's Ry. Co. — m, — g, — lb r, — c, — h. Pres. Julius S. Walsh, V. Pres. J. P. Helfenstine.  
 Forest Park, Laclede & Fourth St. Ry. Co. 5½ m, 4-10 g, 44 lb r, 20 c, 190 h. Pres. C. H. Turner, Sec. H. B. Davis, Man. P. C. Maffit. 2  
 Jefferson Ave. Ry. Co. Pres. John M. Gelkeson, Gen. Man. John Scullin, Sec. C. K. Dickson.  
 Lindell Ry. Co. 13½ m, 4-10 g, 45 lb r, 75 c, 407 h. Pres. John H. Maxon, Sec. & Treas. Geo. W. Baumhoff. Office, 2207 Washington ave. c  
 Northern Central.  
 Missouri R.R. Co. — m, — g, — lb r, — c, — h. Pres. P. C. Maffit, Sec. W. D. Henry.  
 Mound City R.R. Co. Pres. John Scullin, Sec. & Treas. C. M. Seaman, Supt. Jas. Sullivan.  
 People's Line. Pres. Chas. Green, Sec. John Manoney, Supt. Patrick Shea.  
 Southern Ry. Co. 7 4-5 m, 4-10 g, 35-52 lb r, 49 c, 250 V. Pres. E. R. Coleman, Sec. J. S. Minary, Man. W. L. Johnson



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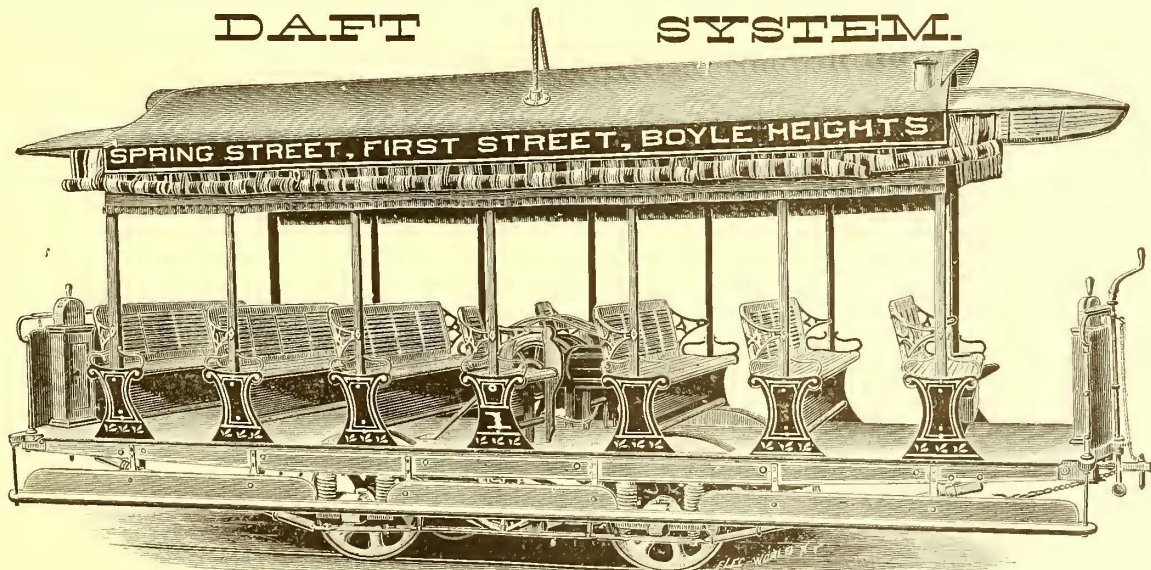
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St. Louis R.R. Co. 11 m, 4-10 g, 38-44 lb r, 58 c, 375 h. Pres. C. Peper, Sec. & Treas. R. B. Jennings, Supt. Chas. Ischer.

St. Louis Cable & Western Ry. Co. Pres. M. A. Downing, V. Pres. F. M. Colburn, Sec. & Treas. E. F. Claypool, Man. Geo. F. Branham.

Tower Grove & Lafayette Ry. Pres. Chas. Green, Sec. John Mahoney, Supt. Patrick Shea.

Union Depot R.R. Co. —m, —g, —lb r, —c, —h. Pres. John Scullin, V. Pres. & Treas. C. M. Seaman, Supt. Jas. H. Roach.

Union Ry. Co. 8 m, 4-10 g, 52 lb r, 40 c, 290 h. Pres. Julius S. Walsh, V. Pres. J. P. Helfenstein, Sec. & Treas. C. N. Duffy, Supt. Michael Moran.

**ST. PAUL, MINN.**—St. Paul City Ry. Co. 37 m, 4-8½ g, 45-52 lb r, 82c, 600 h. & mu. Pres. Thos. Lowry V. Pres. C. G. Goodrich, Sec. A. Z. Levering, Treas. Clinton Morrison, Supt. A. L. Scott.

**ST. THOMAS, CAN.**

**STONEHAM, MASS.**—Stoneham St. R. R. Co. 2½ m, 4-8½ g, 28 lb r, 11 c, 30 h. Pres. A. F. Breed, Treas. F. H. Monks, Supt. G. F. Jones, Office, 35 Congress St. Boston.

**STILLWATER, MINN.**—Stillwater St. Ry. Co.

**STILLWATER, N. Y.**—Stillwater & Mechanicsville St. Ry. Co. 4½ m, 4-8½ g, 25-30 lb r, 4 c, 6 h. Pres. W. L. Denison, V. Pres. Lyman Smith, Gen. Supt. Peter Van Veghten, Sec. & Treas. Edw. I. Wood.

**STROUDSBURG, PA.**—Stroudsburg Passenger Ry. Co. 1½ m, 4-8½ g, 28-30 lb r, 3 c, 10 h. Pres. & Treas. J. Lantz, Sec. Jacob Houser.

**SYRACUSE, N. Y.**—Syracuse & Onondaga R.R. Co. 2-3-5 m, 4-8 g, 28-47 lb r, 9 c, 18 h. Pres. Peter Burns, V. Pres. Chas. P. Clark, Sec. & Treas. Lyman C. Smith, Supt. W. B. Thompson.

Central City Ry. Co. 2½ m, 4-8½ g, 47 lb r, 12 c, 42 h. Pres. Daniel Pratt, V. Pres. Jonathan C. Chase, Sec. & Treas. James Barnes, Supt. George Crampton.

4 Syracuse Savings Bank Building.

Fifth Ward R.R. Co. 2½ m, 4-8½ g, 35-56 lb r, 8 c, 30 h. Pres. P. B. Brayton, V. Pres. John D. Grey, Sec. & Treas. O. C. Potter, Supt. Hugh Purnell. Office W. Washington st.

Genesee & Water St. R.R. Co. and Fourth Ward R.R. Co. 4 m, 4-8½ g, 18-30 lb r, 10 c, 35 h. Pres. Robt. G. Wynkoop, V. Pres. Wm. H. Smith, Sec. & Treas. Geo. J. Gardner, Supt. W. J. Hart. Onondaga Savings Bank Building.

New Brighton & Onondaga Valley R.R. Co. 1½ m, 4-8 g, 16-35 lb r, 2 c, 6 h. 1 dummy. Pres. Matthias Britton, Sec. T. W. Meacham, Treas. J. H. Anderson, Supt. Arthur G. Markham. Office, 58 W. Railroad St.

Seventh Ward Ry. Co. Pres. E. F. Rice, Supt. R. Purnell.

Syracuse & Geddes Ry. Co. 2½ m, 4-8½ g, 30-45 lb r, 8 c, 35 h. Pres. R. Nelson Gere, Sec. & Treas. Rasselas A. Bonta, Supt. Wm. J. Hart. Gen. offices, 1 Onondaga Co. Savings Bank Building.

Third Ward Ry. Co. Pres. W. B. Cogswell, Sec. & Treas. W. S. Wales.

**TAMPA, FLA.**—Tampa St. Ry. Co. 2½ m, 3-3 g, 25 lb r, 7 c, 2 engines. Pres. C. A. Martinez Ybor, Sec. & Treas. G. T. Chamberlain, Supt. C. E. Purcell.

**TAUNTON, MASS.**—Taunton St. Ry. Co. 4 m, 4-8½ g, 14 c, 45 h. Pres. Wm. C. Lovering, Treas. Henry M. Lovering, Clerk, Orville A. Barker, Supt. Geo. C. Morse.

**TERRE HAUTE, IND.**—Terre Haute St. Ry. Co. 4½ m, 4-8½ g, 28 lb r, 16 c, 48 h. Pres. T. C. Buntin, V. Pres. Josephus Collett, Sec. John R. Hagen, Supt. John T. Shriver.

**TOLEDO, OHIO.**—Toledo Consolidated St. Ry. Co. 21 m, 4-8½ g, 42 lb r, 50 c, 255 h. Pres. & Treas. J. E. Bailey, Sec. A. E. Lang, Supt. John Gilmarlin.

Metropolitan St. Ry. Co. 10 m, 3 g, 28-35 lb r, 31 c, 101 h. Pres. & Sec. Jno. J. Shipherd of Cleveland, Treas. H. E. Wells of Cleveland, Gen. Man. T. F. Shipherd Supt. Jno. A. Watson.

The Central Passenger R.R. Co. of Toledo, O. 9 m, 3 g, 27 lb r, 17 c, 80 h. Pres. F. E. Seagrave, Sec. C. F. Parkis, Treas. A. R. Seagrave, Supt. Joseph Murphy.

**TOPEKA, KAN.**—Topeka City Ry. Co. 9 m, 4 g, 25-48 lb r, 25 c, 90 h. Pres. Joab Mulvane, V. Pres. D. W. Stormont, Sec. & Treas. E. Wildes, Supt. Jesse Shaw.

**TORONTO, CAN.**—Toronto St. Ry. Co. 60 m, 4-10½ g, 30 lb r, 180 c, 850 h. Pres. Frank Smith, Sec. James Gunn, Supt. John J. Franklin. Offices, 94 & 96 King st., east.

**TRENTON, N. J.**—Trenton Horse R.R. Co. 3 m, 5-2 g, 43-48 lb r, 10 c, 33 h. Pres. Gen. Lewis Perrine, Sec. & Treas. Lewis Perrine, Jr., Supt. Thomas S. Morris City Ry. Co. 10 m, 5-2½ g, 35 lb r, 24 c, 105 h. Pres. Adam Exton, V. Pres. W. H. Skirm, Sec. H. B. Howell, Treas. & Mang. Director Chas. V. Bamford. Office, 264 Clinton ave.

**TRINIDAD, COL.**—Trinidad St. Ry. Co. 1½ m, 3-2 g, 14 lb r, 2 c, 8 mu. Pres. S. H. Jaffa, Treas. T. B. Collier, Sec. R. L. Wootton, Supt. R. L. Pearson.

**TROY, N. Y.**—Cortland & Homer Horse R.R. Co., 4 m, 4-8½ g, 25-30 lb r, 2 c, —h. Pres. C. H. Garrison, Troy, V. Pres. E. A. Fish, Cortland, N. Y., Treas. Jas. M. Milen, Cortland, Sec. S. E. Welch, Cortland.

Troy & Albion Horse R.R. Co. 3.33 m, 4-8½ g, 35-45 lb r, 10 c, 41 h. Pres. Thos. A. Knickerbacker, Sec. & Treas. Theo. E. Haslehurst, Supt. W. R. Bean. Office 11 First st.

Troy & Lansingburgh R.R. Co. 2½ m, 4-8½ g, 45 lb r, 9 c, 420 h. Pres. William Kemp, V. Pres. Charles Clemmishaw, Sec. & Treas. Joseph J. Hagen, Asst. Supts. L. C. Brown, and C. H. Smith. 205 River st.

**URBANA, ILL.**—Urbana & Champaign St. Ry. Co. 2 m, 4-8½ g, 33 lb r, 4 c, 20 h. Pres. Wm. Park, Sec. & Treas. Frank G. Jaques, Supt. W. Park.

**UTICA, N. Y.**—Utica, Clinton & Binghamton St. R.R. 12 m, 4-8½ g, 43-56 lb r, 17 c, 82 h. Pres. Isaac Maynard, Sec. & Treas. Robt. S. Williams, Supt. Roger Rock.

Utica & Mohawk R.R. Co. 3½ m, 4-8 g, 47 lb r, 8 c, 11 h. Pres. Jas. F. Mann, V. Pres. R. W. Sherman, Sec. Wm. E. Lewis, Treas. Geo. D. Dimon. Office, 26 Union Bldg.

Utica Belt Line St. Ry. Co. 8 m, 15 c, Pres. J.

Mather, V. Pres. J. W. Boyle, Treas. Chas. W. Mather.

**VALLSBURGH, N. J.**—Newark, So. Orange Ferry St. & Hamburg Place R.R. Co.

**VALEJO, CAL.**—Valejo St. Ry. Co.

**VICKSBURG, MISS.**—Vicksburg St. Ry. Co. Hill City R.R. Co.

**VINCENNES, IND.**—Vincennes St. Ry. Co. 2½ m, 4-8½ g, 36 lb r, 4 c, 24 h. Pres. & Treas. Fredk. Graeter, Sec. Geo. W. Graeter. Office, Fair Ground ave.

**WACO, TEX.**—Waco St. Ry. Co. 5 m, 4-8½ g, 18 & 20 lb r, 15 c, 55 h. Pres. E. Rotan, Sec. & Treas. W. R. Kellum, Supt. J. W. Sedbury.

**WALTHAM, MASS.**—Waltham & Newton St. Ry. Co. 3.4 m, 3-8½ g, 36 lb r, 7 c, 20 h. Pres. R. E. Robbins, Treas. & Supt. Henry Bond.

**WASHINGTON, D. C.**—Capital, No. O St. & So. Washington R.R. 13½ m, 4-8 g, 35 lb r, 45 c, 176 h. Pres. C. White, Sec. & Treas. W. E. Boughton, Supt. Andrew Glass.

Anacosta & Potomac River Ry. Co. 3 m, 4-8 g, 37 lb r, 9 c, 24 h. Pres. H. A. Griswold, Sec. & Treas. J. B. Pitcher. Office, Anacosta, D. C.

Columbia R.R. Co. 5 m, —g, —lb r, 23 c, 71 h. Pres. H. A. Willard, Sec. & Treas. Wm. H. Claggett, Supt. Elbert Claggett. Office, 15th st. and Boundary N. E.

Metropolitan R.R. Co. 19.44 m, 4-8 g, 38 lb r, 110 c, 445 h. Pres. George W. Pearson, V. Pres. A. A. Wilson, Sec. & Treas. Wm. J. Wilson, Supt. L. W. Emmart Office 2411 P. St. N. W.

Washington & Georgetown R.R. Co. 20 m, 4-8½ g, 42 lb r, 173 c, 850 h. Pres. H. Hurt, Sec. & Treas. C. M. Koones, Gen. Supt. C. C. Saller.

**WATERBURY, CONN.**—Waterbury Horse R.R. Co. 5 m, 4-8½ g, 40 lb r, 13 c, 100 h. Pres. D. S. Plume, Sec. C. R. Baldwin, Treas. E. T. Turner. Office, 4 Bank st.

**WATERFORD, N. Y.**—Waterford & Cohoes R.R. Co. 2 m, 4-8½ g, 45 lb r. Pres. Thos. Breslin, Sec. & Treas. C. C. Ormsby. (Leased by the Troy & Lansingburgh R.R. Co.) Supt. E. A. Bradley.

**WATERLOO, IA.**—Waterloo St. Ry. Co. 2 m, 3 g, 20 lb r, 2 c, 1 baggage wagon. 9 h. Pres. W. H. Hartman, V. Pres. & Supt. J. A. Foye, Sec. & Treas. T. N. Kellogg.

**WEST HAVEN, CONN.**—New Haven & West Haven R.R. Co. 6½ m, 4-8½ g, 50-60 lb r, 24 c, 115 h. Pres. Geo. R. Kelsey, Sec. Sam'l L. Smith, Treas. W. W. Ward.

**WESTPORT, CONN.**—Westport & Saugatuck Horse R.R. Co. 1½ m, 4-8½ g, 40 lb r, 3 c, 5 h. Pres. A. S. Buributt, Sec. and Treas. B. L. Woodworth, Supt. E. S. Downey.

**WHEELING, W. VA.**—Citizens Ry. Co. 10 m, 5-2½ g, 45 lb r, 16 c, 60 h. Pres. Dr. Geo. B. Caldwell, Sec. Frank P. Hall, Supt. Michael I. Otus.

Wheeling & Elm Grove R.R. 7 m, 4-8½ g, 30 lb r, 12 c, 4 Baldwin Motors. Pres. J. D. Dubois, Sec. E. J. Rutter, Supt. C. Hirsch. Office, 16th st.

**WICHITA, KAN.**—Wichita City Ry. Co. 14 m, 2-6 g, 16 lb r, 26 c, 135 h & mu. Pres. B. H. Campbell, V. Pres. Treas. & Gen. Man. E. R. Powell, Sec. G. W. Laramer, Atty. E. C. Ruggles. Office, 436 N. Main st.

**WILKESBARRE, PA.**—Wilkesbarre & Kingston Pass. R.R. 3 m, 5-2 g, 30-45 lb r, 10 c, 22 h. res. & Man. Wm. J. Harvey, Sec. & Treas. A. J. Davis.

Coalville Passenger R.R. Co. 2½ m, 4-8½ g, 20-34 lb r, 3 c, 12 h. Pres. Geo. W. Kirkendall, Supt. A. S. Orr, Sec. and Treas. Geo. Loveland. Capital, \$62,675.

**WILLIAMSPORT, PA.**—Williamsport Pass. Ry. Co. 3½ m, 4-8½ g, 36 lb center bearing r, 7 one h c, 26 h. Pres. Robt. P. Allen, V. Pres. Henry C. Parsons, Sec. R. J. C. Walker, Treas. and Gen. Man. S. A. Filbert. Office, 907 W. 4th st.

**WILMINGTON, DEL.**—Front & Union St. Pass. Ry. Co. 1½ m, 5-2 g, —lb r, 7 c, 22 mu. Pres. Geo. W. Bush, Supt. Sam'l A. Price, Treas. E. T. Taylor. Office, Front & Union sts.

Wilmington City Ry. Co. 6 m, 5-2½ g, 45 lb r, 20 c, 80 h. Pres. W. Canby, Sec. & Treas. John F. Miller, Supt. Wm. H. Burnett. Office, Delaware ave. & Dupont st.

**WINDSOR, CAN.**—Sandwich & Windsor Passenger R.R. Co.

Windsor & Walkerville Electric Ry. Co. 2 m, 2 c.

**WINFIELD, KAN.**—Union St. Ry. Co. 1½ m, 4 g, 28 lb r, 2 c, 8 mu. Pres. A. J. Thompson, Sec. J. R. Clark, Treas. John A. Eaton. Capital, \$25,000.

**WINNIPEG, MANITOBA, CAN.**—The Winnipeg St. Ry. Co. 5 m, half single, half double, 4-8½ g, 35 lb r, 15 c, 15 sleighs, 100 h. Pres. Jas. Austin, Sec. & Mangr. Albert W. Austin, Supt. Geo. A. Young.

**WINONA, MINN.**—Winona City Ry. Co. 4 m, 3-6 g, 27 lb r, 10 c, 39 h. Pres. B. H. Langley, Sec. & Treas. C. H. Porter, Supt. L. Marion.

**WOBURN, MASS.**—No. Woburn St. Ry. Co. 2½ m, 4-8½ g, 40 lb r, 5 c, 4 h. Pres. & Treas. J. R. Carter, Supt. Dexter Carter.

**WORCESTER, MASS.**—Worcester St. Ry. Co. 7½ m, 4-8½ g, 43-45 lb r, 32 c, 150 h. Pres. Geo. H. Seeley, Treas. H. S. Seeley, Supt. J. N. Akarman, Asst. Supt. L. B. Chapin. Office, 15 Market st.

Citizens' St. Ry. Co. 7½ m, 4-8½ g, 45 lb r, 19 c, 100 h. Pres. Chas. B. Pratt, Sec. & Treas. H. S. Seeley, Supt. J. N. Akarman.

**WYMORE, NEB.**—Wymore and Blue Springs Ry. Co. 3½ m, 3-6 g, 4 c, 10 h. Pres. J. H. Reynolds, V. Pres. Ben Reynolds, Sec. & Treas. E. P. Reynolds, Jr., Supt. A. N. Bradfield.

**YONKERS, N. Y.**—Yonkers R. R. Co. 5 m, 4-8½ g, 42-48 lb r, 10 c, 70 h. Pres. D. N. Stanton, Sec. John F. Brennan, Treas. D. Perry Stanton. Office, 83 Main st.

**YORK, PA.**—Pres. W. H. Lanius.

**YOUNGSTOWN, O.**—Youngstown St. R.R. Co.

**ZANESVILLE, O.**—Zanesville & McIntire St. Ry. Co. 3 m, 3-6 g, 38 lb r, 12 c, 51 h & mu. Pres. F. M. Townsend, Sec. W. C. Townsend, Treas. O. H. Townsend.

4-8½ g. Pres. Junius E. Beal, V. Pres. Edward Duffy, Sec. Zina P. King, Treas. Louis D. Taylor, Supt. Thomas J. Keech. Capital \$20,000. Office, 46 Main st.

**BALTIMORE, MD.**—Baltimore, Brooklyn & Cedar Hill Ry. Co. 4 m, 4-8½ g, 25 lb r, 16 c, 50 h. Will be running by May 1. S. C. Long, Solicitor.

**BINGHAMTON, N. Y.**—Van Depoele Co. will supply plant for new road; 6 c.

**BIRMINGHAM, ALA.**—East Lake Land Co. 7 m, 4-8½ g, 40 lb steel, 8 c, motor power. Pres. Robt. Jenison, V. Pres. A. A. Clisby, Sec. & Treas. S. M. Hanby. Will build from Birmingham to East Lake. Contract has been let, to be completed by May 1. Rails have been shipped, and 4 steam motors ordered. Capital \$200,000. Office, 2,009 First ave.

Birmingham & Jones Valley St. R.R. 6 m, 45 lb steel r. Heflin & Knox received proposals.

Smith & Eastman have made surveys for electric road to run 3 m from the city to their real estate near North Birmingham.

**BOSTON, MASS.**—West End St. Ry. Co. H. M. Whitney, Asa P. Potter, Eben D. Jordan and others incorporators. About 8 m, 4-8½ g. Pres. H. M. Whitney, Treas. G. D. Braman. Hope to use electricity as motive power. Begin work 'his spring, and hope to operate a portion of their road this year.

Suburban St. Ry. Co., proposes to lay tracks through Park, Beacon, Arlington and Marlboro streets to West Chester Park.

**BROOKLYN, N. Y.**—Annex St. Ry. Co. in progress, to be completed in spring of 1887. Pres. F. M. Delano, New York, V. Pres. H. H. Adams, Brooklyn, Treas. Philip Richardson, N. Y. Office, 204 Montague st., Brooklyn, N. Y.

Brooklyn & suburban St. Ry. Co. To run from Bedford ave. through Flatbush to Flatlands, with a branch to the Cemetery of the Holy Cross. Will use either horse or cable power. Geo. Malcom. Wm. Ziegler, Wm. J. Gaynor, Henry H. Adams, Jas. Ryan, Peter Sutter and Patk. McCanna, Directors. Paid-up capital, \$100,000.

Union Ry. Co. of the City of Brooklyn.

**BRUNSWICK, GA.**

**CHARLESTON, W. VA.**—Glenwood Co. will lay out a town near the city and ultimately construct a road 2½ m long. Supt. Benj. Brown. Capital, \$55,400.

**CHARLOTTE, N. C.**—Charlotte St. Ry. Co. 2 m, 4 c. Manager, F. W. Dixon.

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

**CHICOPEE, MASS.**—New company started under the leadership of Haines Bros. Capital, \$25,000. Work to begin in the spring. Line to extend from Chicago Falls through Chicopee Center to the point where the boundary line between Chicopee and Springfield crosses the River road. About 4 m, 4-8½ g, not less than 35 lb r. Chas. D. Haines and Geo. W. Stetson of N. Y. City are the largest stockholders.

**COVINGTON, GA.**—W. C. Clark & Co. incorporators and owners. 1 m, 20 or 30 lb r, 2 pass. c, 2 flat c, pass. cars for 1 h, 6 to 8 mu. or h.

**DANVILLE, VA.**—L. C. Berkeley, W. N. Ruffin, Albert Gerst and others are raising a bonus for whoever will build a road, and the town makes an offer of exemption from taxation.

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

**DECATUR, ALA.**—Decatur Land Improvement & Furnace Co. have begun the building of a street car line, and expect to have 1 m completed in a few weeks.

**DURHAM, N. C.**—Durham St. Ry. Co. 8 m, 4-8½ g, 16 lb r, 16 c, 25 h. and mu. Pres. W. T. Blackwell, V. Pres. J. S. Carr, Sec. & Treas. R. D. Blackwell. Construction committee, R. D. Blackwell, W. W. Fuller, J. W. Blackwell. Work has begun, and the road will be opened by May 15. Capital stock, \$25,000.

**EUFAULA, ALA.**—City of Eufaula St. Ry. Co. 4 m, 4-8½ g, 20 lb r, 4 regular cars and several excursion flats, 12 h. Will commence work about July, and the road will be opened in September. Pres. E. B. Young, Sec. Geo. McCormick, Treas. Eli Shorter. Capital \$25,000.

**FLUSHING, N. Y.**—Charter obtained for line from College Point to Framingham Cemetery, along Jamaica ave. Supervisor Dykes, John Henderson and D. Master are among those interested.

**FRAMINGHAM, MASS.**—Framingham St. Ry. Co. So. Framingham to Framingham Center. Principal stockholders: Richard S. Brown, Chas. D. Haines, Geo. W. Stetson, Andrew G. Haines and Frank W. Stanley, all of New York. Capital \$35,000. Work to begin about middle of May and to be finished by July 1. Main line 4 m, with a branch to the Middlesex South Agricultural grounds, another to the Para Rubber Shoe Co.'s works, and another to the State muster field, 10 c Treas. Geo. W. Stetson, Clerk Ira B. Forbes, Supt. of construction R. S. Brown.

Framingham Center Ry. Co. Capital, \$25,000. 2½ m, 4-8½ g.

**HARTLAND, KAN.**—Hartland St. Ry. Co. 2 m, narrow g, light r, 2 c, 1 mu. Work probably commenced in spring, the scheme depending on how the town "booms" this year. Pres. E. S. Snow, Sec. & Treas. Logan A. Garten, Supt. W. S. Handy. Capital stock, \$5,000.

**HASTINGS, NEB.**—Hastings St. Ry. Co. Application made for right of way. Will be 2 m, long.

**HUNTINGTON, N. Y.**—3 m, from the Long Island R. R. station along the east side of Huntington Harbor. Stockholders, D. Schuberth and R. G. Phelps of New York, Henry S. Brush and others of Huntington. Capital stock, \$30,000.

**ITHACA, N. Y.**—Haines Bros. are building here, and will use the Daft System, under contract with the Safety Electric Ry. and Power Co.

NEW ROADS.

**ALLEGHENY CITY, PA.**—Allegheny Rapid Transit Ry. Co.

**ANN ARBOR, MICH.**—Ann Arbor St. Ry. Co.



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**PUBLIC BENEFACTORS.**--Burlington Free Press and Times.

**ACCOMPLISHING WHAT FEW MEN WOULD UNDERTAKE TO DO.**--Rutland Herald.

**THEIR REPUTATION AS BUILDERS OF STREET AND SHORT LINE RAILWAYS HAS BECOME NATIONAL.**--New York World.

**THEIR WORK IS A GREAT TRIUMPH OF CONSTRUCTIVE GENIUS AND FINANCIAL SKILL**  
--Syracuse Herald.

**THEY NOT ONLY MAKE HAY WHILE THE SUN SHINES, BUT THEY SEEM TO BUILD RAILROADS AFTER THE ORB OF DAY GOES TO SLEEP IN THE WEST.**--Newburg News.

**THESE GENTLEMEN, AS THEIR WORK AND HISTORY SHOW, ARE THE MOST EMINENT IN THE UNITED STATES ENGAGED IN THEIR PURSUIT.**--Newburg Journal.



JUNCTION CITY, KAN.—Will begin operations this spring, and push the line to Fort Riley as soon as the company can get a favorable expression from Congress.

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

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

LOS ANGELES, CAL.—The American Rapid Transit Co. has been formed here, capital, \$500,000, to build from Pasadena to Monica, under the Enos elevated electric system.

MEMPHIS, TENN.—Union St. Ry. Co. 2

MINNEAPOLIS, MINN.—Minneapolis West Side St. Ry. Co. Incorporators: Randolph Burgess, John T. Byrnes, Albert Chamberlain, H. J. Mitchell and Matthew Walsh, all of Minneapolis. Capital stock, \$500,000.

NEW CASTLE, PA.—New Castle St. Ry. Co. Organized, but mode of propulsion not yet determined. Sec. Chas. S. Wallace.

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

NEWBURYPORT, MASS.—Plum Island St. Ry. Co. 4 m, 4-8 1/2 g, 35-40 lb steel & Johnson r, 10 c, 20 h, & dummy or electricity. Pres. & Gen. Man. E. P. Shaw, Treas. Eben Sumner. Capital \$40,000. To be built early in the spring and opened June 1. Route from Fair st. on Water st., Newburyport, to and over Plum Island to mouth of Merrimack river. Cars are being built in Newburyport.

NEWTON, KAN.—Newton City St. Ry. Co. Pres. Allen Moore, V. Pres. John A. Randall, Sec. W. G. Oldfield, Treas. J. M. Ragsdale.

NEWTON, MASS.—Newton St. R. R. Co. 5 m, 4-8 1/2 g, 5 c. 5 electric motors, 35 lb r. Pres. Horace B. Parker, V. Pres. Lucius G. Pratt, Treas. Herbert C. Pratt. Capital stock, \$50,000. Office, Newtonville. Work will be commenced and the road opened in the spring of 1887.

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

North & East Rivers Ry. Co. To run through Fulton and Cortlandt streets, operated by Bentley-Knight electric system. Pres. W. W. Laman, Directors A. Hudnut, Ira Perego, David Bangs, Aaron Raymond, J. L. Truman, W. H. McDougall, W. G. Smith, Homer A. Nelson, R. R. Hazard, Robt. W. Blackwell and John T. Fanning. J. W. Childs, contractor for construction of road.

New York Underground R. R. Co. Pres. Edw. Lauterbach, J. Coleman Drayton is Pres. of New York Underground Construction Co., which has made application to open Lafayette place to operate under the Bentley-Knight system. Col. Rowland R. Hazard is prominent in the enterprise.

OMAHA, NEB.—Cable line to be built by a Kansas City syndicate. Intended to have 3 m. in operation by next fall.

Lake Manawa R. R. Co. will run from Broadway down Eighth street and then off in the direction of the Lake. Directors: Samuel Haas, J. J. Brown, D. W. Archer, George F. Wright, E. A. Benson, George Keeline, N. Merriam, of Omaha; H. H. Hay, of Minneapolis; T. J. Evans and Spencer Smith.

E. A. Benson, W. L. McCague and C. E. Mayne have formed a company which has received permission to build on Thirty-sixth street, Hamilton street and Institute boulevard; also on Lowe and Mercer avenues to Vista street; also on Leavenworth street, Lincoln place and west of Walnut hill to Institute boulevard. Work has begun.

ORANGE, N. J.—Orange Crosstown and Orange Valley St. Ry. Co. 2 1/2 m, 5-2 g, 35 lb Johnson girder rail, 5 Stephenson cars, are trying Dart electric system. Two-thirds built and all material now on ground. Pres. Francis M. Eppley, of Orange, Sec. Jas. E. Brown of Elizabeth, Treas. Henry W. Pope of Elizabeth, Capital stock, \$20,000; bonds, \$20,000.

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

PELHAM, N. Y.—Pelham Park St. Ry., to be built by Wm. P. Craig, and to be in operation by May 1. Runs from Barton station through Pelham park and over nearly the entire length of City Island.

PASSAIC, N. J.—Road to run from Garfield to Clifton, through Passaic. Work to begin early in April.

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

PITTSBURG, PA.—From junction of cable road to Squirrel Hill, and will utilize the old rails and rolling stock and horses of the road replaced by the cable.

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

Road to be built to Squirrel hill from a junction with the new cable road.

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

PORT CHESTER, N. Y.—Port Chester & Rye Beach St. Ry. Co. 3 m, 4-8 1/2 g, 30 lb r, 6 c, 25 h. Work will be commenced June 1, and the road will be opened July 1. Pres. Chas. D. Haines, V. Pres. Andrew G. Haines, Sec. Frank H. Skeele, Treas. Geo. W. Stetson. Capital, \$40,000.

RALEIGH, N. C.—Jas. Graham, who is backed by the Messrs. Pratt, the oil man, has obtained a franchise.

RICHFIELD SPRINGS, N. Y.—Richfield Springs & Canadarago Lake Surface R. R. 1 m. D. C. Haddock of Syracuse organizer. Capital \$15,500.

RICHMOND, VA.—Richmond Un. Pass. Ry. Co.

V. Hechler, Jr., and others incorporators. To be completed before May, 1888.

ROME, N. Y.—Rome City St. Ry. Co. 5 m. first-class track. To be built at once by Hill & Dayton of New York. Pres. Rowland F. Hill, V. Pres. Chas W. Dayton, Sec. & Treas. Wm. Moore's, Chief Engineer Sam'l McElroy.

SAN FRANCISCO, CAL.—The Powell St. Ry. Co. 13 m, 3-6 g. 38 lb r. Pres. W. J. Adams, V. Pres. Thos. Magee, Treas. H. H. Lynch, Sec. G. H. Waggoner. Capital stock, \$2,000,000. Work in progress. Cable traction. Office, 32 Merchants Exchange.

SAVANNAH, GA.—Cars to be furnished by Pullman Palace Car Co.

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

SCHENECTADY, N. Y.—Schenectady St. Ry. Co. Jas. Graham, contractor, 1 m finished, and the rest will be completed by April 10. 5 c. already, and will have about 30 h. The Pratts (oil men) own all the stock and half the bonds.

SCRANTON, PA.—The Nayuga Crosstown R. R. Co. Pres. G. Clark, V. Pres. H. C. Dowd, Sec. T. C. Snow, Treas. B. E. Leonard. Will build 5 m, and probably use electricity. Capital, \$50,000.

SELMA, ALA.—Selma Land Imp't & Furnace Co. will build electric st. ry. Capital, \$3,000,000. R. M. Nelson, W. Ullman and V. T. Vaughan are among the incorporators.

SHEFFIELD, ALA.—Sheffield & Tuscumbia St. R. R. Co. 6 m, broad g, heavy steel r, 2 c at first, steam dummy. Will be opened early in April. Pres. F. D. McMillan, V. Pres. J. T. Hull, Sec. Ed. B. Alman, Treas. Jo. H. Nathan.

SIOUX CITY, IA.—E. W. McNeil, Manager

Rasmussen cable, will this season build a road here; 2 1/2 m.

STEELTON, PA. 3 STEUBENVILLE, O.—Haines Bros, propose building a new line here this spring.

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

TAUNTON, MASS.—Scadding St. Ry. Co. Franchise granted, 4 m. To build through Cedar street from Main to Grant, thence through School, Purchase, Washington and Bay to Scadding's pond. Work begins at once.

TEXARKANA, ARK.—Texarkana St. Ry. Co. Pres. N. W. Bechtel, V. Pres. E. N. Maxwell, Sec. & Treas. Thos. Orr, Supt. B. M. Foreman. Will commence work soon.

TOPEKA, KAN.—Topeka Rapid Transit St. Ry. Co. 12 m, 4-8 1/2 g, 40 lb r, 20 to 25 c, 12 to 15 noiseless steam motors. Work begun, and expect to get part of line in operation early in May. Pres. John Francis, V. Pres. P. G. Noel, Sec. J. B. Bartholomew, Treas. Armin Fassler. Capital, \$250,000. Office, 189 Kansas avenue.

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

WICHITA, KAN.—Riverside and Suburban Ry. Co. Pres. J. O. Davidson, Sec. N. G. Lee. Capital stock \$100,000. Work now in progress, and will be finished within three months.

WILMINGTON, N. C.—Wilmington St. Ry. Co. Incorporators include Lieut. Gov. Stedman, John D. Bellamy, Jr., and J. C. Devine. Will build 2 1/2 m at once, and have contracted with Sea Shore Construction Co. of New York for construction and entire equipment.

STREET RAILWAY STOCK QUOTATIONS.

NEW YORK STOCKS.—Corrected by H. L. GRANT, 145 Broadway, New York.

Table with columns: Par., Amount, Period, Rate, Date, Bid., Asked. Lists various street railway stocks such as Bleecker St. & Fulton Ferry, Broadway & Seventh Avenue, etc.

PHILADELPHIA STOCKS.—Corrected by ROBERT GLENDINNING & Co., 303 Chestnut st., Philadelphia

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

BOSTON STOCKS.—Corrected by R. L. DAY & Co. 51 State st., Members of Boston Stock Exchange.

Table with columns: Par., Amount, Period, Rate, Date, Bid., Asked. Lists Boston stocks like Metropolitan, South Boston, Boston Consolidated, etc.

\*This company, owing to defalcation of its Treasurer, and loss of upwards of \$250,000, passed its January, 1887, dividend. Dividends for 1886 had been 8%.



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35a GREAT GEORGE ST.,  
WESTMINSTER, LONDON, S.W.



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Andrews, Frank H., F. T. Lerner, General Agent, 545 West 33d st., N. Y.	380,381
Ayres, A., 502-518 W. 45th st., New York	379
Ayers Pat. Sash Holder Co., Stewart Bldg., New York	395
Babcock, John, & Co., 2 Liberty sq., Boston, Mass.	403
Bacon Bros., Canadian agts. F. H. Andrews, 377 St. Paul st., Montreal, Can.	380,381
Baldwin, A. L., Sec. and Treas. Standard Index and Register Co.	372,373
Baldwin, Eli, Pres. Standard Index & Reg. Co.	352,373
Baldwin Locomotive Works. Burnham, Parry, Williams & Co., Props. Philadelphia, Pa.	403
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Bemis, S. A., Pres. The Bemis Car Box Co.	402
Bemis Car Box Co., The, Springfield, Mass., S. A. Bemis, Pres., Springfield; Geo. B. Hewlett, Sec. and Treas., New York; Geo. M. Hoadley, Supt., Springfield; Horace G. Bird, Gen. Agent, 436 Insurance Exchange, Adams & La Salle sts., Chicago, Ill.	402
Bentley-Knight Electric Ry. Co., 115 Broadway, New York. E. M. Bentley and W. H. Knight, Patentees. Rhode Island Loco Wks., cnstrs.	359
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Bryden Forged Horse Shoe Works, Ld. Oliver Williams, Treas.; T. F. Frederick, Supt.; J. B. White, General Sales Mang. (288 Greenwich st., New York) Catsauqua, Pa.	369
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Business Notes.

THE MAGNOLIA METAL, C. B. Miller Proprietor, has given excellent results in recent tests made in New York.

THE JORDAN-MILLS MANUFACTURING CO., 32 Nassau street, it is reported have been in every way successful in the recent tests of their automatic sand distributor on the Brooklyn Bridge Cable Ry.

IN AN EXHAUSTIVE ARTICLE on cable roads, published in the Argus, of Albany, March 6, 1887, the following paragraph is contained: "The best cable roads are provided with two cables and double sets of motive power to provide against accident."

PRESIDENT J. H. BONN, of the North Hudson County Ry. Co., writes the Jordan-Mills Mfg. Co., of 32 Nassau street, as follows:—"We have been using this winter on all our elevated cable cars the Automatic Sand Distributor made by the Jordan-Mills Mfg. Co. of New York, and are very well satisfied with the working of the same."

THE VANDERBILT HOUSE in Syracuse, it may be interesting to street railway people to know, is kept by a street railway man. Mr. P. A. Brayton, Proprietor, is President of the Fifth Ward railroad. The hotel is first-class in every respect, and our friends will probably feel more at home there than elsewhere in Syracuse.

THE CAR TRACK FRICTION APPLIANCE CO., Boston, are in receipt of the following:—

CAMBRIDGE RAILROAD COMPANY. SUPERINTENDENT'S OFFICE. HARVARD SQUARE. W. T. BUTLER, Esq., General Manager.

DEAR SIR:—The Reliable Sand Boxes placed upon one of our cars work admirably. I shall have more put on. It does all you claimed for them.

WM. A. BANCROFT, Supt. Cambridge, Mass., Feb. 26, 1887.

WOODLAND AVENUE AND WEST SIDE STREET R. R. CO. CLEVELAND, O., Jan. 15, 1887.

MESSRS. VAIL & WISEN, Cleveland, O.

GENTLEMEN:—In reply to yours of the 10th. inst. asking our opinion as to the merits of your car starter, we will say that after testing the starter for the past eight months we find that it overcomes about one-half of the draft in starting the car, prevents that dead pull such as is always required in starting a car, prevents all sudden jerking, in fact fulfills all requirements that a car starter is intended for; it requires no attention beyond keeping it oiled. We find on examination the starter has worn but little if any. We have tested several starters before trying yours but found none of them satisfactory. When you decide to manufacture and equip cars with said starter, please quote us prices per car equipped ready for action.

Yours truly, GEO. G. MULHERN, Gen. Supt.

NOTICE.

The firm of J. G. Brill & Co. has this day been dissolved by mutual consent. The business of the firm of J. G. Brill & Co. has been transferred to the

"J. G. Brill Company," a corporation under the laws of Pennsylvania (Act of April 29, 1874), who will continue the business of the firm, and assume all their outstanding contracts and engagements of all kinds.

The management of the business of the J. G. Brill Co. will continue in the same hands, J. G. Brill being President; G. M. Brill, Vice President and General Manager; James Rawle, Treasurer and Secretary, and John A. Brill, General Agent.

The Board of Directors are: J. G. Brill, Henry Rawle, G. M. Brill, James Rawle and John A. Brill. The capital stock is \$300,000. The entire assets of J. G. Brill & Co. have been transferred to the J. G. Brill Company.

The facilities of the establishment for manufacturing cars of all kinds have been materially increased, and the company is well prepared to execute contracts for railway cars, tramway, cable and electric motor cars; also, cars for special designs, and materials of all kinds for construction of cars and for railroad purposes.

J. G. BRILL COMPANY, JAMES RAWLE, Secretary.

Thirty-first and Chestnut streets, Philadelphia, March 4, 1887.

SPECIAL NOTICES.

WANTED—A live man to ascertain among street railways the best system of heating street cars yet devised. Address A. W., care STREET RAILWAY JOURNAL, 113 Liberty street, New York.

THE SUBSCRIBER has an Automatic Switch for street railways, adapted for horse and motor cars of all kinds. Dispenses with the ordinary tongue switch as in present use. Self cleaning, simple, durable and cheap in construction. Will make liberal terms with manufacturers or others for the introduction of the same. "SWITCH," office STREET RAILWAY JOURNAL, 113 Liberty street, New York.

WANTED—A position as General Manager on a new or old established Street Railway by thoroughly practical man. Location no object; and willing to work for a small salary. Can give the best of New York City references. Parties wanting a man who is able to look sharp after the interest of the company, will please address J. L. D., care of STREET RAILWAY JOURNAL, 113 Liberty street, New York.

FOR SALE—One full sized Andrews Improved Snow Sweeper and Plow. Been used only six times. Satisfactory reason for selling. WATERBURY HORSE RAILROAD, Waterbury, Conn.

FOR SALE,—65 second-hand, 10 foot one-horse cars; 52 built by Stephenson, 13 by Brill. All in first-class order. No reasonable offer refused. LEWIS & FOWLER MFG. CO., 27 Walworth st., Brooklyn, N. Y.

WANTED—Capitalist to invest money in the best Cable Grip yet invented. First-class inducements and best of references. RELIABLE, care STREET RAILWAY JOURNAL.

WANTED—Second hand, reversible seats, open cars in good condition. Address, stating name of manufacturer, price, etc., GEO. W. HERSEY, S. R. & B., 87 Summer street, Boston, Mass.

WANTED, \$10,000 four or five years at 6%. Security, First Mortgage on Street Railway with \$20,000 paid up capital, earning 8% on same, and on the extension of the road for which the loan is required; or would sell half interest. Closest investigation will show it to be a first-class, entirely sold, investment. Address L. F. D., STREET RAILWAY JOURNAL, 113 Liberty street, New York.

WANTED—Position as Superintendent on a street railroad by an experienced man. N. Y. City references. Willing to go South or West. Parties wishing a good, steady man, and one able and willing to look sharp after all the minute details of a road will please address Superintendent, care STREET RAILWAY JOURNAL, 113 Liberty st., New York.

SUPERINTENDENT.—Advertiser of ability and good managing capacity desires an engagement as superintendent of surface railroad; experienced in European and New York systems; would take full charge, including stables and treatment of sick horses if desirable; first-class references. Address MANAGER, care STREET RAILWAY JOURNAL, 113 Liberty street, New York.

WANTED.—Offers to supply, f. o. b., good second-hand St. Railway Johnsons and T rail, iron or steel (steel preferred), 20, 25 and 30 lbs to the yard, for one-half to two miles track, and splices to match. Communicate best terms, describing fully surface width, height, weight, condition, etc. DENISON STREET RAILWAY CO., Denison, Texas.

WANTED—Position as Superintendent or Foreman with some good street railroad, by a thoroughly practical and experienced street railroad man who has had 15 years' experience in the business; can refer to some of the most prominent street railroad men of the country. Address R. P. A., care STREET RY. JOURNAL, 113 Liberty st., New York.

FOR SALE.

Steel Rails, T and Street Patterns, all weights; Spikes, Fishplates, Bolts, Wrought Iron Knees, Etc.

Light Steel T Rails always on hand. Old Rails taken in trade, or purchased for remanufacture.

HUMPHREYS & SAYCE, No. 1 Broadway, New York.

WANTED.

Second Hand One-Horse Street Cars in good condition.

HUMPHREYS & SAYCE, 1 Broadway, New York.



# CAMBRIA STEEL Street Rails

Address,

**CAMBRIA IRON CO.,**  
218 SO. FOURTH ST., PHILADELPHIA, PA.

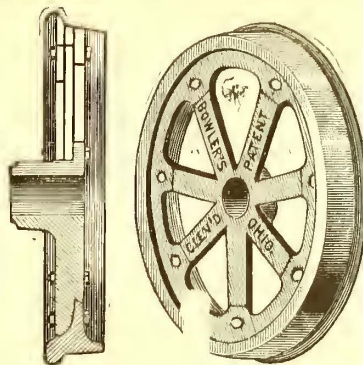
**J. C. SAXTON,**  
**STREET RAILWAY SUPPLIES,**

52 Broadway, New York.

TELEPHONE CALL, 505 NEW.

## O. W. MEYSENBURG & CO., Street Ry. Track Material.

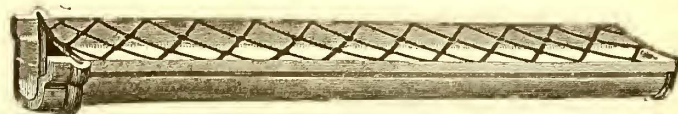
204 No. Third St., St. Louis. 185 Dearborn St., Chicago.



# Cleveland Foundry,

Manufacturers of

Car and Locomotive Wheels either Chilled or Steel Tired; with or without axles. Street Railway Wheels, Turnouts and Turntables. Patent Chilled Face R.R. Frogs. Engine & Heavy Castings a Specialty.



**Graded Stable Cutter with Straight or Curved Cover**  
Descent 1/4 inch per foot. Pieces 5 feet lengths; short pieces furnished to suit any length. Spouts to connect with sewer.

They control and make N. P. Bowler's Patent Street Railroad Wheel. The tire of this wheel is cast separately from the hub and spokes; the latter is made of soft strong iron, and is perfectly free from strain—therefore can be made much lighter and more durable. The tires and the spokes or center of the wheel are made perfectly interchangeable so that when the tire or rim is worn out another can be put in its place by any employee with no other tool than a common wrench.

**Bowler & Co. 10 TO 24 Winter St. Cleveland, O.**

# The Clark Grooming Machine.

(Patented Dec. 15, 1874; Jan. 9, 1883.)

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.

Foul and unhealthy accumulations are instantly and thoroughly eradicated, and the pores of the skin opened to healthy action. It not being possible to slight the work upon the animal, as in hand grooming, the hair becomes oily and glossy, a healthy action to the skin being maintained.

We now offer this Groomer to the public in confidence, knowing it will be found invaluable in its use in all stables, and especially so wherever perfection in stock raising is desired.

Grooming means the purification of the skin and the cleanliness of the coat, thereby contributing to the animal's

health, and requiring proportionately less food.

Machine Grooming is found to be less expensive than hand grooming, saving in food and medicines, and materially increasing the value of the animal.

We manufacture Grooming Machines single and double. Capacity 2-Brush Machine, 30 head per hour; Single, 12 head per hour.

## HORSE RAILROADS

**SAVE THE COST OF A DOUBLE BRUSH  
MACHINE TEN TIMES A YEAR  
ON EVERY 100 HORSES.**

## ALL LARGE STABLES

**WILL HAVE THESE MACHINES AS  
SOON AS THEY CAN GET THEM  
AFTER INVESTIGATION.**

## REMARKS.

These machines are much improved, and are now as perfect as can be made. The wearing parts were formerly iron, but are replaced with steel, and are giving perfect satisfaction.

For Circulars, prices and full particulars, address,

**CLARK GROOMING MACHINE, 760 Warren Av., Chicago, Ill.**



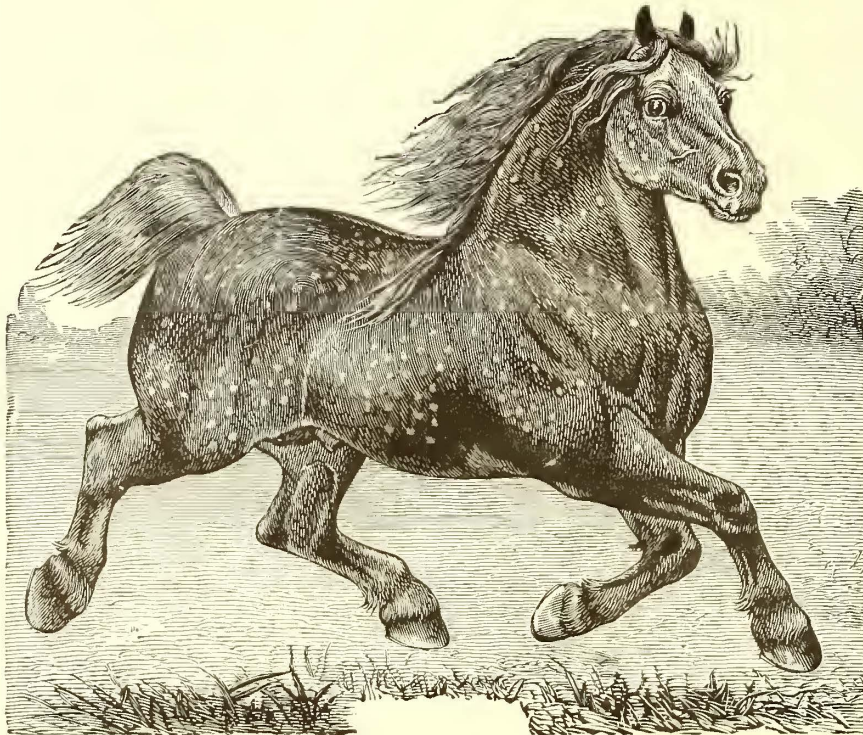
# Gombault's Caustic Balsam.

As a veterinary remedy this is takin'z the lead, and WHY? Because it is a remedy that can be safely used by any one with best results, leaving no scar or blemish. Veterinary surgeons, as a rule, consider it unprofessional to indorse any specific preparation, but some of them rise above this bigoted prejudice and boldly acknowledge its superior veterinary qualities. If you TRY IT ONCE you will always use it when occasion requires. We not only ask you to read the following testimonials sent us from some of the best veterinary surgeons and horsemen, but if any doubt exists, just write to them and satisfy yourself that what we say is a fact.

**IT IS THE KING OF VETERINARY REMEDIES TODAY!**

**A Noted Horseman says,**  
 "ABDALLAH PARK," CYNTHIANA, KY., Dec. 13, 1886.  
 LAWRENCE, WILLIAMS & Co., Cleveland, O.:  
 I have used Gombault's Caustic Balsam for some years, and it has so far been PERFECTLY SATISFACTORY to me.  
 W. H. WILSON.

Every horseman will have confidence in the above, coming as it does from perhaps the most noted horseman in Kentucky, as he is pretty thoroughly known by horse owners all over the United States. He also has about 100 horses in his stable, comprising some of the best-bred stock in this country.  
 L. W. & Co.



Mr. Day is one of the leading horsemen of Chicago, and owner of the fast pacing mare Kate Allen; he is also correspondent of some of the leading horse papers, signing himself "On the Road."

Messrs. LAWRENCE, WILLIAMS & Co.:  
 Last spring I wrote you regarding Gombault's Caustic Balsam, which I used on my mare, Kate Allen. I got it nervous at the time, and was very sorry I ever used it. But it did its work splendidly, and I have recommended it in many cases. Everybody who has used it was more than pleased with the results. I regard it the most wonderful liniment I ever saw or used. John Kelly is just gone after a bottle to use on Robin.  
 J. L. DAY.

**No Need of Getting Nervous.**  
 CHICAGO, ILL., Nov. 1, 1885.

## COMBAULT'S CAUSTIC BALSAM.

550 Horses in One Stable.

Office E. Cleveland St. R. R. Co.,  
 Cleveland, O., Dec. 1, 1886.

LAWRENCE, WILLIAMS & Co., Cleveland, O.:  
 Gents:—In reply to your inquiry as to our opinion of Gombault's Caustic Balsam, we have been using it for three or four years in our stables. Have now 550 horses, and have probably treated nearly or quite 100 in the past year, using it for all kinds of leg or shoulder lameness, strains, diphtheria, pink eye, etc., and must say that for any case where blistering is necessary we find it to be just what we need and to do what you claim for it, and a perfectly safe remedy to use. We could not well do without it, and can freely recommend it to horsemen.

EDWIN DUTY, Supt.

We would add that the above company have used over six dozen bottles in the past year, which fact speaks pretty plainly for itself.

### "Beats Anything I Ever Saw."

SHARON, WIS., Feb. 12, 1887.

LAWRENCE, WILLIAMS & Co., Cleveland, O.:  
 Enclosed find draft for six bottles Gombault's Caustic Balsam. I have now used about twenty bottles of your Balsam, and must say it beats anything I ever saw on curbs, ringbones, spavins, capped hock, sweeties, and all bunches on a horse that need blistering. I consider it the greatest blister of the day.

Yours with respect,

J. C. MCKESSON.

### Don't Read This.

BERTHOND, COLO., Nov. 26, 1886.

LAWRENCE, WILLIAMS & Co.:  
 We have for two years past been using your Gombault's Caustic Balsam extensively on our horses for removing collar and shoe boils, poll evil, sore withers, capped hocks, lung and bowel ailments, sore throat, and for several cases of spavin, curb, and splint, and in every case with complete success. It never fails, and we would not be without it for any cost.

JACKSON & LAWRENCE,  
 Proprietors "Red Rock" ranch.

### A Mayor Tells of its Beauties.

STOUX RAPIDS, IOWA, Nov. 29, 1886.

LAWRENCE, WILLIAMS & Co., Cleveland, O.:  
 It affords me great pleasure to state that I have used six bottles of Gombault's Caustic Balsam, and in every instance where used it has given good satisfaction, and I can cheerfully recommend it to all parties needing a safe, sure, and reliable blister. One of the beauties of it is that it leaves no blemish or scar. I am Mayor of our city and quite an extensive horse owner. My son finishes his studies as a veterinary surgeon next spring.

JAS. M. HOSKINS.

### "Entirely Satisfactory Results."

SECORRO CO., NEW MEXICO, Dec. 13, 1886.

LAWRENCE, WILLIAMS & Co., Cleveland, O.:  
 The Caustic Balsam arrived in good shape. We are using nearly 200 horses here, chiefly under the saddle; the result is, many horses with sore backs, terminating frequently in "poll evil," "fistula," etc. I have used the Caustic Balsam in various cases and always with entirely satisfactory results.

Very respectfully,  
 NATHAN HALL,  
 Gen. Manager "Nathan Hall Cattle Co."

### "Certainly the Cheapest."

CLEVELAND, O., Feb. 14, 1887.

MESSRS. LAWRENCE, WILLIAMS & Co.  
 I have used your great veterinary remedy, Gombault's Caustic Balsam, for several years and always with highly beneficial results. Horses so lame from

spavin as to be almost unable to step have been so well cured of it that they are now doing regular work on the city pavement. For spavin and soreness I have never found anything equal to it. Considering that it may be kept indefinitely, and that one bottle can be used for so many cases, it is certainly the cheapest of all remedies of value. Hoping, for the sake of suffering horses and their owners, that its use may become universal, I am yours,

R. D. UPPEGRAFF,  
 Breeder of Fine Horses.

### "That Good Liniment."

CARLEY CO., ILL., Feb. 19, 1887.

LAWRENCE, WILLIAMS & Co., Cleveland, O.:  
 Please ship me one dozen bottles Caustic Balsam. I must say, as I have before, that it is one of the best counter-irritants ever discovered, and the only objection is the price. If it could be retailed at \$1 per bottle it would sell much more rapidly. It truly deserves all its credit. This order is for customers who insist on getting some of "that good liniment," as they call it.

Respectfully,  
 FRED H. JENSON, V. S.

### It Paid Well.

MECHANICSBURG, ENRY CO., IND.,  
 August 6, 1886.

LAWRENCE, WILLIAMS & Co.  
 Gentlemen:—In regard to your Caustic Balsam, I find it to be one of the best medicines I ever used. I bought a valuable young mare that had a lump on her shoulder that had been treated by several horse doctors, and I went myself to give her treatment, but concluded would buy her after the gentleman expressed his opinion of the place. I removed the lump in one week, and have been offered fifty dollars for my bargain. I have used it in another case or two with good success. It does everything it is recommended to do.

Yours truly,

VIC. M. COOPER.

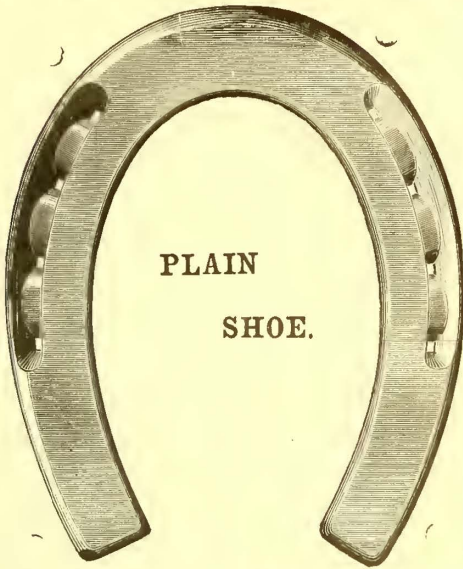
Be SURE you get the Genuine. If you have a Lame or Unsound Horse,

can you not afford to TRY a remedy that is so highly recommended? Any information on special cases of inquiry freely given. We can publish many more of equally good letters, but it does not seem necessary when it is so highly indorsed editorially by such papers as "The Field and Farm," "New York Sportsman," "Spirit of the Times," "Chicago Horseman," "The Ohio Farmer," and other stock papers. It is Far Superior, More Economical, and a Perfectly Safe, Reliable and Prompt remedy to use as compared with any other remedy used for like purposes. IT WILL PAY YOU WELL TO TRY IT. Every drop of it is imported from France direct by us, and every genuine bottle of THE COMBAULT'S CAUSTIC BALSAM sold in this country or Canada has a label printed in English with fac-simile of the signature of Lawrence, Williams & Co., who are sole and only importers. Any other is a worthless imitation. Price, \$1.50 per bottle. Sold by druggists, or sent by express, CHARGES PAID. Address,

**Lawrence, Williams & Co., Cleveland, O.**



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



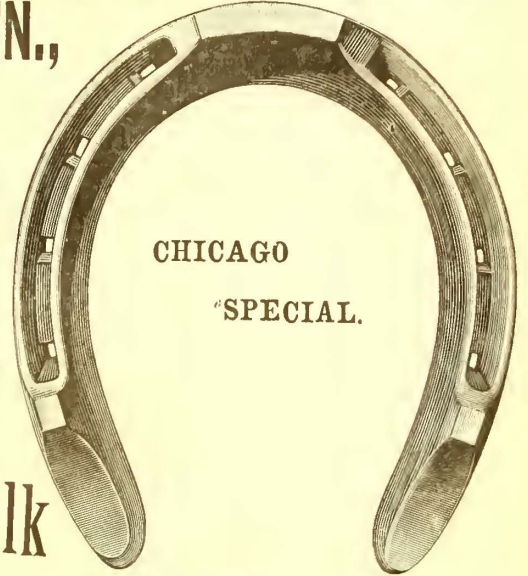
PLAIN  
SHOE.

MANUFACTURERS OF

## THE BRYDEN

Forged Solid Calk

### HORSE AND MULE SHOE.



CHICAGO  
"SPECIAL.

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

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

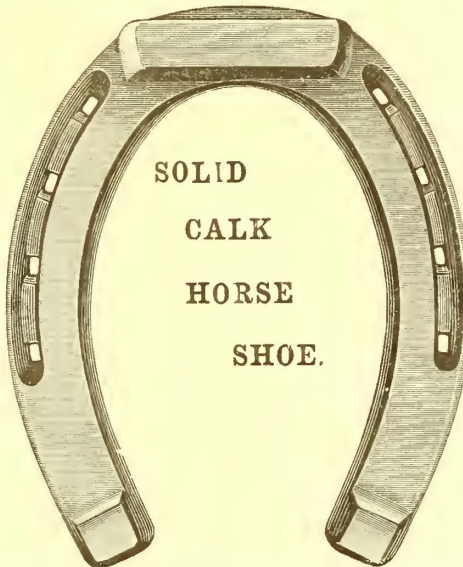
The crease is made low and the nail holes are punched well in and beveled to permit the nailhead to be well driven in, reducing the strain on the nails and insuring a firmly fastened shoe.

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

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

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

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

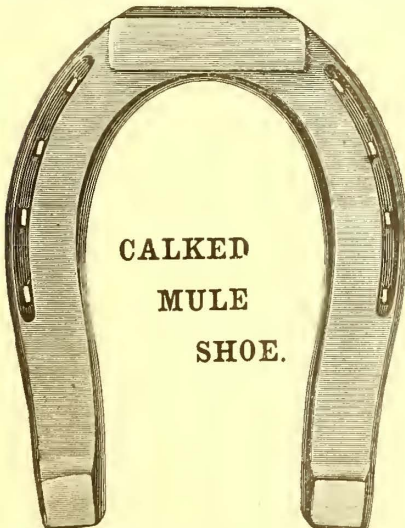


SOLID  
CALK  
HORSE  
SHOE.

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

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

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

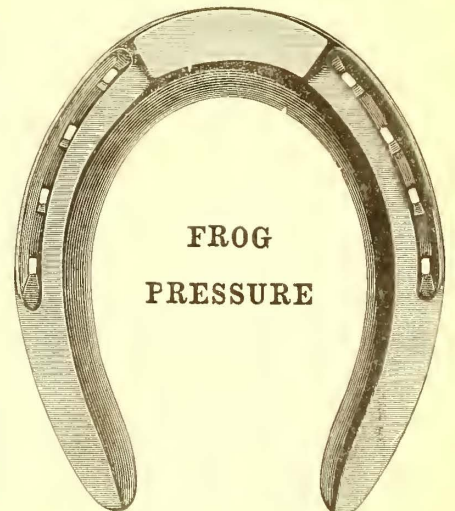


CALKED  
MULE  
SHOE.

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

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

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

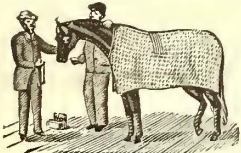


FROG  
PRESSURE

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

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





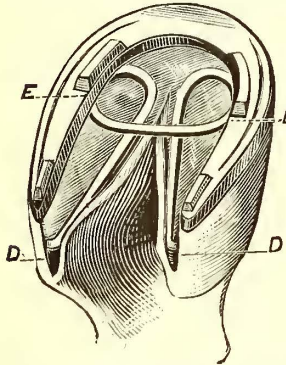
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CELEBRATED

## ANTI-FEVER MEDICINE.

The Anti-Fever Medicine has now been in use for over 30 years as a specific in all Diseases of an Inflammatory Character in Horses and Cattle. Anti-Fever Medicine is a Certain Cure for Chills and Fever, Sore Throat, Inflammation of Lungs, Coughs, Staggers, Inflammation of the Bowels, Spasmodic Colic, and Pleuro-Pneumonia in Cattle. This valuable Medicine is now used by the Principal Stables in the Country, by the U. S. and American Express Companies, and many of the Street Car Companies. Try one bottle and you will be convinced of its value in your stable. Sold by all Druggists. PRICE \$1 per bottle. Discount to the Trade. Address **Wm. Somerville & Sons, Buffalo Horse Infirmary, 127 Erie st. Buffalo, N.Y.** Mention this paper.

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



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

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

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

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

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

1,741 BROADWAY, NEW YORK.

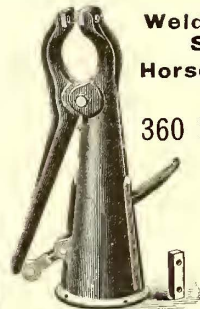
Liberal discount to the trade. They are kept by all first-class Horseshoers, Saddle and Hardware men.

### P. F. Burke, c. F. Dewick & Co.,

Successor to

Manufacturers of

Patent Steel Shoe CALKS, Blunt and Sharp.

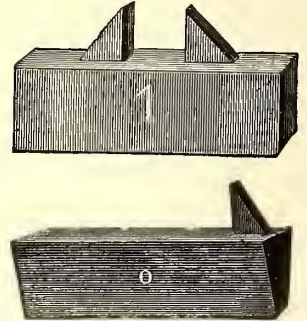


Welding Dies for Sharp, and Horse Shoers' Foot Vises.

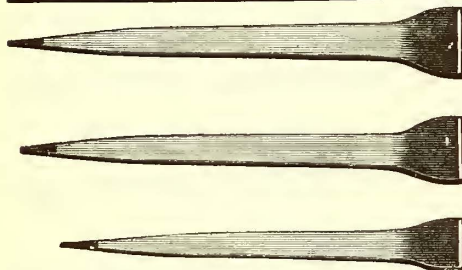
360 Dorchester Ave.,

Boston, Mass.

SEND FOR CIRCULARS.



For Sale by Iron, Steel and Heavy Hardware Dealers.



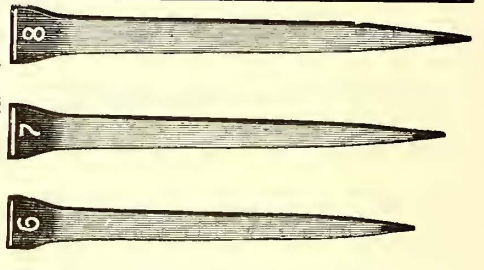
### CHAMPION HORSE NAILS.

Manufactured from very best SWEDISH METAL. Will not SPLIT. Are accurately pointed, tough, strong and hold the shoes. Soft enough to clinch readily; stiff enough to drive without bending. All nails uniform and perfect. They are used in thousands of shops with the best of satisfaction, and are especially liked by "floor-men" for their good reliable driving. Made in two patterns, "LARGE HEADS" and "CITY HEADS."

QUALITY GUARANTEED.

Nos. 4, 50c; 5, 28c; 6, 25c; 7, 23c; 8, 22c; 9, 21c; 10, 20c.

Champion Horse Nail Co., Appleton, Wis.



# THE PUTNAM NAIL CO.

## LOOK WELL

TO YOUR

Highest Award at the

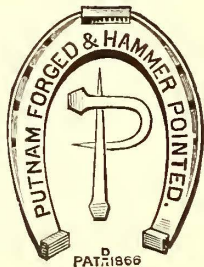


Fig. 1.

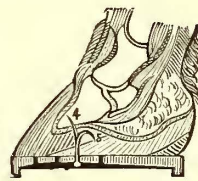
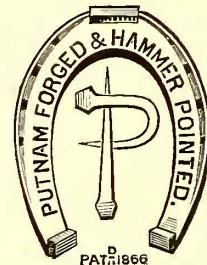


Fig. 2.



Centennial Exhibition.

# HORSES' FEET

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

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

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

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

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

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

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

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

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

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

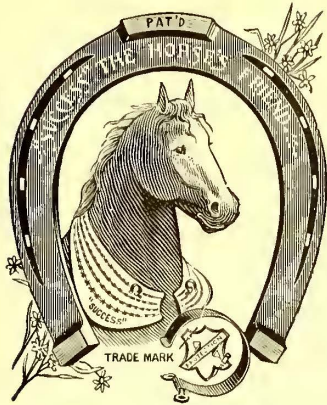
**THE PUTNAM NAIL.**

Address for Circulars, etc.,

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



### "Success" Sweat Collars



Are Guaranteed to Cure and Prevent Sore Necks, Collar Galls, and Collar Bruises.

"SUCCESS"

is the Correct Thing for Street Car Horses.

For Sale by the Saddlery Trade in General.

For full particulars, Address:

**E. L. McClain Manufact'ng Co., Cincinnati, O.**  
Please mention this Journal.

### RUFUS MARTIN & CO.,

13 PARK ROW, N. Y.

Manufacturers and Dealers in Every Variety of

## STREET RAILWAY SUPPLIES.

F. M. DELANO.

PHILIP RICHARDSON.

47 Broadway, New York.

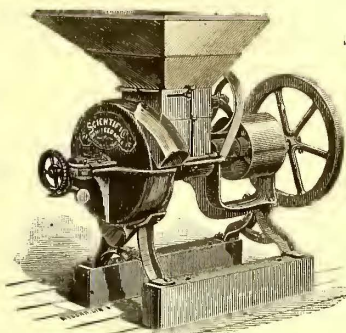
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Dealers in Street Railroad Securities. Correspondence invited.

# THE SCIENTIFIC GRINDING MILL.

THE BEST MILL ON EARTH.

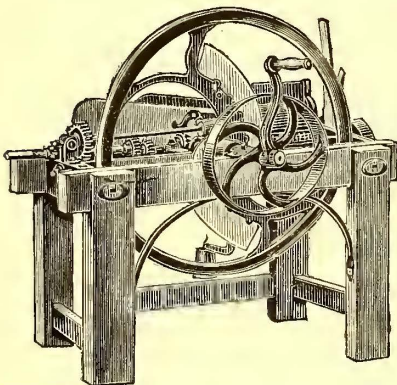


For Grinding EAR CORN, SHELLED CORN, OATS and all GRAIN for Feed. Just the thing for STREET CAR STABLES, as it can be run with 6 to 8 horses to a sweep power. Also made in large sizes for steam power. Grinding plates have double capacity as they sharpen themselves on being reversed, which is done by merely crossing belt. Each set guaranteed to grind Five Thousand to Eight Thousand Bushels before wearing out.

Send for forty page Catalogue and thirty-two page Testimonial Circular.

THE FOOS MANUFACTURING COMPANY, - - SPRINGFIELD, OHIO.

## The Belle City Feed and Ensilage Cutter.



IS THE BEST FEED CUTTER. IS THE STRONGEST, MOST DURABLE, AND ON THE WHOLE IT IS THE BEST FEED CUTTER IN THE WORLD.

OUR TWO LARGEST SIZES HAVE SELF-FEEDING ARRANGEMENTS, AN ADVANTAGE NO OTHER CUTTER HAS.

THEY CAN BE FED WITH A PITCHFORK AND ARE GUARANTEED TO SUIT EVERY TIME.

WRITE FOR CATALOGUE, PRICE LIST, ETC., TO

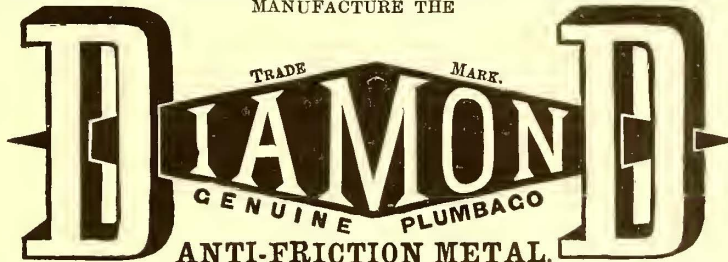
**The Belle City Manufg. Co., Racine, Wis., U.S.A.**

GEO. S. HUNT, President.

A. L. HALE, Gen. Manager.

## THE DIAMOND ANTI-FRICTION METAL COMPANY.

MANUFACTURE THE



NONE GENUINE UNLESS STAMPED

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The only metal successfully containing PLUMBAGO. Superior to all others for journal bearings as shown by U. S. Government Tests by Chief Engineer Lithian. Being a partial lubricator itself, saves half the usual oil. Warranted to wear longer than any other and never heat.

WE CHALLENGE THE WORLD TO PRODUCE ITS EQUAL.

Beware of Spurious Plumbago Metals—see that the above Trade Mark is on every bar. Also

**THE ACME GOLD BELL METAL, the Only Malleable Cast Bell Metal Known.**

Resembles fine gold and takes a high and lasting polish. Bells and Gongs that cannot be Cracked or Broken for street cars and all other purposes made to order. Office and Factory, Nos. 32 and 34 South Clinton Street, Chicago, Ill.



ELI BALDWIN, President.

WALTER S. BALDWIN, Sec'y &amp; Treas.

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SOLE LICENSEES AND MANUFACTURERS OF THE

SIMPLE.

IMPROVED

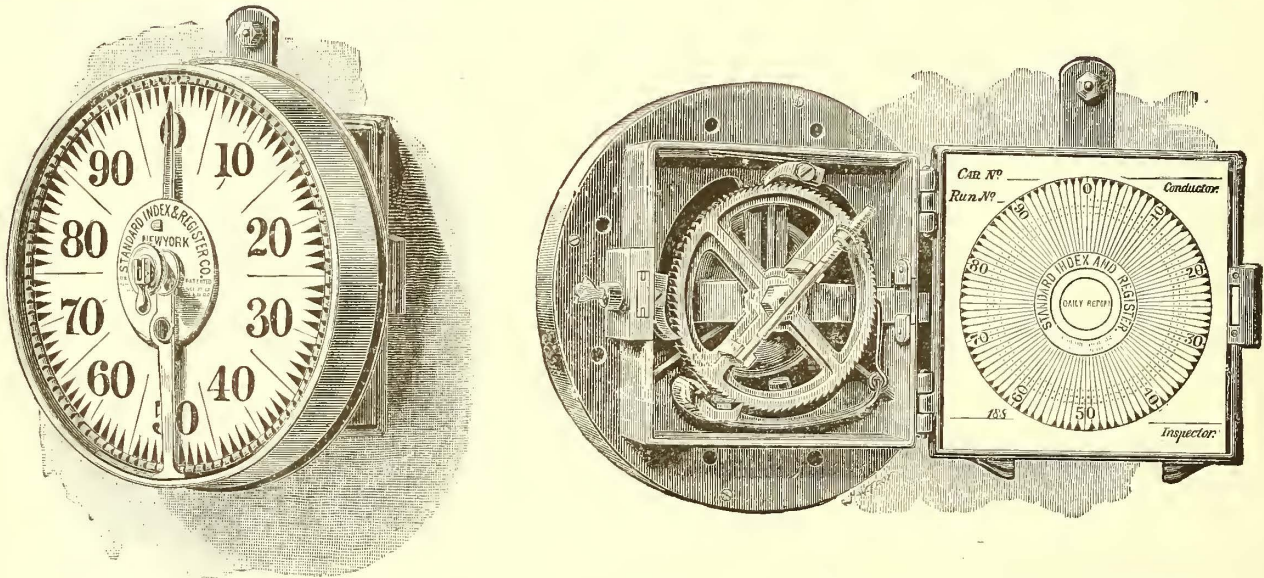
DURABLE.

# STANDARD

INFALLIBLE.

INDEX &amp; REGISTER.

ECONOMICAL.



ADOPTED BY THE LEADING RAILROADS IN THE UNITED STATES.

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

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

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



# THE STANDARD INDEX AND REGISTER COMPANY,

138 FULTON STREET, NEW YORK.

## IMPORTANT DECISION.

The Standard Register is now free from all claim of infringement, and can be used by the Railroad Companies without fear of suit.

### TO STREET RAILWAY OFFICIALS:

The improvements in the Standard Index & Register which have been applied to those in use on various railroads of the United States during the past year, and which have met with so much favor, particularly the apparatus for setting the trip-hand to zero, have been the subject of another action by the Railway Register Manufacturing Co., who claimed that the last mentioned was an infringement of the Benton Patent of July 4, 1882, and thereupon moved in the United States Circuit Court for a decision accordingly. Arguments were heard by the court in this city, on the 9th inst., resulting in a decree on the 12th inst. in favor of the users of the Standard Index & Register.

We give below the decision of the court in full.

Yours respectfully,

STANDARD INDEX & REGISTER CO.

UNITED STATES CIRCUIT COURT SOUTHERN DISTRICT OF NEW YORK.

RAILWAY REGISTER MANUFACTURING COMPANY  
vs.  
BROADWAY & SEVENTH AVENUE RAILROAD COMPANY. } IN EQUITY.

A permanent injunction has been granted in this cause against further infringement of the plaintiff's patent No. 280,526 dated July 4, 1882, and granted to John B. Benton for an improvement in fare registers. The patented invention is a combination which includes a tell-tale hand to indicate any failure to re-set the trip hand of the register at zero at the commencement of a trip, 26 Fed. Rep., 523. The tell-tale hand of the patent is moved with the trip hand in re-setting; and if they are re-set at zero moves with it in registering fares until they are again re-set. If they are not re-set at zero the tell-tale hand remains at the place at which they are re-set when the trip hand moves forward in registering fares, and indicates that registration was begun at a wrong place. The tell-tale hand of the infringement moves the trip hand forward in re-setting, and is left by it when registration begins, and as that is begun at any place other than zero it indicates that fact. Since the injunction the defendant has commenced using another re-setting device which the plaintiff claims is an equivalent of the tell-tale hand in the combination, and a colorable attempt to evade the injunction. The plaintiff has moved for an attachment on account of this use of that device. This device re-sets the trip hand by moving it forward, and has a stop by which it cannot move the trip hand beyond zero. If it is stopped short of zero and registration is begun it can be moved up to zero, when the trip hand has proceeded in registration to that point beyond, and if it is stopped at zero it can be moved back from that point at any time and forward to it again without interfering with the trip hand in registration. It is therefore a stop on moving the trip hand beyond zero, but is not capable of being fixed where registration is begun away from the proper place so as to indicate that fact, or act as a tell-tale at all. Therefore it is not the equivalent of the tell-tale hand in the combination and its use is not a violation of the injunction. The motion is denied.

HOYT H. WHEELER.

EDWARD N. DICKERSON, JR., for Plaintiff.  
JOHN DANE, JR., JOHN F. DILLON, for Defendant.

At a regular term of the Circuit Court of the United States, held in the court rooms of said court in the city of New York, in the Second Circuit, in the Southern District of New York, on the 9th day of March, 1887.

Present:—

The Hon. HOYT H. WHEELER, Circuit Judge.

THE RAILWAY REGISTER MANUFACTURING COMPANY, } On motion for an  
vs. } attachment for con-  
BROADWAY & SEVENTH AVENUE RAILROAD COMPANY, et. al. } tempt.

This cause coming on to be heard upon the motion of the plaintiff, the Railway Register Manufacturing Co., for an attachment for contempt based upon the proceedings already had, and upon the injunction issued herein, and upon the affidavit of Edward E. Quimby, verified December 10th, 1886, presented on the part and behalf of the said plaintiff; and upon the affidavit of Chandler Hall, verified March 5th, 1887; the affidavit of William H. Kukuck, verified March 7th, 1887, and the affidavit of Arthur L. Baldwin, verified March 8th, 1887; and upon the exhibits produced in court; the opinion of the court on final hearing in this case, and the interlocutory decree heretofore filed herein, presented, read, and referred to, on the part and behalf of the defendants herein, and after hearing the arguments of counsel for the respective parties hereto; and after due consideration thereof, on the motion of John Dane, Jr., Solicitor for the defendants, it is *ORDERED*, that the said motion for an attachment be, and the same hereby is, denied.

HOYT H. WHEELER.

A true copy.

(Seal of the Court.)

TIMOTHY GRIFFITH, Clerk.



# RAILWAY REGISTER COMPANY.

## MANUFACTURING

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



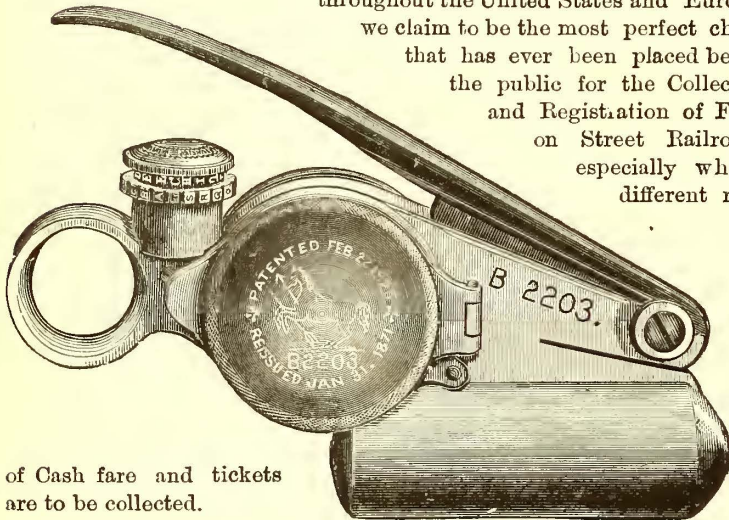
JAMES McCREDIE, Pres., Buffalo, N. Y.

## COMPANY.

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

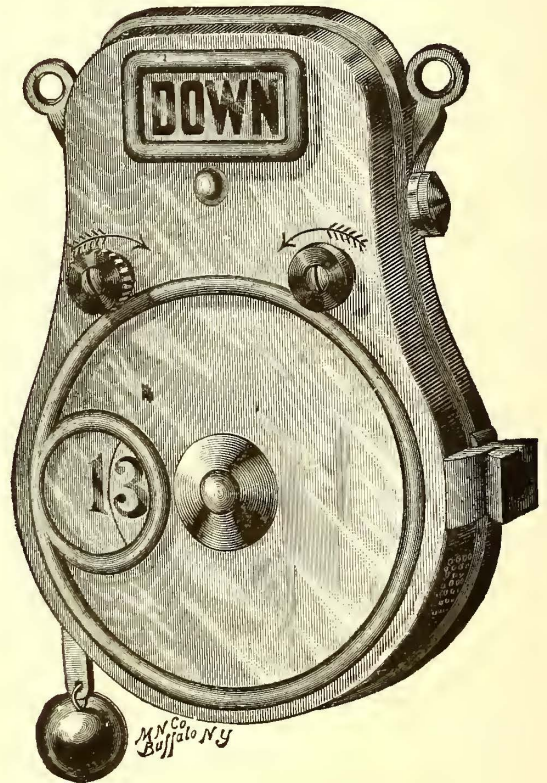
### The Alarm Registering Punch.

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

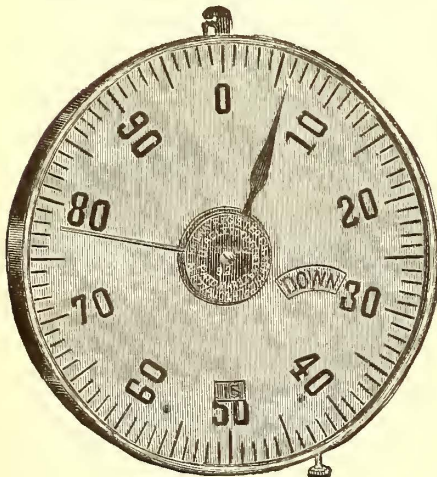


of Cash fare and tickets are to be collected.

### Benton Register.

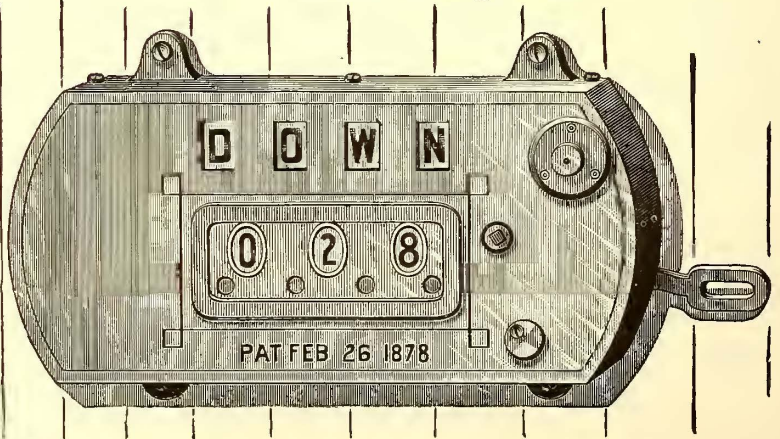


### The Monitor Register.



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

### The Pond Register.



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



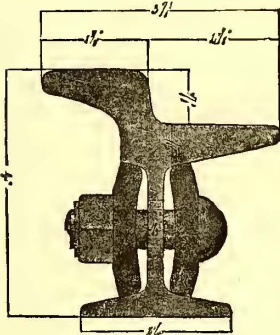
THE GIRDER SYSTEM OUR SPECIALTY.

THE

# Johnson Steel Street Rail Company,

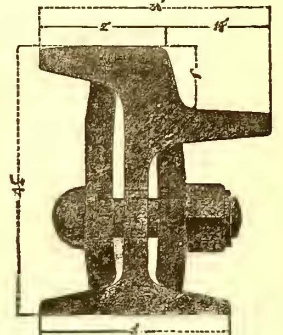
JOHNSTOWN, PA.

Section C. 38, No. 111.



Patented February 20, 1883.

Section D. 45, No. 11.

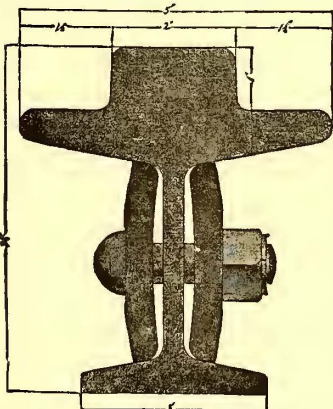


Patented November 27, 1883.

## SIDE BEARING GIRDER RAILS

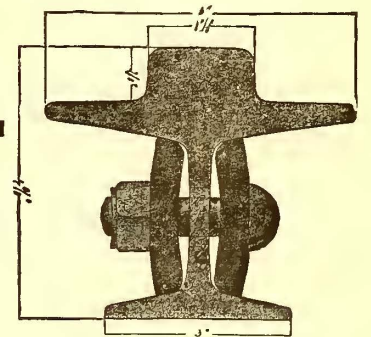
OR

Section E. 76, No. 117.



Patented January 29, 1884.

Section G. 58, No. 120.



Patented January 29, 1884.

## CENTER BEARING GIRDER RAILS.

Large Assortment of different Weights and Sections.

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

We Furnish Every Detail Wanted in Track Work.

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

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



# THE LEWIS AND

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Buy Direct from the Manufacturer.

WE MAKE ANY STYLE OF

## CAR TRIMMINGS

YOU MAY REQUIRE.

Car & Omnibus Builders Supplied with Trimmings

FROM ANY SPECIAL PATTERNS.

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PATENTEES AND MANUFACTURERS OF THE

### IMPROVED "ALARM" PASSENGER REGISTER.

USED BY RAILWAY COMPANIES IN ALL PARTS OF THE COUNTRY.

KEPT IN REPAIR ONE YEAR FREE OF CHARGE.

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



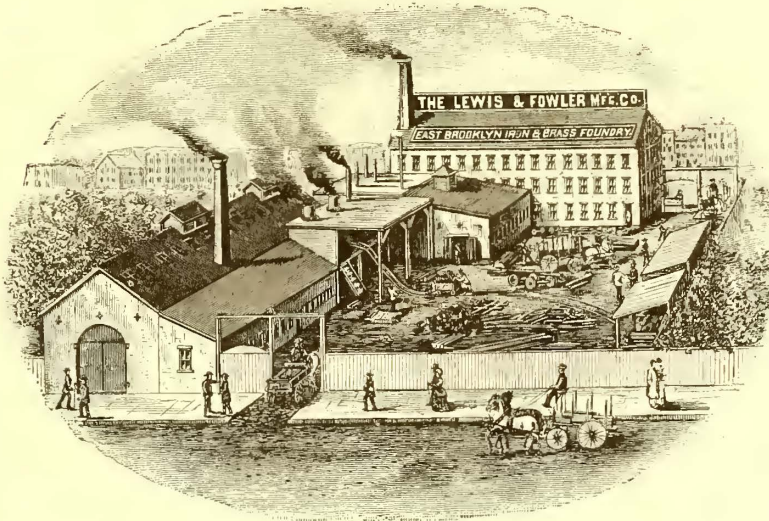
# FOWLER MF'G Co.

Walworth St., Brooklyn, N.Y.

MANUFACTURERS OF MATERIALS FOR

## Street and Cable Railway Construction

KNEES  
 SPIKES  
 CHANNEL PLATES  
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 GROOVED RAILS  
 FOR CURVES  
 BENT ANY DE-  
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PEDESTALS  
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 BRASS BEARINGS  
 TURNABLES  
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 PLOWS  
 ETC. ETC. ETC.

### AUTOMATIC SWITCHES

AND

## RAILROAD CASTINGS

OF EVERY DESCRIPTION AND MOST APPROVED PATTERNS.

### FOWLER'S IMPROVED

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CATALOGUE FREE TO RAILROAD COMPANIES.



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

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We make a specialty of street railway work, acting as engineers, or will contract for the construction of new lines. Repairs promptly executed on out of town work. Estimates for warehouse tramways promptly furnished.

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



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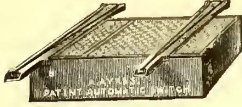
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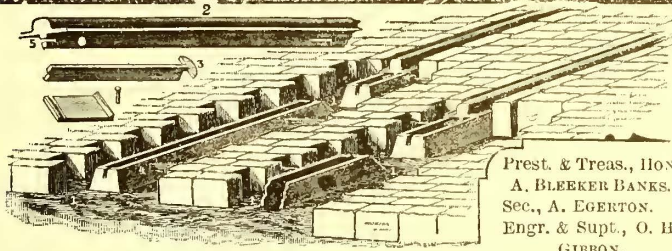
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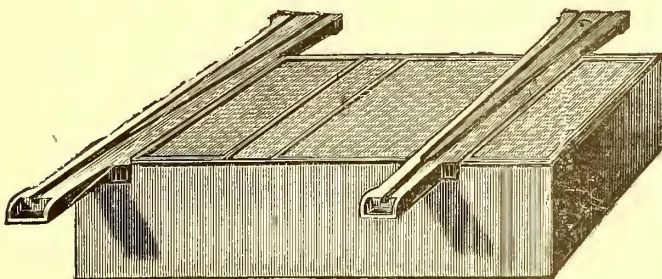
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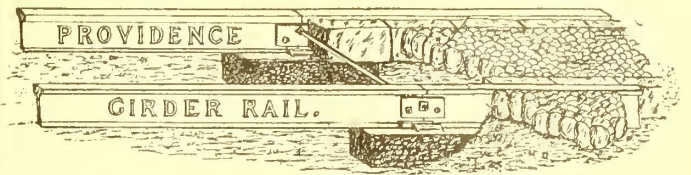
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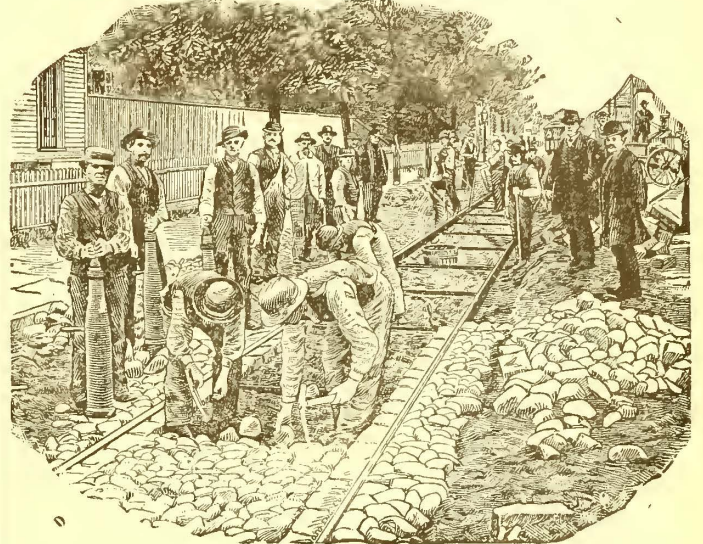


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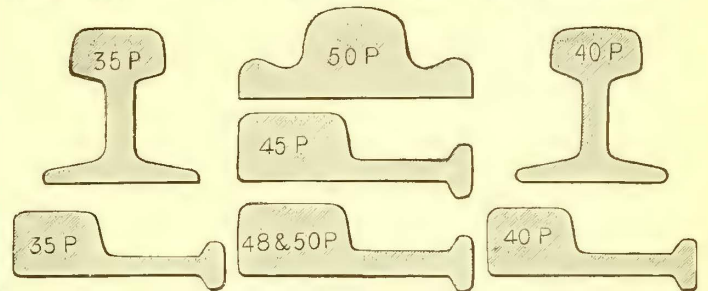
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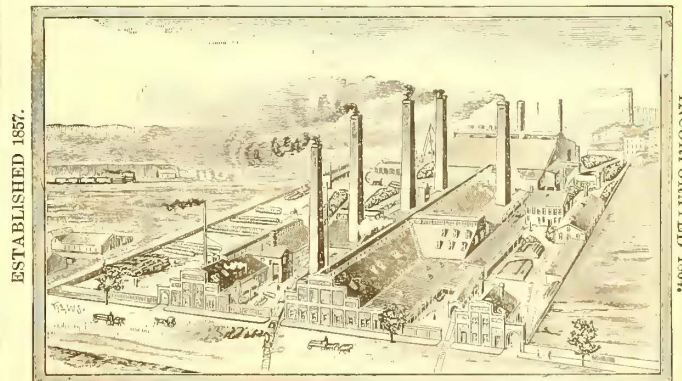
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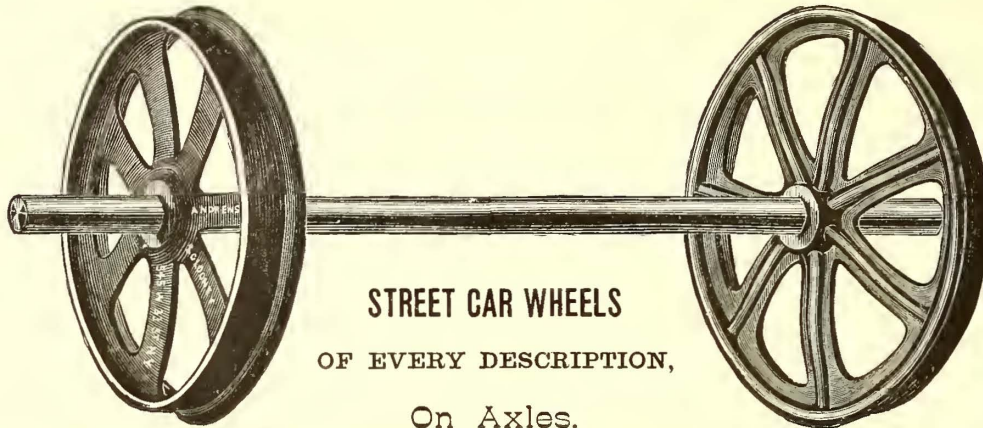
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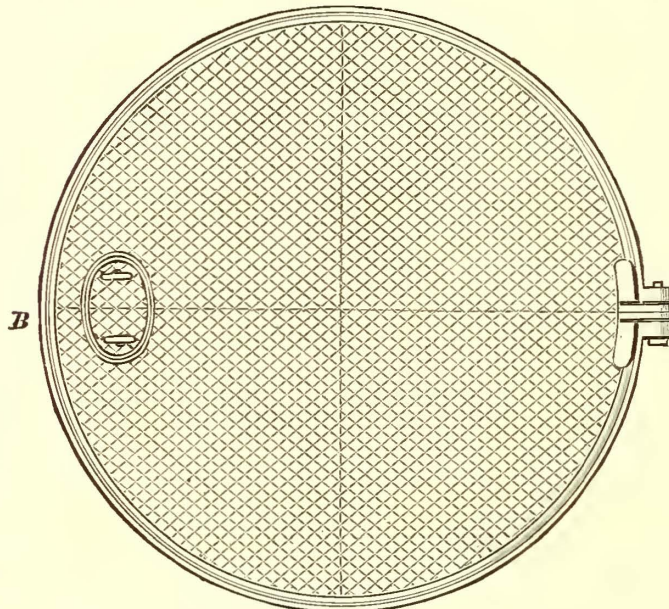
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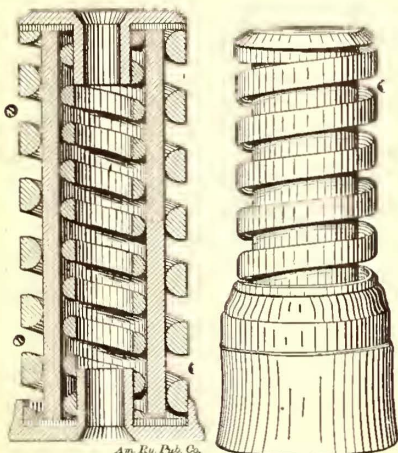
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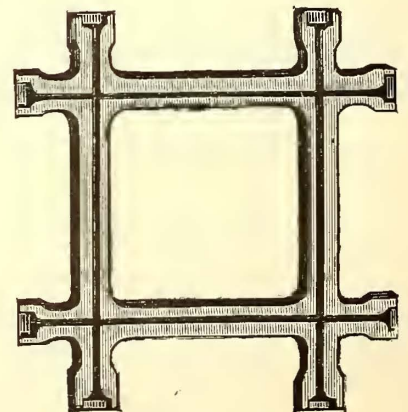
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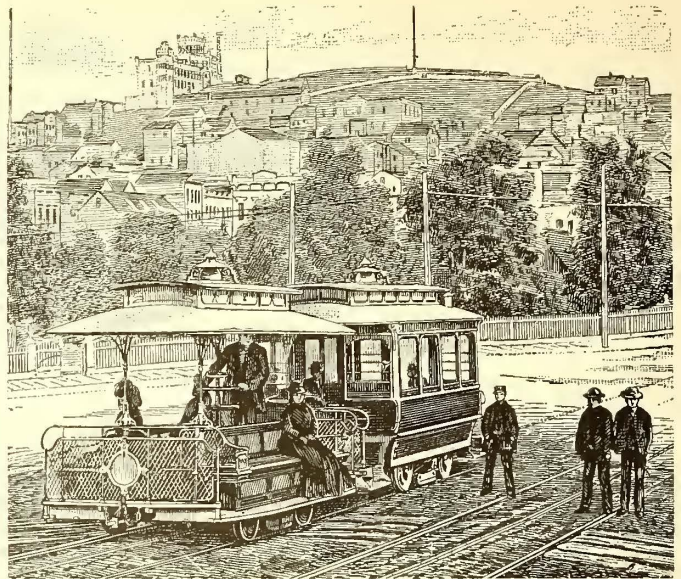
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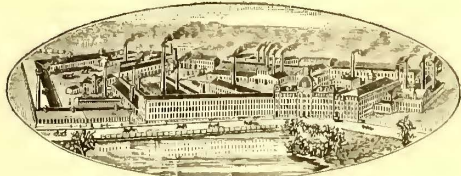


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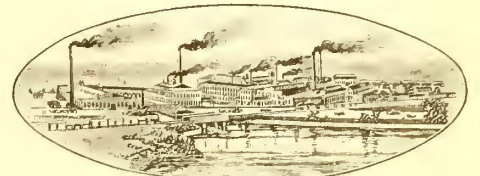


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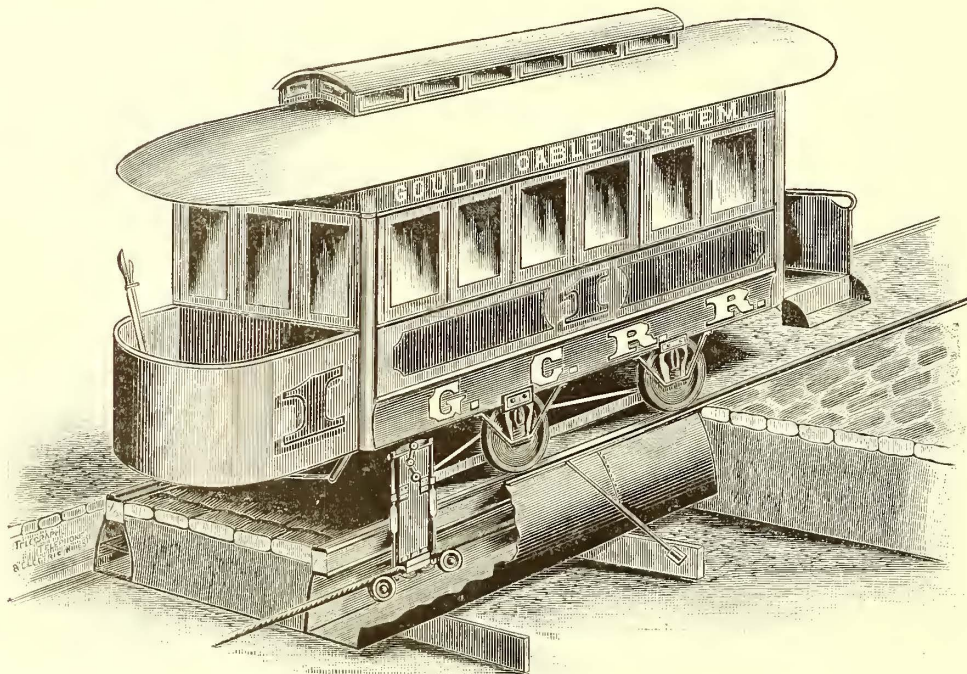
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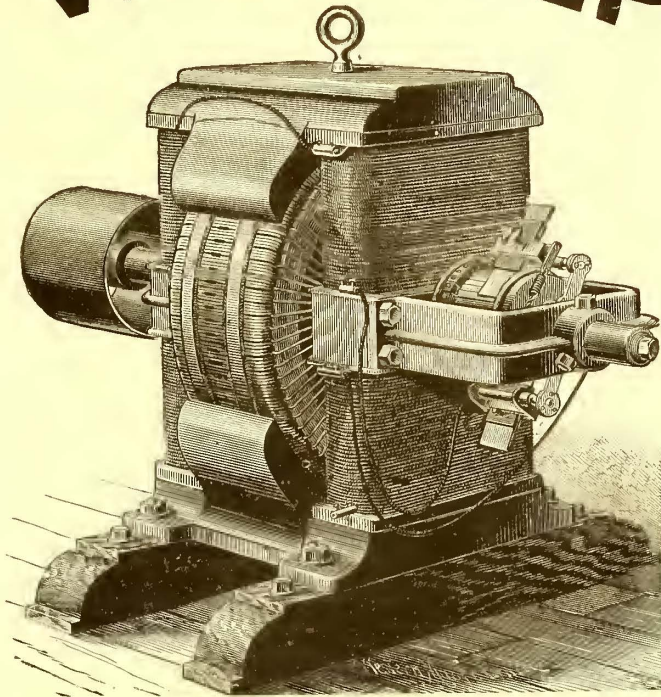
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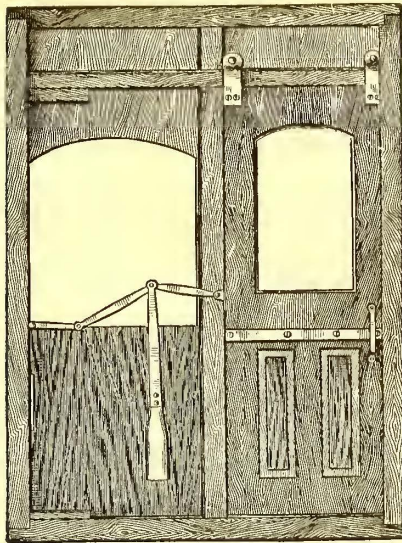
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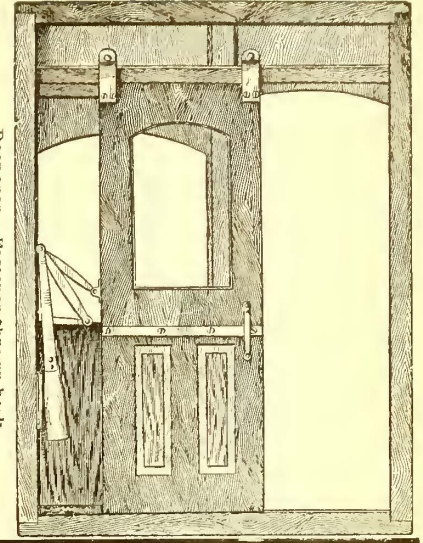
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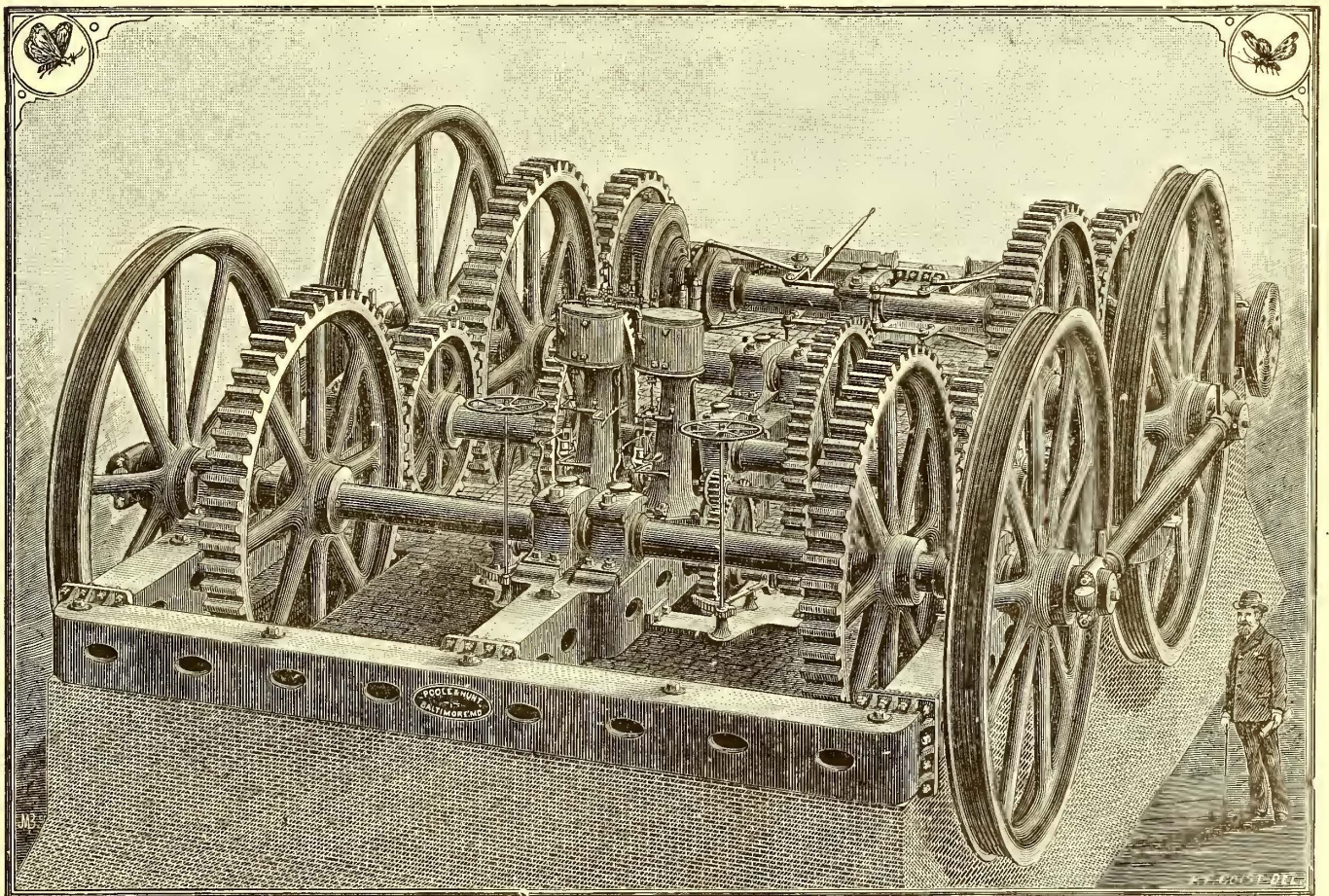
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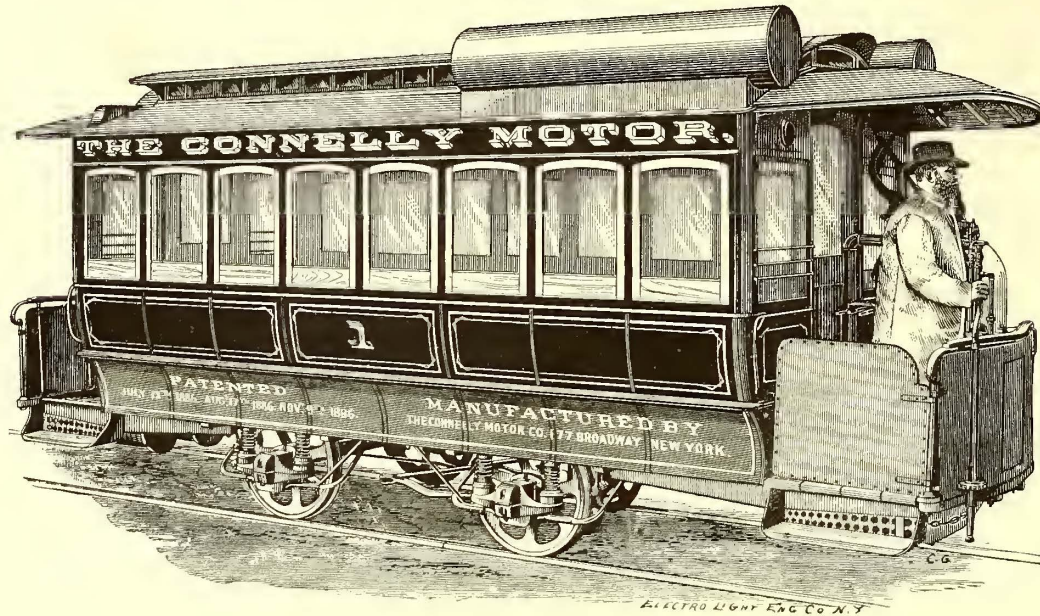


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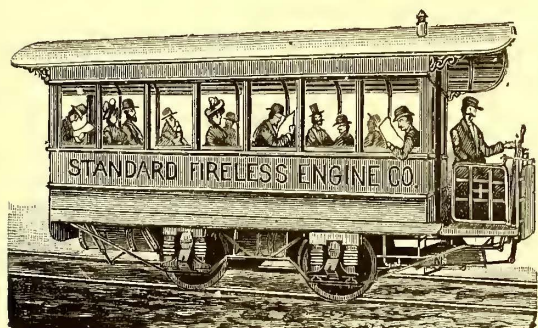
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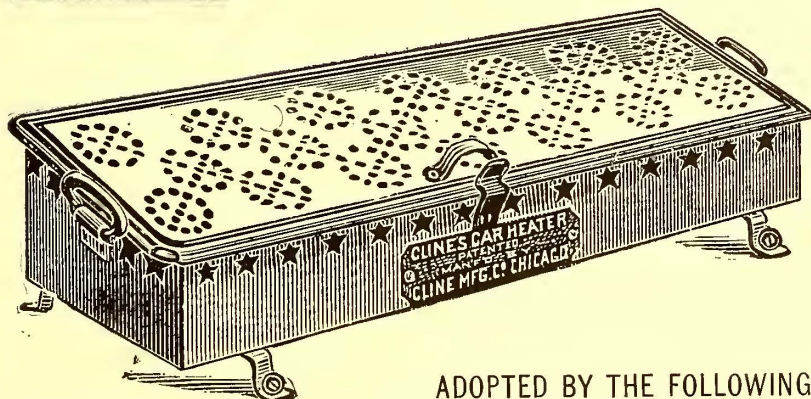
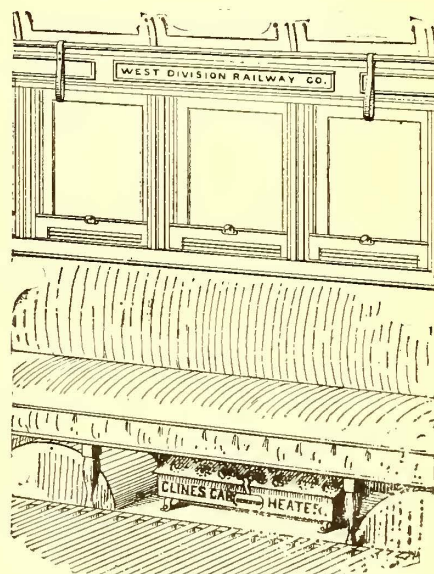
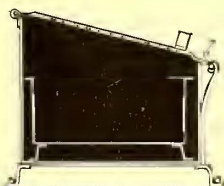
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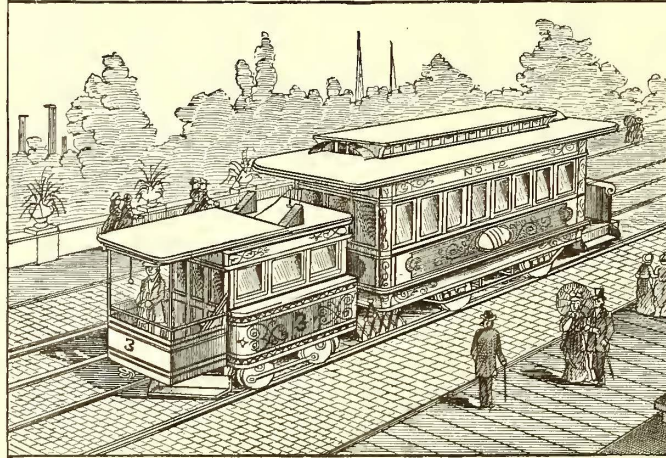
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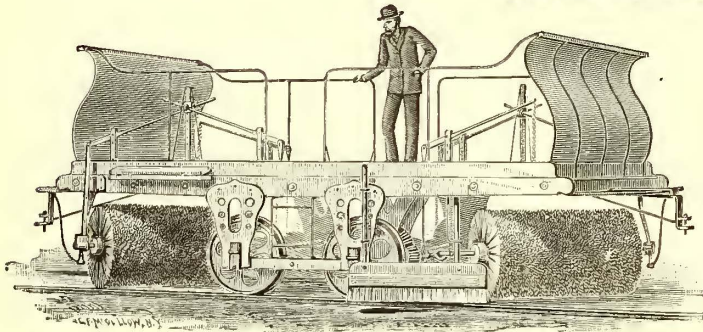
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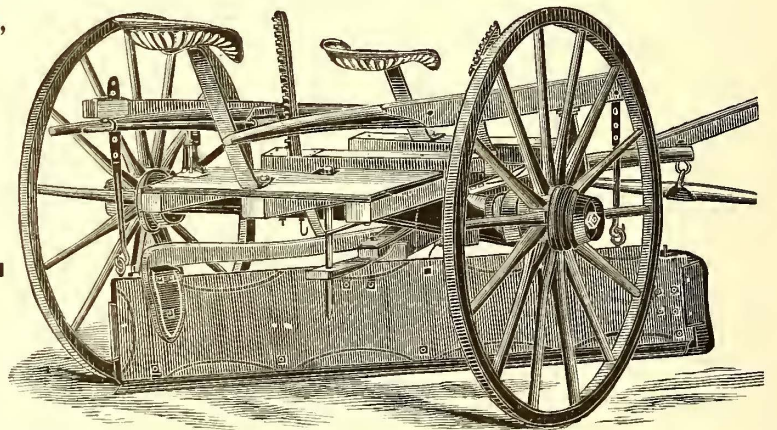
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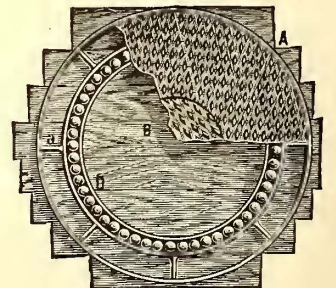
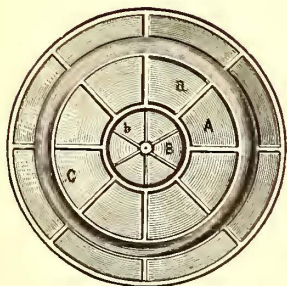
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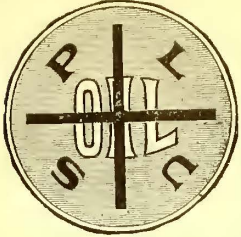
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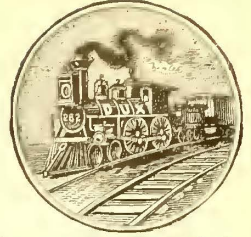
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GENTLEMEN—We have used Dux Lubricant for the past nine months. It has given entire satisfaction; in fact, it is the best I have ever used. Think it fully as good as represented.  
Yours truly,  
J. C. COTTON, Supt.

OFFICE OF CAMDEN HORSE RAILROAD CO., CAMDEN, N. J., Dec. 14, 1886.  
Leib Lubricating Co., 196 and 198 Chicago st., Buffalo.  
We have used your "Dux Lubricant" for about two years and regard it as the best and cheapest lubricant ever used by this company.  
JOHN HOOD, Supt., etc.

OFFICE OF ACUSHNET STREET RAILWAY CO., NEW BEDFORD, MASS., Dec. 11, 1886  
The Leib Lubricating Co., Buffalo, N. Y.:  
DEAR SIR—We have used several packages of your "Dux" and like it very much. We can recommend it to any one using axle grease.  
Yours very truly,  
A. P. SMITH, Treas.

BYRON WESTON, FIRST-CLASS LEDGER AND RECORD PAPER, }  
DALTON, MASS., Oct. 15, 1886. }  
Leib Lubricating Co., Buffalo, N. Y.:  
GENTLEMEN—Yours of the 13th inst. received. In reply; we like your Dux

Lubricating Compound very much, and when this is used up that we have on hand shall order more. I find on heavy bearings where no other oil or grease would cool it yours did the work.  
Yours truly,  
HARRY W. HITT, Supt.

FAULKNER MILLS.—F. J. HASTINGS & Co., MILLERS.  
SO. ACTON, MASS., Dec. 23, 1886.

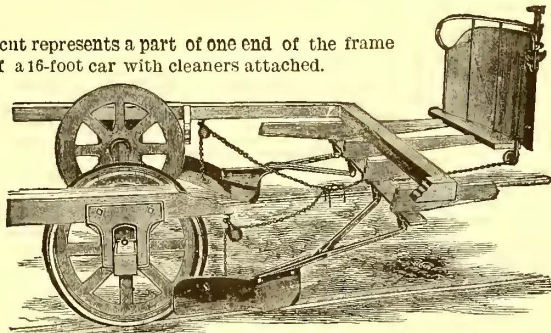
Leib Lubricating Co., Buffalo, N. Y.  
GENTS:—Your favor of the 17th inst. duly received. In reply we would say, that for several years we had much trouble and annoyance to find a lubricant for our heavy bearings that would stand, and tried various articles on the market without being satisfied, until a friend connected with a large manufacturing concern gave us a few pounds of the Dux Lubricant to try. It worked so much better than anything we had ever had that we ordered enough from you to give it further trial, and as a result have used it ever since, and can truly say it is the best lubricant we ever used. It will stand heat, gives off no drip and is economical, and we are very much pleased with it, and do not hesitate to declare that it is our firm belief that there can be nothing ever made to equal it. Our experience on wagons has been equally satisfactory; our first attempt being on a heavy wagon used every day, heavily loaded, ran 21 days when it went into the shop to be painted, and then was in a good condition to run longer. The only thing we regret is that we did not at once try and arrange to sell it in this locality, still one of our townsmen to whom we gave your address, Mr. Littlefield, has since obtained the agency, we learn, and we can obtain it through him.  
Yours truly,  
F. J. HASTINGS & Co.

MANUFACTURED BY

The Leib Lubricating Co., 196 & 198 Chicago St., Buffalo, N.Y.

## DAY'S IMPROVED STREET RAILWAY TRACK CLEANERS.

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



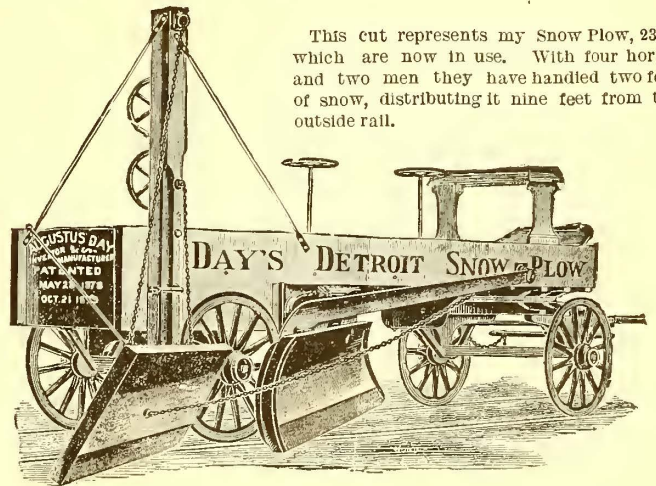
These Track Cleaners need no extended statement of their great superiority over all others invented. The fact of over three thousand pairs being now in use is sufficient evidence of their necessity and utility. Are adaptable to all kinds of rails and styles of cars. Clean Snow, Ice, Mud and Stones from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

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

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

Detroit City Ry., Detroit, Mich.	154	Pair
Chicago City Ry., Chicago, Ill.	400	"
Rochester City & Brighton R. R. Rochester, N. Y.	100	"
Albany Ry., Albany, N. Y.	75	"
Lynn & Boston R. R., Boston, Mass.	68	"
Boston Highland Ry., Boston, Mass.	46	"
Grand Rapids Street Ry.	48	"
Naumkeag Street Ry., Salem, Mass.	49	"
Bridgport Horse Ry., Bridgport, Conn.	40	"
Cream City Ry., Milwaukee, Wis.	40	"
Milwaukee City Ry., Milwaukee, Wis.	50	"
Buffalo Street Ry., Buffalo, N. Y.	32	"

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



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

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

For Further Information and Price, Address:

AUGUSTUS DAY, 76 State Street, cor. Park Place,

Detroit, Michigan, U. S. A.

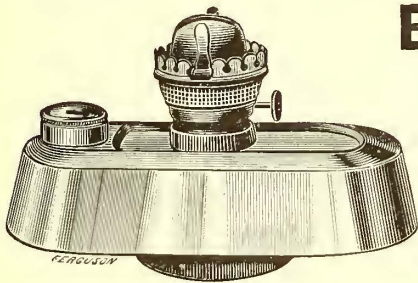


**EDWARD C. WHITE,**  
**Brass & Bronze Works,**  
 531 West 33rd St., New York.  
 Superior Quality Journal Bearings; Car, Locomotive and Machine Castings. Railway Hardware & Supplies.

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.

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



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

**GEORGE M. CLUTE,** Sole Manufacturer;  
 Also Dealer in Car Reflectors, Chimneys, Burners, Etc.  
**WEST TROY, N. Y.**

**The Wiser & Vail Car Starter.**

**A PRACTICAL DEVICE.**

1. Overcomes one-half the draft.
2. When car is going and horses attempt to go faster the starter throws in gear and assists.
3. There is no dead strain on horses at any time.
4. If driver puts on his brake before holding horses back, the spring makes it easy on horses' shoulders.
5. Starter is automatic. Requires no attention more than oiling at time of oiling car.
6. Beneficial for Cable Roads as well as horse power.

FOR SALE Outright, or Upon Royalty, or Will Equip Roads.

**WISER & VAIL,**

277 PEARL STREET, CLEVELAND, OHIO.

**THE CAR TRACK FRICTION APPLIANCE CO.,**  
 MANUFACTURERS OF

**THE PAT. RELIABLE SAND BOXES**

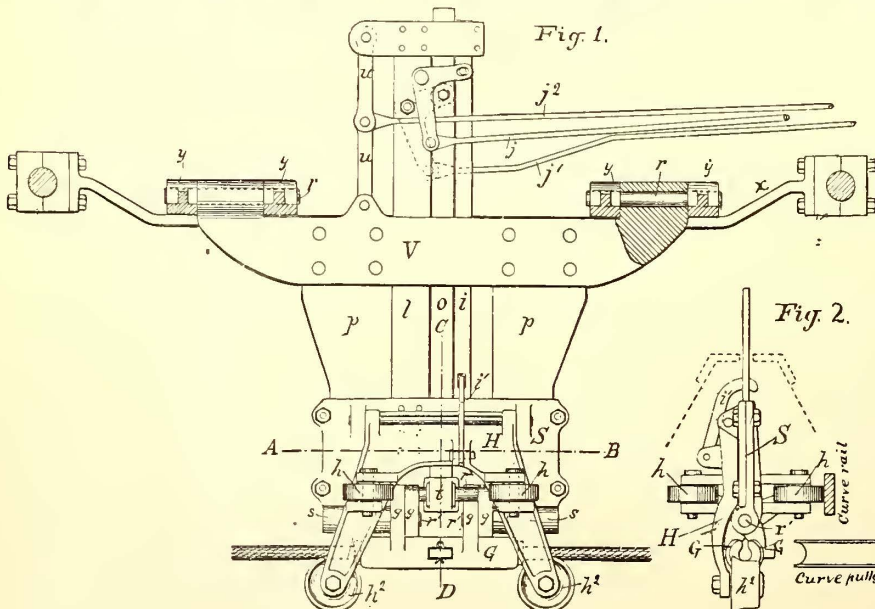
FOR STREET RAILROADS, HORSE, ELECTRIC, CABLE OR STEAM MOTORS.

W. T. BUTLER, General Manager.

No. 19 Tremont Row, Boston.

These boxes are guaranteed to distribute upon the rail SAND, SALT or GRAVEL, WET or DRY.

**ANDERS' CABLE RAILWAY GRIP.**



**Simple, Durable, Efficient.**

Cable may be dropped and picked up without leaving the platform. The whole under the constant control of the gripman.

Most efficient device in existence for releasing and gripping cable in crossing other roads.

Can be worked from either end of the car.

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

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

**D. B. ANDERS,**

2313 RIDGE AVE., PHILADELPHIA, PA.

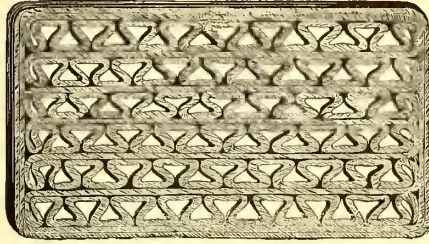


# LYNN & PETTIT,

MANUFACTURERS OF

## Machine Braided Cocoa Car Mats.

707 Market Street, Philadelphia.



A Sample Order Solicited.

# Ayers' Anti Rattler,

FOR RAILROAD CAR WINDOWS.



The Best and Cheapest ANTI-RATTLER IN THE MARKET. ALSO,

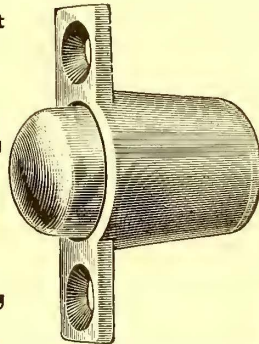
## Ayers' Pat. Sash Holder,

FOR HOLDING CAR WINDOWS AT ANY HEIGHT.

Manufactured by the

## AYERS' PAT. SASH HOLDER CO.,

Room 242, Broadway & Chambers St. STEWART BUILDING, NEW YORK.



Send for Circulars.

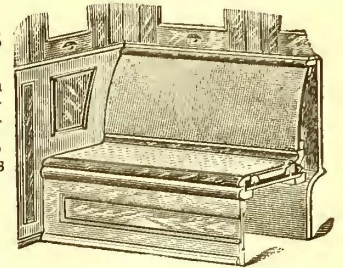
# THE HALE & KILBURN MANFG. CO.,

Extensive makers of Patented

## Street Car Seats

of every description.

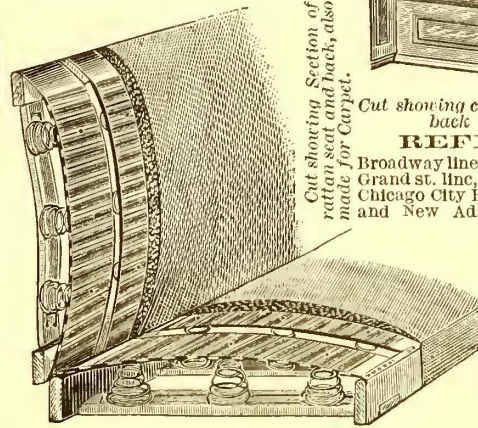
Our Patent Spring Seats covered with Rattan or Carpet are fast being adopted by the best railroads in the country. Seats for Steam Cars a Specialty. Owners and makers of all the Cobb patents



Cut showing car with rattan seat and back without springs.

### REFERENCES:

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



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

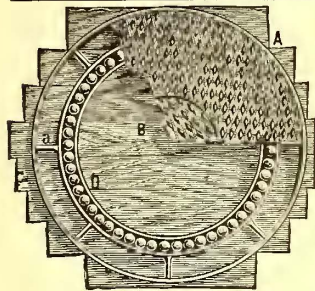
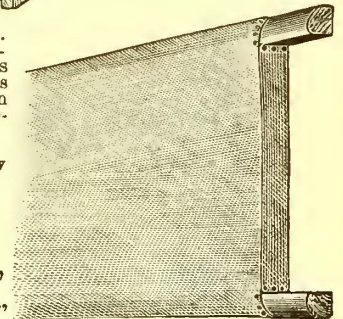
Many R. R. Co's use our Rattan Pat. Canvas Lined Seats for Summer and cover the same with carpet for Winter. This method of seating we recommend as durable and economical, for the reason both a Summer and Winter seat is obtained in one.

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

A TRIAL SOLICITED.

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

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

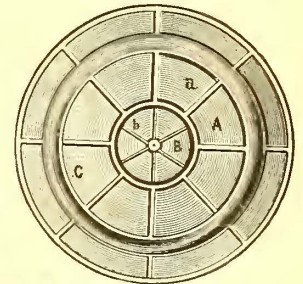


S. M. CARPENTER, Prop.

C. J. LANGDON, Secy.

# FULTON FOUNDRY,

MANUFACTURERS OF



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

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

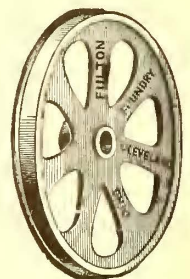
Chilled curve rail, Turnouts, Switches, etc., etc. Blue prints and Bills Furnished on Application. Send for Illustrated Catalogue. Address,



# FULTON FOUNDRY,

202 MERWIN ST.

CLEVELAND, OHIO.





# "PAY HERE."

## Fare Boxes and Change Receptacles

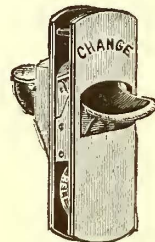
### FOR STREET CARS.

### OUR NEW FARE BOX NO. 3

Is pronounced by the many Street Car Companies using it to be the best.

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

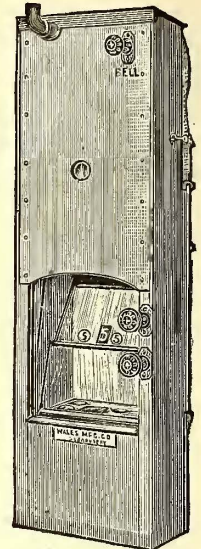
Simplicity of Construction,  
Quickness and Convenience of  
Cleaning, Security of Money  
Drawer, Beauty of Finish and  
Much Cheaper in Price.



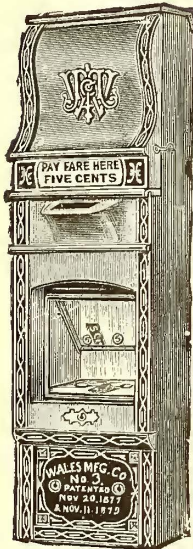
CHANGE RECEPTACLE.

Descriptive and Illustrated  
Circular on application.

Examine the merits of this  
box and get our prices before  
buying.



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



Box No. 3.  
Front of Passengers'  
View.

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

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

### TESTIMONIALS.

Below we give a few of the many good words that are said in favor of the "Wales Fare Box," which is now being largely used by the many Street Railway Companies in this and foreign countries.

OFFICE OF CAPITAL CITY RAILWAY CO., }  
MONTGOMERY, ALA., JULY 14, 1887. }

WALES MFG. CO., SYRACUSE, N. Y., }  
GENTLEMEN:—I can state with great impartiality that I am using altogether over thirty-two of your Fare Boxes, both at Columbus, Ga., and Montgomery, Ala., with great satisfaction. I have used **all other makes, and none equal to your Improved Fare Box.**

Respectfully yours, J. A. GABOURY, Supt.  
OFFICE OF SEAGRAVE BROS., }  
TOLEDO, O., FEB. 10, 1886. }

WALES MFG. CO., }  
GENTLEMEN:—We have your Fare Box on 17 of our cars. It gives good satisfaction. The special features that recommend it is the ease by which fares are distinguished, owing to the mirrors arranged above and below, and your change light. The box is neat and strong **and we prefer it to any other.**

Very respectfully, F. E. SEAGRAVE, Pres. Central Pass. Ry. Co.  
SEATTLE STREET RAILWAY COMPANY, }  
SEATTLE, WASHINGTON TERRITORY, MAY 25, 1886. }

WALES MFG. CO., }  
GENTLEMEN:—Please find enclosed check for \$45.00 to balance account. We are very much pleased with your box, **and we consider it by far the best of any we have tried, in fact the only satisfactory one.** Please ship us two more by express, as soon as possible.

Very truly, THE SEATTLE STREET RAILWAY CO.  
OFFICE, DAYTON STREET RAILROAD, }  
DAYTON, O., MAY 4, 1886. }

WALES MFG. CO., }  
GENTLEMEN:—Your sample box came to hand in due time, was put into a car, examined and admired. Please ship us seven more at your earliest convenience.

Respectfully, A. W. ANDERSON, Supt.  
TOPEKA CITY RAILWAY CO., }  
TOPEKA, KANSAS, }  
JESSE SHAW, Supt., JUNE 5, 1886. }

WALES MFG. CO., }  
GENTLEMEN:—The Fare Box sent me some time ago has given entire satisfaction. Please send me one more as I want two in the car. I have ordered two of the Fare Boxes placed in each of the cars that we are now having built, and as our Company get ready to replace the old Fare Boxes with new ones, shall probably want your box.

Yours respectfully, JESSE SHAW.  
Since the above date, the Topeka Company has placed its order for 25 of our boxes to take the place of their old ones.

**An examination of the merits of our Fare Box, will, we think, convince anyone of its superiority over other boxes. Write for our descriptive circular before placing your order.**

**WALES MANUFACT'G CO., SYRACUSE, N. Y.**

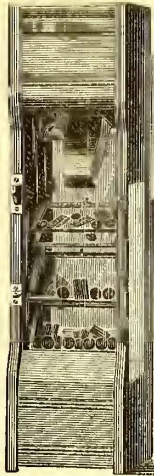
We give names of some of the Companies to whom we furnished our Box in 1886.

We hope to be favored with your order.

**WALES MANUFACT'G CO., SYRACUSE, N. Y.**

- Hestonville, Mantua and Fairmount Pass. Ry. Co., Philadelphia, Pa.
- Lombard and South Sts. Pass. Ry. Co., Philadelphia, Pa.
- Erie City Pass. Ry. Co., Erie City, Pa.
- City Pass. Ry. Co., Harrisburg, Pa.
- Pittsburg, Allegheny and Manchester Ry. Co., Pittsburg, Pa.
- Ogdensburg St. Ry. Co., Ogdensburg, N. Y.
- Harlem Bridge, Morrisania and Fordham Ry. Co., New York City.
- Fulton and Oswego Falls St. Ry. Co., Fulton, N. Y.
- Oswego St. Ry. Co., Oswego, N. Y.
- Newburgh St. Ry. Co., Newburgh, N. Y.
- Utica Belt Line St. Ry. Co., Utica, N. Y.
- Metropolitan R. R., Washington, D. C.
- Danbury St. Ry. Co., Danbury, Conn.
- Stamford St. Ry. Co., Stamford, Conn.
- Bridgeport Horse R. R. Co., Bridgeport, Conn.
- Pueblo St. Ry. Co., Pueblo, Col.
- Denver Tramway (Electric) Co., Denver, Col.
- Des Moines Broad Gauge St. Ry. Co., Des Moines, Ia.
- Haverhill and Groveland St. Ry. Co., Haverhill, Mass.
- Fitchburg St. Ry. Co., Fitchburg, Mass.
- Garden City St. Ry. Co., Garden City, Kan.
- Wichita City Ry. Co., Wichita, Kan.
- Topeka City St. Ry. Co., Topeka, Kan.
- Pawtucket St. Ry. Co., Pawtucket, R. I.
- Dayton St. R. R. Co., Dayton, O.
- Toledo Consolidated St. Ry. Co., Toledo, O.
- Metropolitan St. Ry. Co., Toledo, O.
- Central Pass. Ry. Co., Toledo, O.
- Union City Ry. Co., St. Louis, Mo.
- Citizens' St. Ry. Co., Decatur, Ill.
- Capital City Electric St. Ry. Co., Montgomery, Ala.
- Appleton Electric St. Ry. Co., Appleton, Wis.
- Gate City St. R. R. Co., Atlanta, Ga.
- Seattle St. Ry. Co., Seattle, Wash. Ter.
- Citizens' Ry. Co., Elkhart, Ind.
- Eau Claire St. Ry. Co., Eau Claire, Wis.
- East Saginaw St. Ry. Co., East Saginaw, Mich.





# THE BEAMAN FARE BOX.

MANUFACTURED UNDER TWO PATENTS OF FEB. 15th, 1887.

## Absolutely Secure, Whether Fastened to the Car, or Not.

No Fares can Possibly be Turned Out or Abstracted by any Known Means.

EVERY CONVENIENCE PROVIDED FOR THE INSPECTION OF FARES.  
Easily Cleaned, Simple and Durable in Construction.

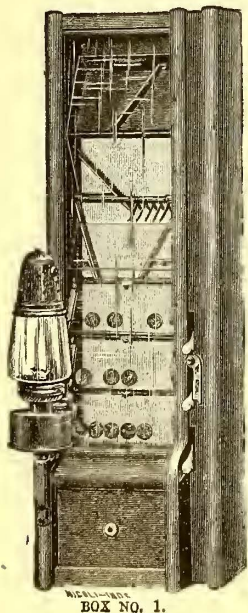
The Smallest Detail has been Carefully Designed.

Its many New and Important Features, it is Conceded, place It Beyond Competitors.

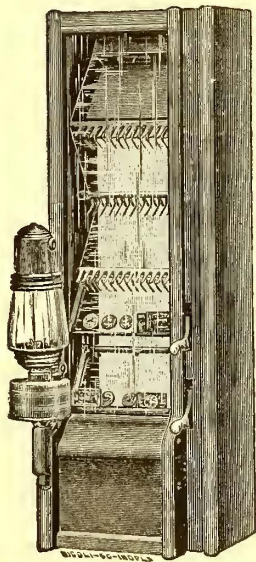
For Full Particulars, Address,

**T. Q. BEAMAN, Knoxville, Tenn.**

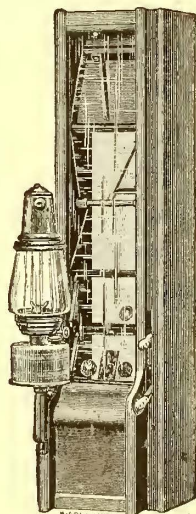
# TOM L. JOHNSON'S IMPROVED FARE BOX.



BOX NO. 1.



BOX NO. 2.



CHARIOT PATTERN.

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

FARES CANNOT BE EXTRACTED OR BOXES  
ROBBED WITHOUT VIOLENCE.

SPECIAL SIZES BUILT TO ORDER.

ROADS EQUIPPED WITH BOXES ON TRIAL,  
AND IF NOT SATISFACTORY, RETURNED WITHOUT  
ANY EXPENSE TO THE COMPANY TRYING THEM.

Patented Oct. 14, 1873.

## REDUCED PRICES.

Write for Descriptive Circular and Price List. Address all correspondence to  
A. A. ANDERSON, INDIANAPOLIS, IND.

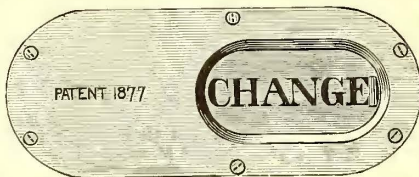


# SLAWSON'S PATENT FARE BOXES

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

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

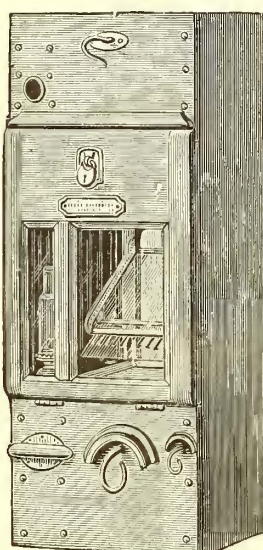
These Boxes, etc., are now in use not only in the United States and Canada, but in Mexico, South America, Europe, Asia, Africa and Australia—in fact, nearly all places where street cars are used.



Change Slide. Outside View.



C. Front View.



C. Back View.

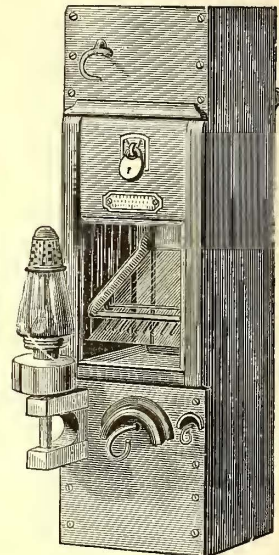


Change Gate. Outside View.

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



D Front View.



D Rear View.

MILTON I. MASSON, Agent, 365 AVENUE A, NEW YORK.

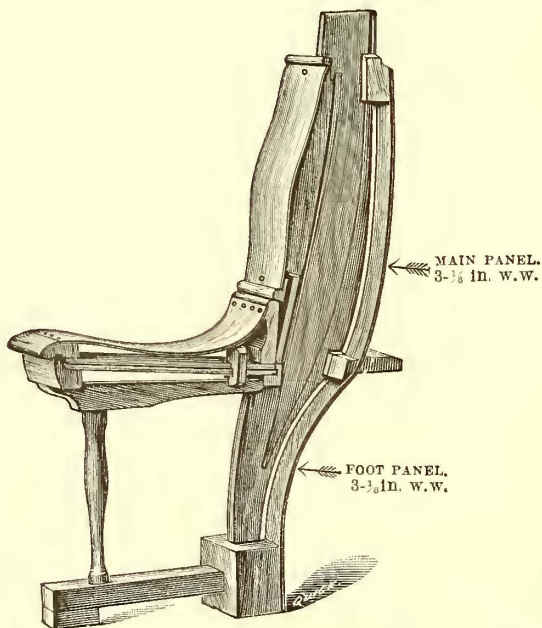
# STREET CAR SEATS & BACKS.

## THREE-PLY CAR SIDES.

Having given our three ply white wood car sides a thorough trial for a number of years in our city street and railway lines, which test has left them as firm and good as the day they were put in, we unhesitatingly place these sides in the market as a superior article. They are composed of three white wood (or poplar) veneers, each 1/8 inch thick, the grain of the center layer running at right angles with the two outside layers. Hence they derive all the special and well-known advantages of glued up wood over single ply, namely:

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

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



# GARDNER & CO.

Manufacturers of Car Seats and Ceilings and Depot Seating,

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

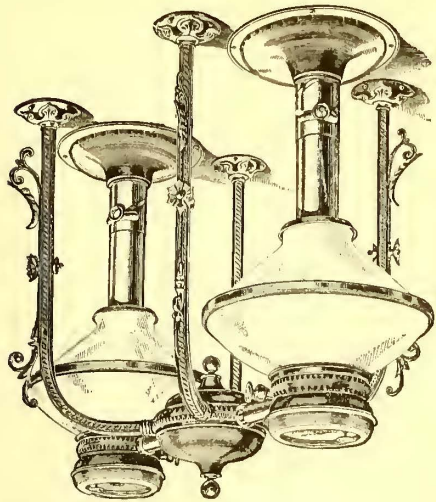
Sample and Salesroom: 206 Canal St., cor. Mulberry.

Send for Catalogue.

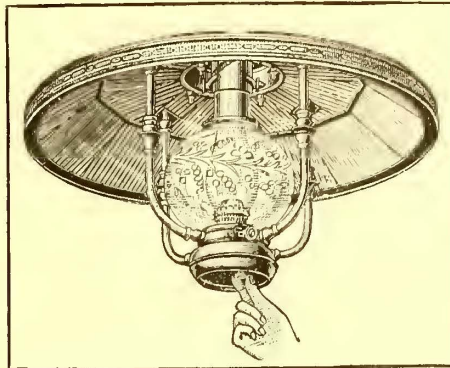
Address all Communications to Office.



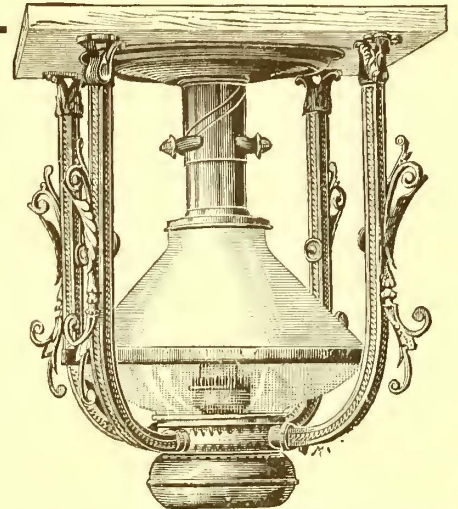
# JOSEPHINE D. SMITH, Successor to the late WILLARD H. SMITH, 350 & 352 Pearl Street, New York.



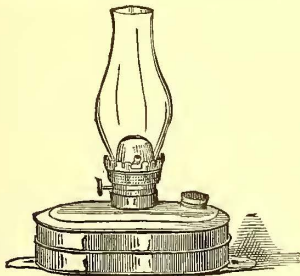
No. 10.--Two-light Car Lamp as used on Tenth Avenue (N.Y.) Cable road.



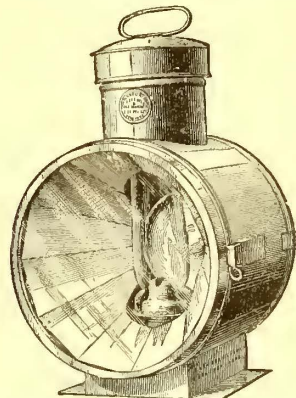
No. 14.—Center Car Lamp.



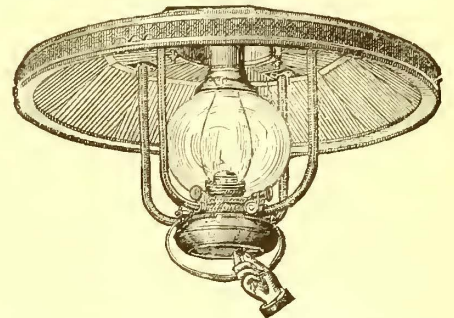
No. 8.—Center Car Lamp as used on Tenth Avenue (N. Y.) Cable road.



No. 3.—Box Lamp with drip cup.



Small Head Light for Grip Cars and Stages.



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

All kinds of trimmings pertaining to car lamps.

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

## STREET CAR SEATS & BACKS.



**THREE-PLY CAR SIDES.**

These seats and backs have been in use a number of years and have given universal satisfaction. They have received such a thorough test and are so well known that they show their good qualities and we need say nothing for them. Our facilities for doing this work are the largest in the world. We own the forest from which our lumber is cut. We cut our own veneer and do our own work in all its departments. We keep laid up in stock seats and backs and can fill all orders promptly. Our 3-ply white wood car sides, ends and roof add fully 75 per cent to the strength of cars. We can also furnish car ceilings made of any kind of wood desired, plain or decorated. Send for Railroad Catalogue.

### Frost & Peterson, 161 & 163 West 18th St., N. Y.

W. P. SEGUINE, Manager Railroad Department.



# Wilson Brake Shaft.

ENTIRELY NEW & NOVEL IN CONSTRUCTION.

POSITIVE AND SURE IN ACTION.

BRAKES SET WITHOUT COMPLETELY TURNING THE HANDLE.

MADE ON THE PRINCIPLE OF A FRICTION CLUTCH.

SIMPLE IN DESIGN.

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

Mordecai M. Wilson, Agent,  
TROY, N. Y.

# Magnolia Anti-Friction Metal.

## TESTIMONIAL.

OFFICE OF HOTCHKISS & UPSON CO.  
BOLT MANUFACTURERS,  
Cleveland, O., February 9th, 1887.

MR. CHAS. B. MILLER 2½ Coenties Slip, New York,  
DEAR SIR:—Enclosed please find check, twelve dollars and fifty cents, for sample of your Magnolia Metal.

Have thoroughly tested your metal and am fully satisfied.

Used the Metal in our large stock transfer elevator pulley bearings, where **rapidity** of motion combined with the **pressure** made a **FINE** test.

In one of the bearings was your **Magnolia Metal**, in the other Babbitt's Best 45 cent metal was used. Upon examining the two, found the **Magnolia Metal** had an unworn surface as smooth and bright as polished steel, while Babbitt's was rough and worn.

In my opinion the **Magnolia Metal** is the **BEST** Anti-Friction Metal yet discovered; experimented ten months with a view of making a similar Anti-Friction Metal, without success; therefore **KNOW** the value of the **Magnolia Metal**.

Yours truly,

F. A. SMITH,  
Superintendent and Foreman of  
The Hotchkiss & Upson Co.

DEAR SIR:—Mr. F. A. Smith's statements are reliable; he is a thorough machinist and mechanic.

THE HOTCHKISS & UPSON CO.  
C. A. HOTCHKISS, Pres't.

New York Depository, E. S. GREELEY & CO.,

F. JORDAN, 200 Broadway, State Agent, outside city.

CHARLES B. MILLER, Manufacturer,  
No. 2 1-2 Coenties Slip, New York.

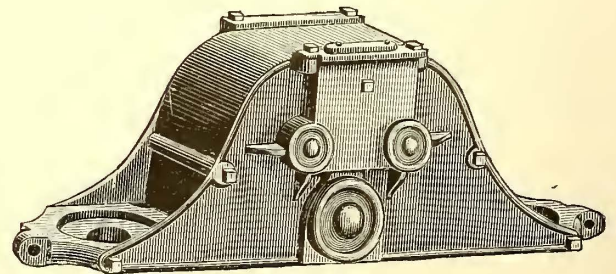
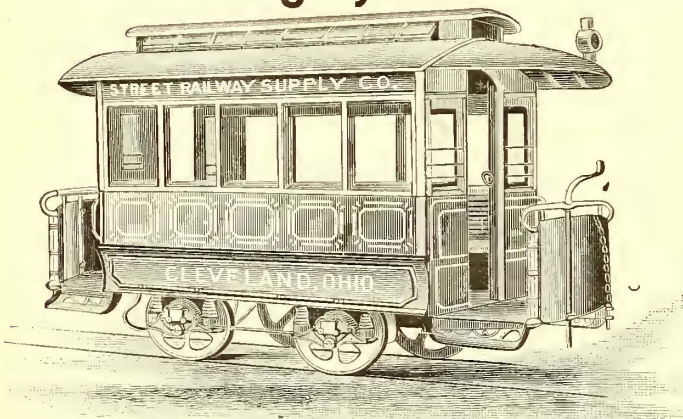
WE HAVE REBUILT OUR WORKS AND ARE READY FOR BUSINESS.

# Street Railway Supply Company,

SUCCESSORS TO

The Higley Car Journal Company, Cleveland, O.,

MANUFACTURERS OF THE



Higley Journal Box.

MANUFACTURERS OF AND DEALERS IN

# Street Railway Supplies Generally.

Wheels, Axles, Springs, Rails, Track Supplies.



# RICHARD VOSE,

13 Barclay Street, . New York,

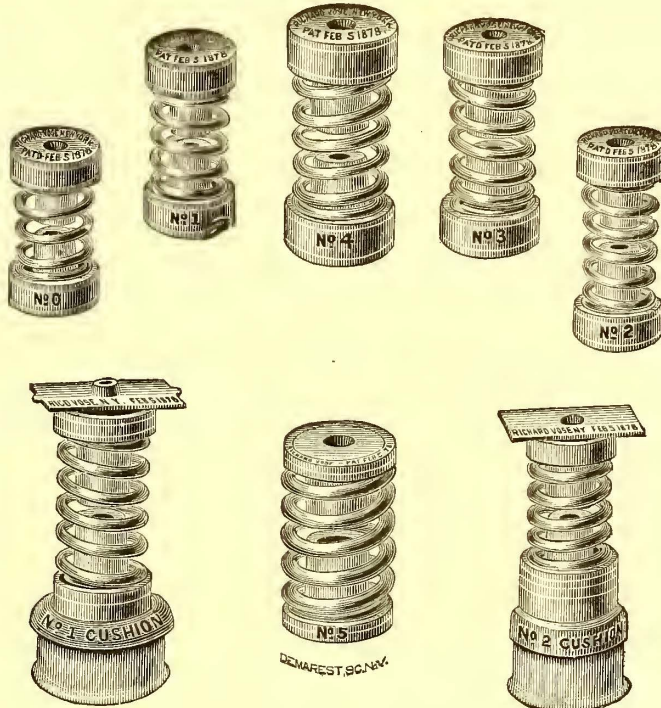
PATENTEE AND MANUFACTURER OF

## Graduated Street Car Springs.

### RUBBER CONE.

Patented, April 15th, 1879.

ADAPTED TO THE  
**STEPHENSON,**  
**BEMIS,**  
**RANDALL,**  
**HIGLEY,**  
**BRILL,**  
**JONES,**  
**BALTIMORE,**  
**VOLK,**  
**CHAPLIN,**  
**LACLEDE**  
 And all other Boxes.



No. 0, for 10-ft. Light Cars.  
 No. 1, for 10-ft. Cars.  
 No. 2, for 12-ft. Cars.  
 No. 3, for 14-ft. Cars.  
 No. 4, for 16-ft. Cars.  
 No. 5, for 16-ft. Cars.  
 (Single Pedestal.)  
 No. 1, Cushion, for 16-ft. Cars.  
 No. 2, Cushion, for 12 and 14-ft. Cars.

## TESTIMONIAL.

MIDDLESEX RAILROAD CO., BOSTON, MASS.

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

CHAS. E. POWERS, Prest.

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

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

V. C. TURNER, Prest.

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

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

J. W. FOSHAY, Prest.

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

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

A. N. DICKIE, Supt.

CHICAGO CITY RY. CO., CHICAGO, ILL.

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

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

C. B. HOLMES, Supt.

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

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

W. A. BANCROFT, Supt.

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

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

J. M. DONERTY, Supt.

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

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

E. C. FOSTER, Supt.

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

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

H. J. C. BERG, Supt.

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

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

J. A. CHASE, Treas.

DAYTON STREET R.R., DAYTON, O.

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

A. W. ANDERSON, Supt.

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

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

N. W. GOODWIN, Secy.

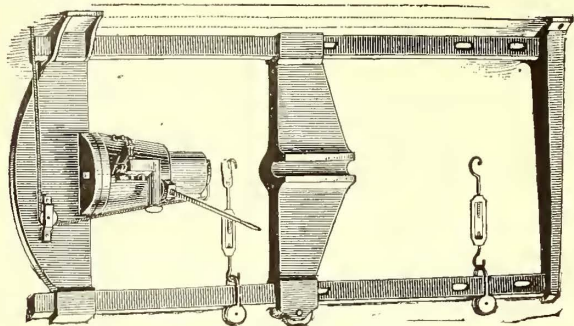
DETROIT CITY RY., DETROIT, MICH.

RICHARD VOSE, Esq. Dear Sir,—I have your favor of the 20th ultimo. We have about 70 cars equipped with your springs. Our experience is that they wear well and give general satisfaction. Yours truly,

GEO. HENDRIE, Treas



HAND POWER, LEVER AND HYDRAULIC PRESSES



See page 197, July, 1885.

Screw and Hydraulic Jacks.  
Watson & Stillman.  
204 to 210 East 43d Street, N. Y.

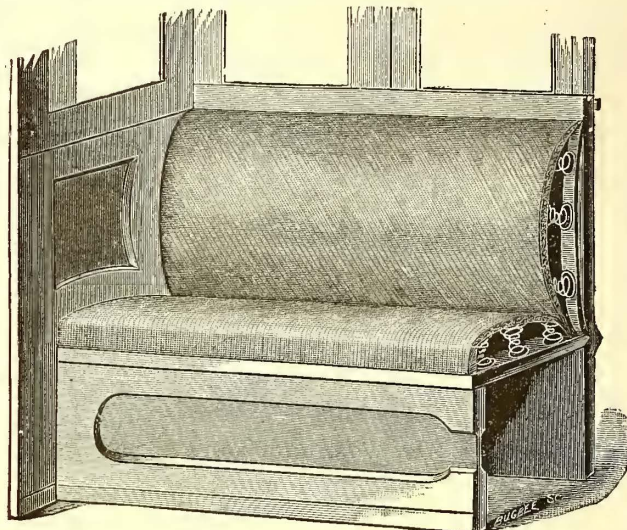
ESTABLISHED 1847.

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.

ROBERTS' PATENT WOVEN-WIRE  
Car Seats and Backs.

Especially adapted to Street Car use.  
Cleanly, Durable, Economical, Cool, Comfortable.  
Cannot be Cut, Injured or Defaced.  
Being entirely of Metal will last indefinitely.  
Can be covered in Rattan, Carpet, Leather or other material, with less labor in covering and less expense in material than any seat in the market.



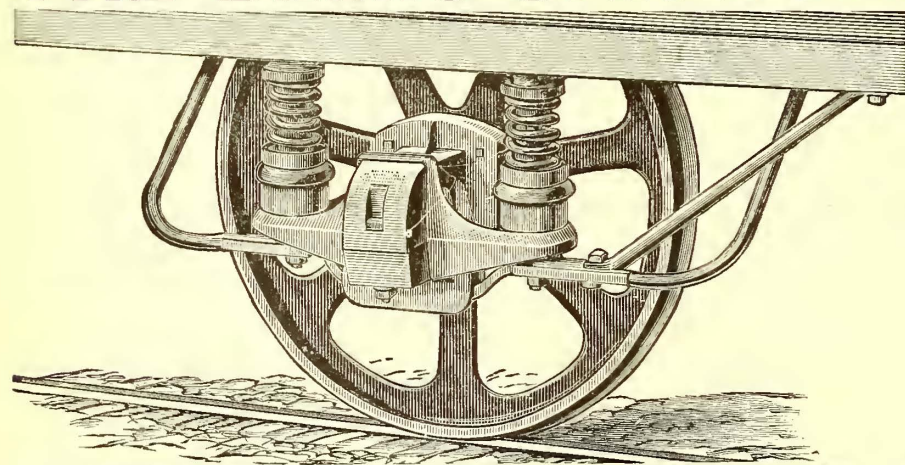
Send for Catalogue with illustrations. Prices and estimates cheerfully given on application to

THE HARTFORD WOVEN-WIRE MATTRESS CO.,  
P. O. BOX 363, HARTFORD, CONN.

THE BEMIS CAR BOX COMPANY,

MANUFACTURERS OF

The Bemis Patent  
Journal Box.



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

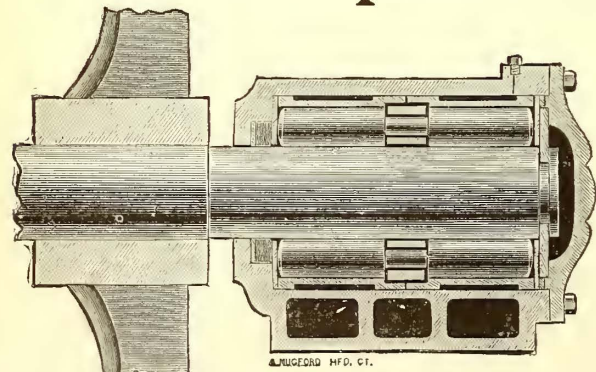
227 Main St., Springfield, Mass.  
Opp. Depot,

The Chaplin Roller Bearing Tramway

CAR BOX AND GEAR.

LIGHT DRAFT EASY RIDING DURABLE  
POSITIVELY DUST PROOF AND OIL TIGHT

Boxes Hold Sufficient Oil for One Year. No Waste Used for Packing nor Babbiting for Boxes.  
Overcomes Friction in Taking a Curve.



AMUCEDRD MFD. CT.

SUPERINTENDENT'S OFFICE, HIGHLAND STREET RAILWAY,  
No. 827 SHAWMUT AVE., BOSTON, August 19, 1886.  
CHAPLIN MFG CO., MESSRS.:—In reply to your note I will say we have had a set of your Gear under car, "Gov. Rice," for the past four years and it has proved very acceptable, so much so that we have decided to put on 50 sets of your improved pattern. The wear on the journal is imperceptible, and it is beyond question the easiest running gear in the market.  
Respectfully, J. E. RUGG, Sup't.

SEND FOR CATALOGUE.

THE CHAPLIN MFG. CO., 69 Wall Street, New York.



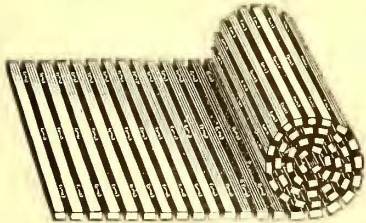
2 LIBERTY SQUARE

# JOHN BABCOCK & CO

BOSTON MASS

MANUFACTURERS OF

## RAILWAY CAR VARNISHES



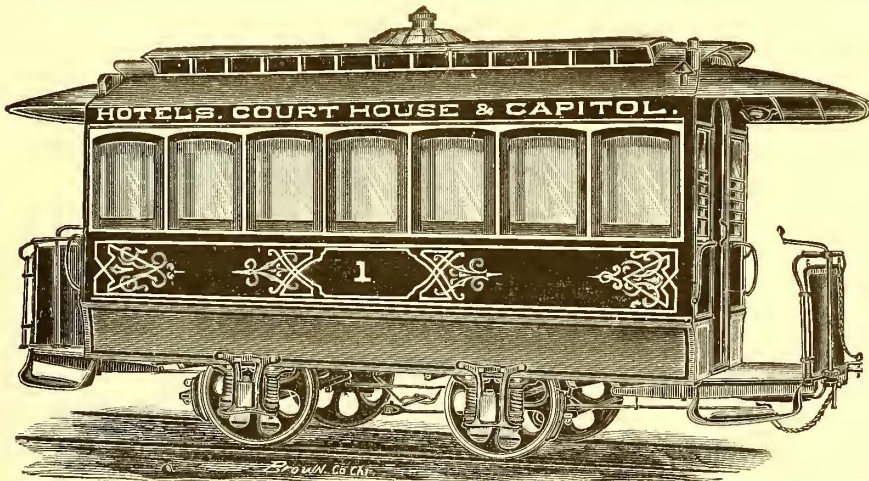
WARNECK & TOFFLER,  
211 East 22d St., New York,  
Sole Manufacturers and Patentees  
of the only  
**"ROLLING WOOD MAT"**  
in the market. This matting, either  
in round, square or flat slats, is the  
most convenient one for horse cars, as  
it is a self cleaner and can easily be  
repaired.  
Price, a running foot, 3 feet wide,  
only 70c. Orders respectfully solicited.



### Parrott Varnish Co.,

### FINE COACH AND CAR VARNISHES.

Bridgeport, Conn., U.S.A.



### ROBINSON & HITT,

WATERLOO, IOWA,

Manufacturers of all kinds of

## Street Cars.

BEST OF FACILITIES. COMPLETE MACHINERY RUN BY WATER POWER.

Also builders of all kinds of

## OMNIBUSES.

# Baldwin Locomotive Works,

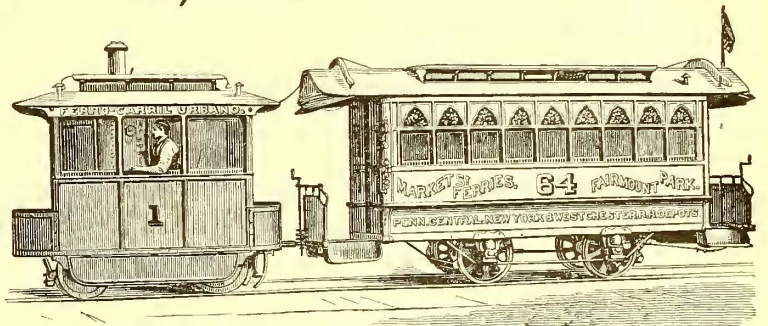
PHILADELPHIA, PA.

Burnham, Parry, Williams & Co.,  
PROPRIETORS.

Locomotives for every variety of service.

Noiseless Motors and Steam Cars for City and Suburban Railways.

Catalogue Furnished upon Application.



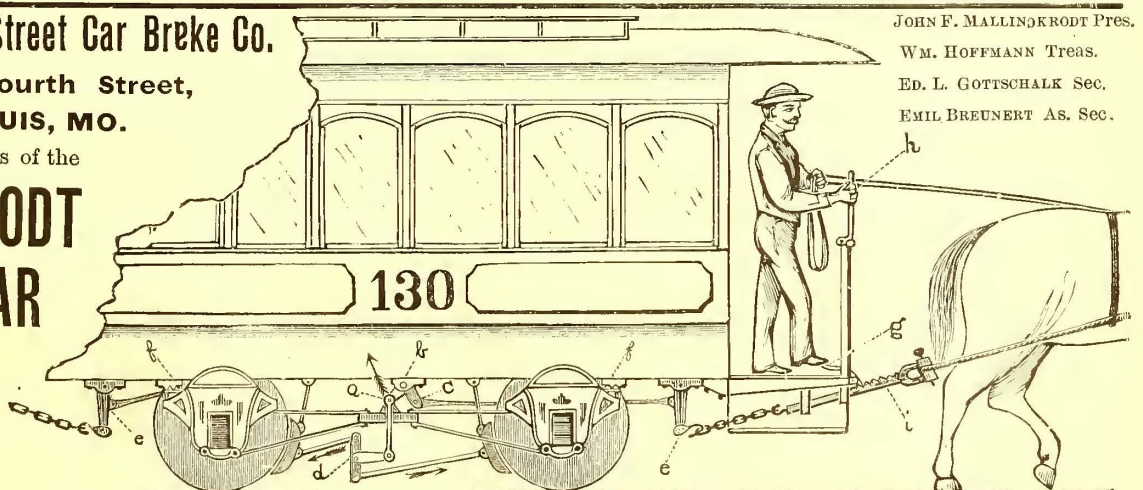
### The Mallinckrodt Street Car Breke Co.

8 South Fourth Street,  
ST. LOUIS, MO.

Manufacturers of the

## MALLINCKRODT STREET CAR BRAKE.

See description on pages 428 and 429 of September number.



JOHN F. MALLINCKRODT Pres.  
WM. HOFFMANN Treas.  
ED. L. GOTTSCHALK Sec.  
EMIL BREUNERT As. Sec.



Established 1856.

Incorporated 1883.

# The Feigel Car Co.,

BUILDERS OF

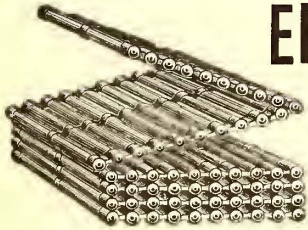
## Cars for Street Railways.

FACTORY

OFFICE

New Utrecht, N.Y.

No. 108 Wall Street, N.Y



## EDWARD BEADLE,

Sole Manufacturer

OF THE

## Eureka Folding Mat.

The Most Durable, Easiest Cleaned and Repaired Wood Mat ever made.

I would respectfully call the attention of Managers of Street Railways to my latest improved Reversible Folding Mat, made to fit any size car. Sample order solicited.

1193 Broadway, New York.

FACTORY—CRANFORD, N. J.

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.

# J. M. JONES' SONS,

AGENTS,

## Street Railway Car Builders,

West Troy, New York.



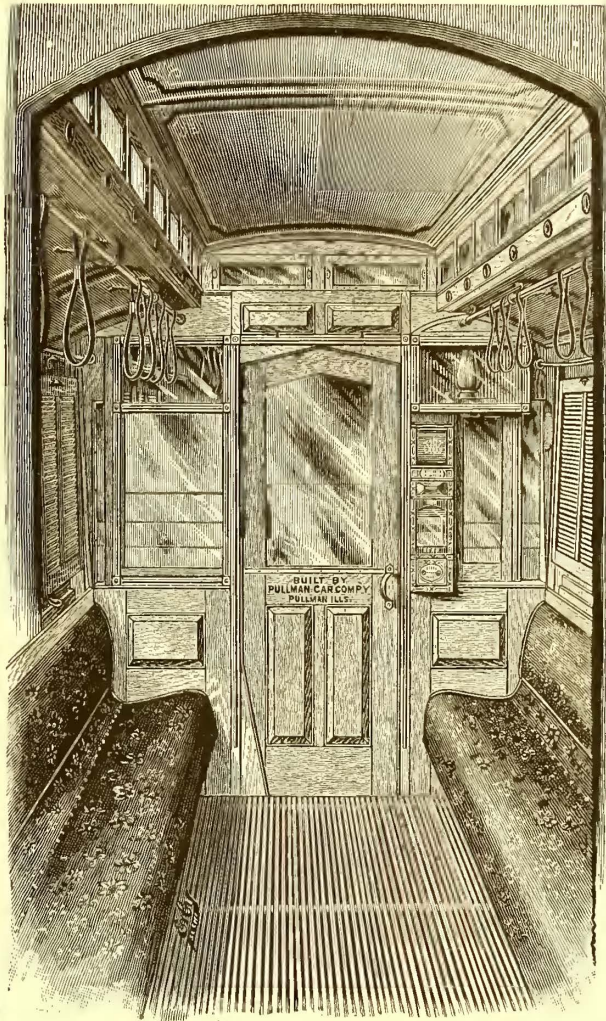
# Pullman's Palace Car Co.,

Manufacturers  
of

RAIL-  
ROAD

CARS.

Pullman, Illinois.

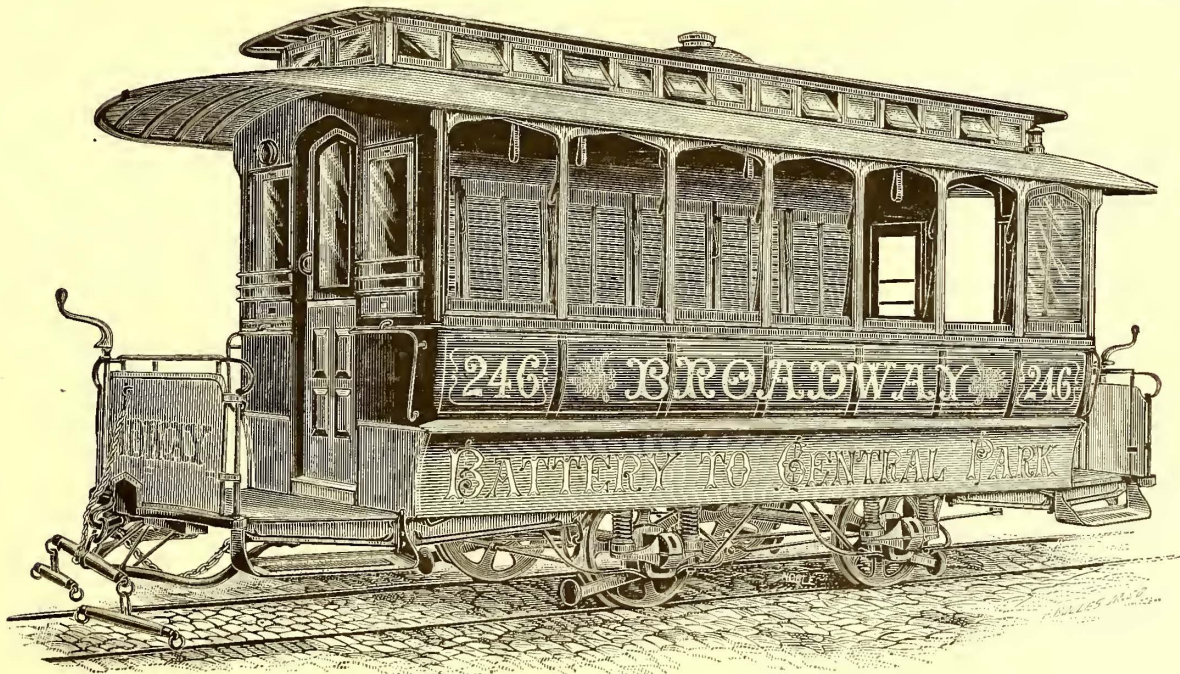


Make a Specialty of

Street, Cable Grip  
& Electric Motor

CARS.

Detroit, Michigan.



Address all correspondence

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

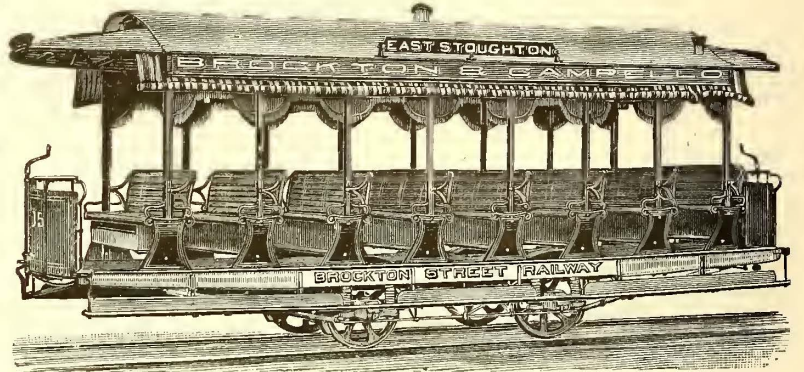
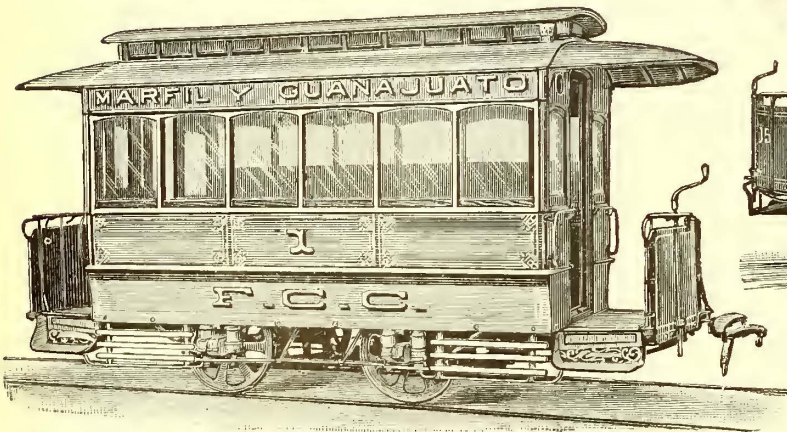


# J. G. BRILL COMPANY,

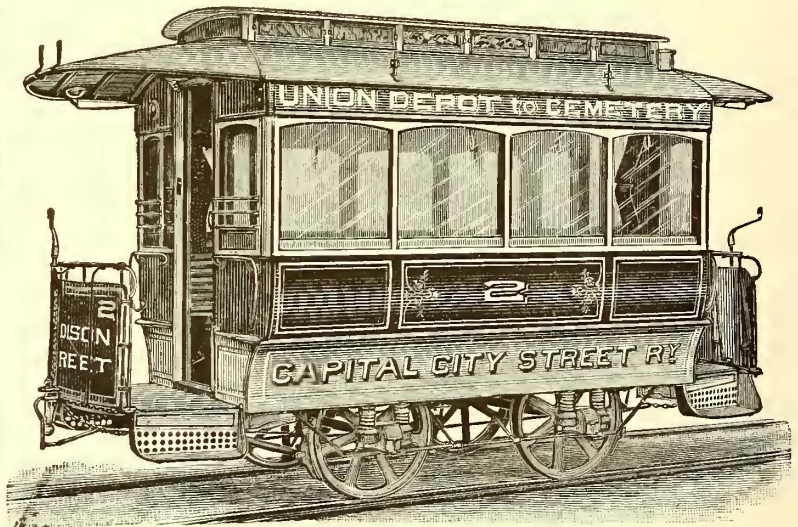
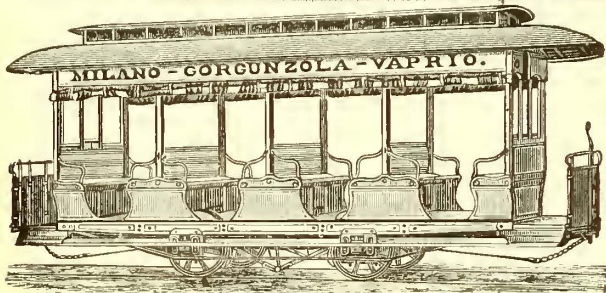
## PHILADELPHIA,

BUILDERS OF

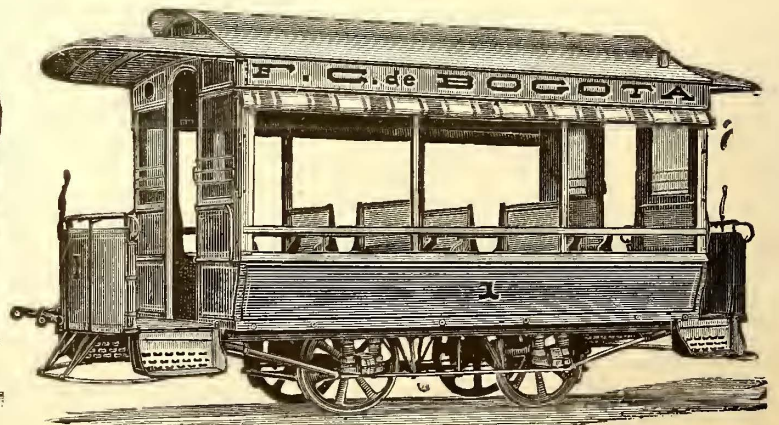
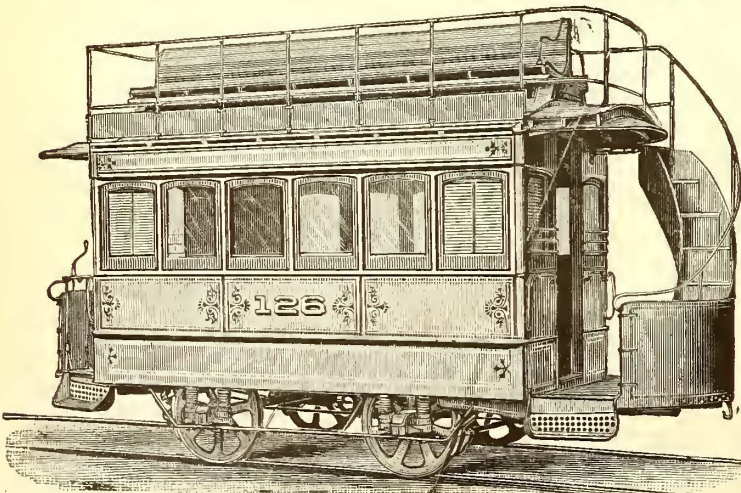
# Railway and Tramway Cars



Gold Medal at Chicago Exhibition  
OF  
1883.



Gold Medal at New Orleans Exhibition of 1885, for Best Open Cars.



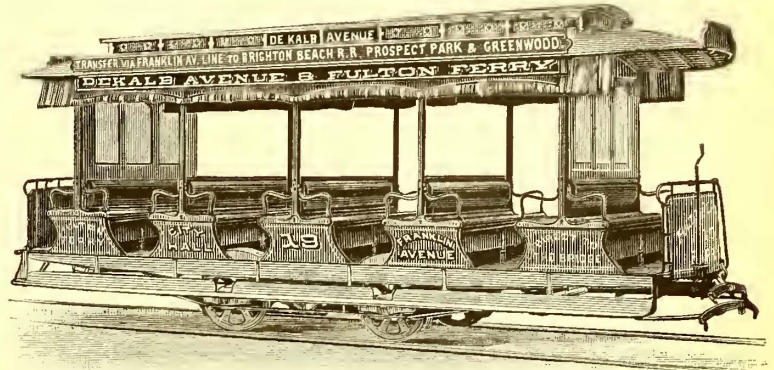
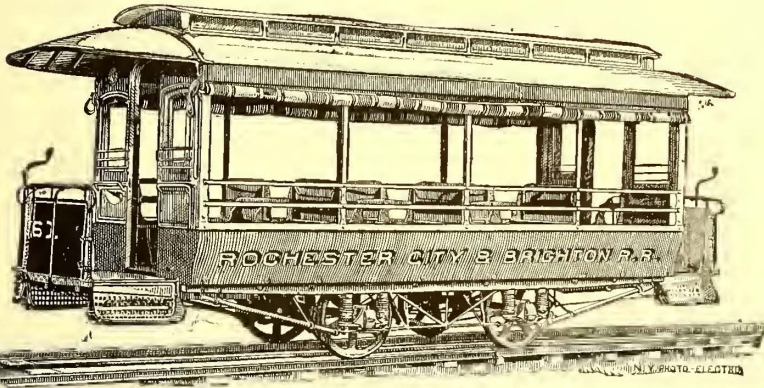


# J. G. BRILL COMPANY,

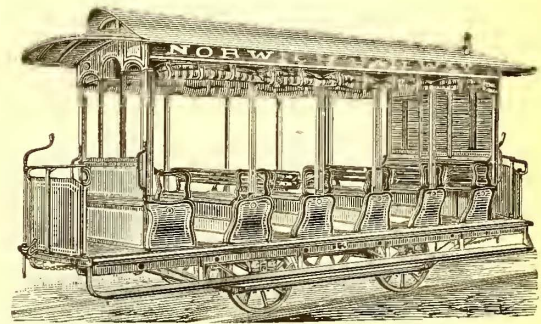
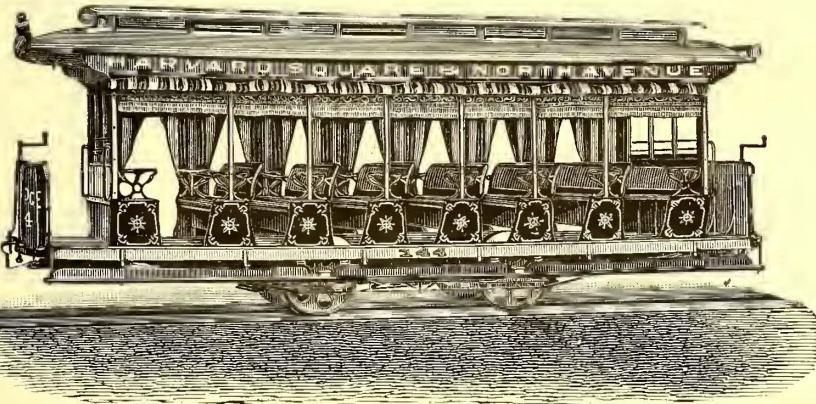
## PHILADELPHIA,

BUILDERS OF

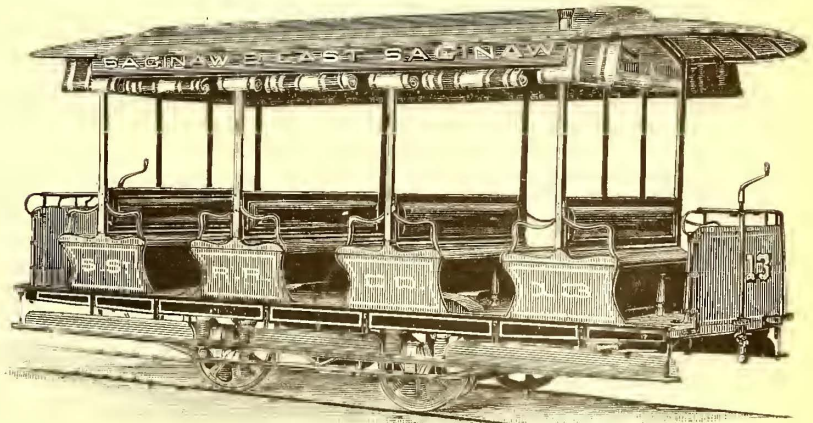
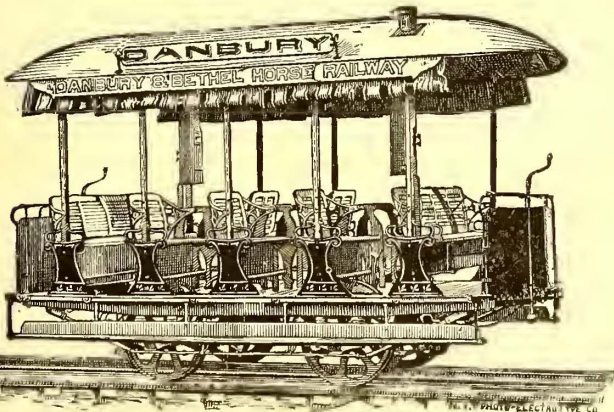
# RAILWAY & TRAMWAY CARS



## Passenger Cars of all Kinds.



## Light Cars for Suburban Roads.

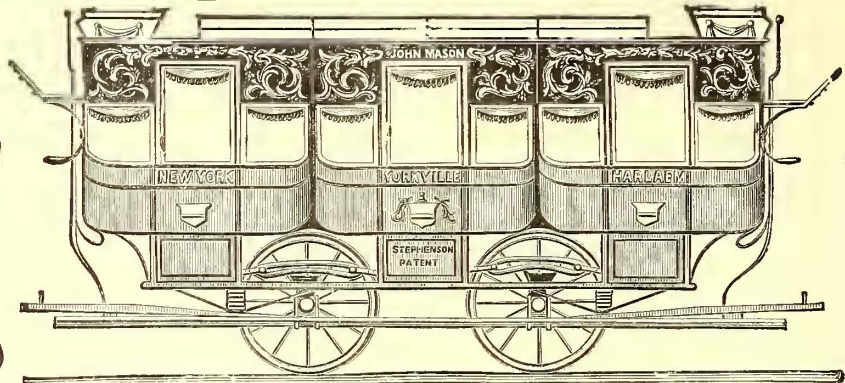


Construction Cars, Cane Cars, Power Hand Cars, Small Merchandise Cars.



ESTABLISHED: 1831.

SUPERIOR  
ELEGANCE



LIGHTNESS  
& DURABILITY

CAR OF 1831

ADAPTED TO ALL COUNTRIES  
AND CLIMATES:

# JOHN STEPHENSON COMPANY LIMITED

47

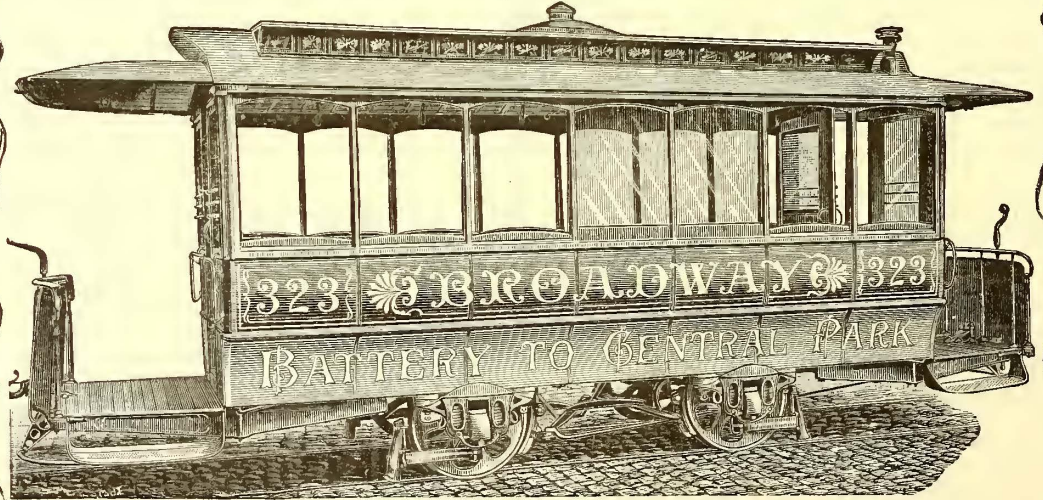
EAST 27 ST  
NEW YORK  
CHICAGO

OFFICE  
185 DEARBORN ST

MANUFACTURE  
STREET [TRAMWAY] CARS  
IN GREAT VARIETY

COMBINING ALL VALUABLE IMPROVEMENTS.

UP TO  
THE  
TIMES



STANDARDS  
BEST  
AND OF

CAR OF 1886

ORDERS FOR SUPPLIES PROMPTLY & CAREFULLY EXECUTED  
PARTICULAR ATTENTION PAID TO SHIPMENTS.

DISPLAY ADV. CO 26 Church St. N.Y.