

THE STREET RAILWAY JOURNAL



Vol. VIII.

NEW YORK & CHICAGO, SEPTEMBER.

No. 9.

The Annual Convention of the New York State Street Railway Association.

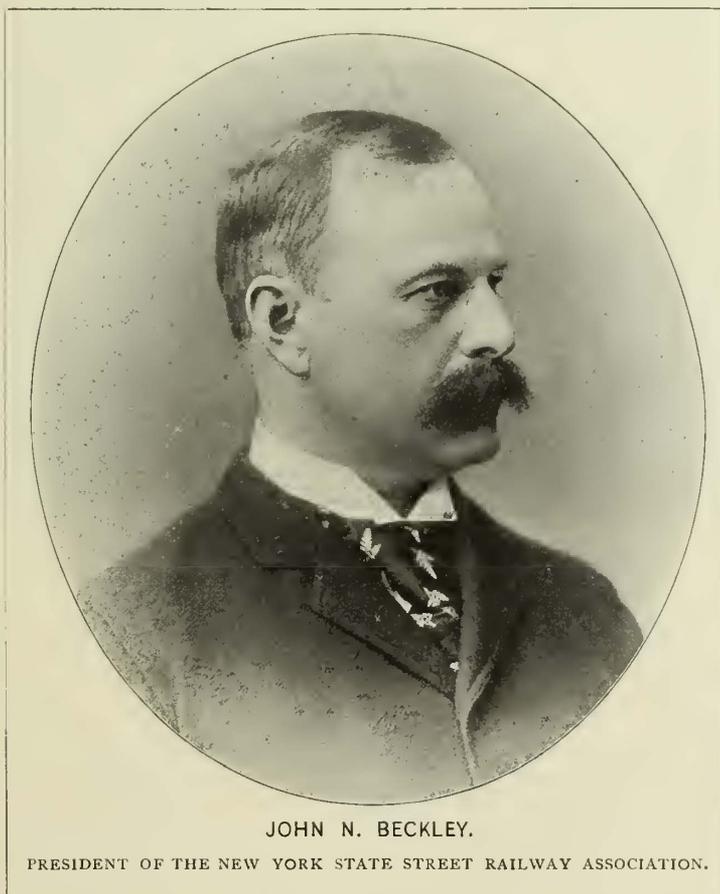
The tenth annual meeting of the Street Railway Association of the State of New York will be held at the United States Hotel, Saratoga Springs, on Tuesday, September 20, at 10 A. M. As already stated, there will be two papers presented to the Association, entitled "Recent Improvements in Cable Traction," by Geo. W. McNulty, engineer of the Broadway & Seventh Avenue Railroad Co., New York, and "Recent Improvements in Electric Traction," by L. H. McIntire, engineer of the Union Railway Co., New York. These papers will undoubtedly be followed by a very interesting discussion on these subjects by the gentlemen present. It is hoped that an unusually large delegation will attend the meeting.

We take pleasure in presenting the portrait of Mr. John N. Beckley, president of the Association for the current year, with a brief sketch of his life. Mr. Beckley was born in Orleans County, December 30, 1848. He received his education at the Genesee Wesleyan Seminary and Genesee College at Lima, N. Y. Choosing law as a profession, he was admitted to the bar in June, 1875, at Batavia, N. Y., where he practised for two years. In 1877 he removed to Rochester, N. Y., and was appointed city attorney of Rochester in 1882, and reappointed twice to that office, first in May, 1884, and again in May, 1886. In June of the latter year Mr. Beckley resigned the office of city attorney and entered the law firm of Bacon, Briggs & Beckley with which he has since been connected. The firm has since been increased by the addition of C. J. Bissell, and is now Bacon, Briggs, Beckley & Bissell.

Mr. Beckley was instrumental in the organization of the South Park Street Railway Co., of Rochester, and the Crosstown Street Railway Co., of Rochester, and aided in the organization of the syndicate which purchased all the street railway interests of Rochester and vicinity in 1890. He was appointed secretary of the Rochester City & Brighton Railroad Co. in November, 1890, and held that office until the organization of the Rochester Railway Co., which last named company took over all the street railway companies mentioned above. The first year of

the organization of the Rochester Railway Co., Mr. Beckley was vice-president and secretary, and succeeded in the following year to the office of president of that company, which position he now holds.

Mr. Beckley is also largely interested in street railway affairs of other cities, where his administration, as in Rochester, has been marked with great executive ability and foresight. The paper read by him at the last meeting of the New York Street Railway Association on "Electric Motive Power for Street Railways," shows that he is an enthusiastic advocate of the use of the electric system for street railway purposes, and his company being one of the first in New York to adopt electric power on a large scale, the street railway fraternity owe a debt to Mr. Beckley for the exposition of the fact that the electric railway can be made commercially successful under the conditions imposed in large cities.



JOHN N. BECKLEY.

PRESIDENT OF THE NEW YORK STATE STREET RAILWAY ASSOCIATION.

Electric Progress in Chicago.

The plans for the electrical equipment of the South Chicago City Railway Co. have been decided upon, and are as follows: The road will be twelve miles long, all double track, and a seventy five pound Wharton girder rail will be used throughout. About three-fourths of the track is now laid, and work on the remainder is being pushed rapidly forward. The power house, for which the ground was broken August 8, is located very near to the centre of the system and on the Calumet River. The building is to be of brick, 180 ft. deep by 100 ft. front. The car house will also be of brick, and will be 270 x 73 ft. The equipment of the power house includes three 22 x 48 Allis-Corliss condensing engines belted direct to 200 k. w., Edison, bipolar generators. The boiler room will contain three Stirling water tube boilers, each fitted with a Stilwell & Bierce live steam purifier.

The car equipment will consist of twenty-five eight-foot, closed car bodies, made by the St. Louis Car Co., and mounted upon McGuire pressed steel trucks, each having a seven foot wheel base. Each of the cars will be equipped with two twenty horse power, Westinghouse, single reduction motors. The number of cars will probably be increased by fifty in the spring.

The Washington & Georgetown Railroad Co.'s System Completed.

On August 6, last, just two years from the date of the passage of an act by Congress requiring that within two years the two principal railway companies in the city of Washington equip their lines for mechanical traction, the first cable train was run over the Pennsylvania Avenue division of the Washington & Georgetown company's system. Within a week twenty trains were running, and before this paper reaches our readers all the horses will have been withdrawn and the entire system, embracing twenty-two miles of track, will be operating by cable. The company, and especially its president, Mr. Henry Hurt, the engineers and contractors are to be congratulated on having completed their Herculean task on time and in so creditable a manner. All parties engaged in the work must certainly experience a thrill of satisfaction in having been the agents for the construction of such an admirable system.

The accompanying diagram (Fig. 1) gives an excellent illustration of the relation of the different lines, embracing the system and their location with reference to the public buildings. The Seventh Street line (seven miles), it will be remembered, has been in operation

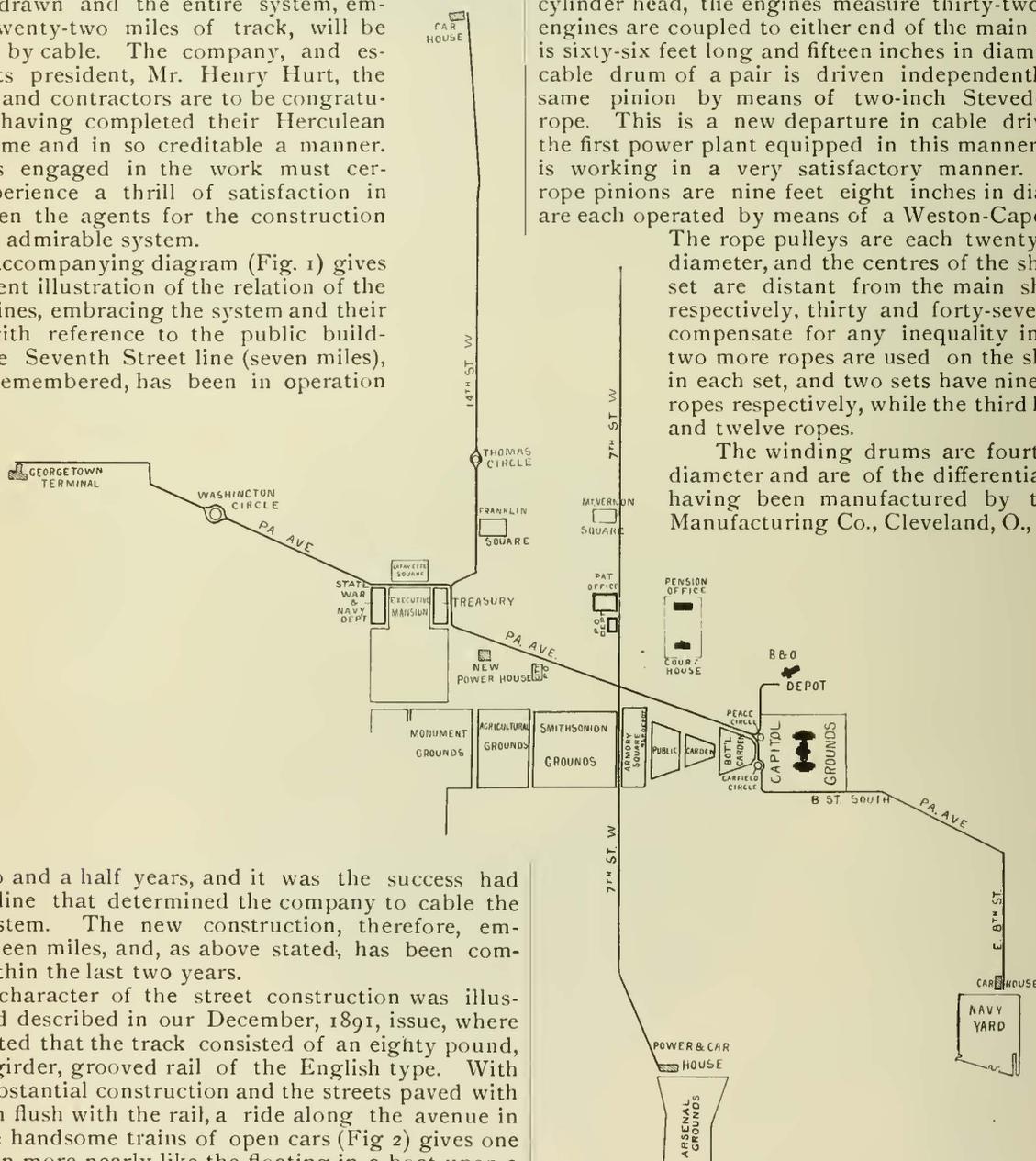


FIG. 1.—CABLE SYSTEM OF THE WASHINGTON & GEORGETOWN RAILWAY CO.

about two and a half years, and it was the success had with this line that determined the company to cable the entire system. The new construction, therefore, embraces fifteen miles, and, as above stated, has been completed within the last two years.

The character of the street construction was illustrated and described in our December, 1891, issue, where it was stated that the track consisted of an eighty pound, Johnson girder, grooved rail of the English type. With such a substantial construction and the streets paved with asphaltum flush with the rail, a ride along the avenue in one of the handsome trains of open cars (Fig 2) gives one a sensation more nearly like the floating in a boat upon a placid lake than we remember to have found on any other line.

The power house, which is to operate the new lines, and which we have before illustrated, is a handsome six story brick and iron structure, 190 x 240 ft. and 100 ft. high, on ground occupying an entire block facing on D Street a short distance from the avenue. The power house occupies the rear of the ground floor, and the company's offices, the first two floors, front to the right of the main entrance. The upper stories will be leased for manufacturing purposes. The building is constructed with a large open court above the first floor which is roofed with skylights, thus admitting light to the tension and engine rooms. The engine and driving drums (Fig. 3) occupy a large, high, light and airy room handsomely finished, being ceiled overhead with Georgia pine, and the side walls wainscoted to a height of five feet with the same material, but above finished with white Keen ce-

ment. The floor is of white maple in narrow strips, and the iron columns are to be encased in terra cotta, terminating in a handsome capital of the same material and protected for about four feet above the floor by a bronze base. On one side opening out from the company's offices is a visitors' gallery, having swelled fronts or bays, and ornamented with a wrought iron guard with a brass railing.

The two engines are of the Reynolds-Corliss type, 750 H. P. each, with 36 x 72 in. cylinders, and were manufactured by the E. P. Allis Co., of Milwaukee, Wis. From the centre of the crank shaft to the rear end of the cylinder head, the engines measure thirty-two feet. The engines are coupled to either end of the main shaft which is sixty-six feet long and fifteen inches in diameter. Each cable drum of a pair is driven independently from the same pinion by means of two-inch Stevedore manilla rope. This is a new departure in cable driving, being the first power plant equipped in this manner, and so far is working in a very satisfactory manner. The three rope pinions are nine feet eight inches in diameter, and are each operated by means of a Weston-Caperon clutch.

The rope pulleys are each twenty-six feet in diameter, and the centres of the shaft of each set are distant from the main shaft centre, respectively, thirty and forty-seven feet. To compensate for any inequality in the drive, two more ropes are used on the short centres in each set, and two sets have nine and seven ropes respectively, while the third has fourteen and twelve ropes.

The winding drums are fourteen feet in diameter and are of the differential ring type, having been manufactured by the Walker Manufacturing Co., Cleveland, O., which com-

pany also manufactured the tension carriages and elevating sheaves and frames. There are three sets of winding drums, each making 18.56 revolutions per minute and giving to the ropes a speed of nine miles per hour. The three ropes are of the following length: That on the Navy Yard division, 31,435 ft.; the one on Fourteenth Street, 27,699 ft., and the Georgetown division 23,468 ft. There is also a fourth rope, 3,822 ft. in length, which operates a branch line to the Baltimore & Ohio Depot, and which is driven by a set of auxiliary machinery located in a pit at the foot of the avenue near the Peace Monument, and operated by power transmitted from the Navy Yard or New York Avenue rope.

Fig. 4 is a plan of the auxiliary drive, from which it will be noted that the return rope from the Navy Yard

passes around a large sheave to the left, then back and around a horizontal driving sheave, having upon its axle a smaller two grooved winding drum, by means of which the auxiliary rope is moved at a slower speed. The auxiliary rope also passes over a one grooved idler, and from the drivers to a tension carriage (Fig. 5) anchored by a heavy spiral spring and located in a second pit beneath the track some distance along the avenue, but connected with the first by a low tunnel. Two of the ropes were manufactured by the John A. Roebling's Sons Co., one of them being of the Lang lay type, the other made by the Broderick & Bascom Co., St. Louis. The ropes from the power plant are led out on the Fourteenth Street side, where they are deflected around twelve foot sheaves mounted in U frames along the street to a second pit located at the avenue. Both west bound ropes are deflected towards Fifteenth Street and pass the Treasury Building, where they separate, one going to Georgetown the other out Fifteenth Street. The lines, it will be noted from Fig. 1, have a large number of curves, there being about 5,200 ft. of

and which were installed by Westinghouse, Church, Kerr & Co., of New York, who also supplied the separator or steam loop in the vertical steam pipe above the engine shown in Fig. 3. The coal is elevated to storage bins and is delivered by gravity to the furnaces. The cinders are drawn directly into a tram car located beneath the boiler room floor, and are then elevated and run out into wagons. The additional steam equipment consists of an 200 h. p. Berryman heater, two Deane duplex feed pumps, while all pipes are provided with Chapman valves of the latest pattern.

The tension carriages (Figs. 9 and 10) have several novel features. The reel mechanism or winch of the carriage proper is provided with a rope drum in place of a hand crank, upon which several turns of one inch manilla rope are wound. The end of this rope, being made to wrap a capstan on the end of the revolving shaft, which transmits power to winch reel and hauls the carriage back, thus taking up the stretch of the rope. The tension weight is hung by means of a second carriage and anchorage as shown in Fig. 10. This method of attaching the tension



FIG. 2.—CABLE TRAIN ON PENNSYLVANIA AVENUE, PASSING THE WHITE HOUSE.

curve construction; but all the curves are of compound type with the smallest radius not less than sixty feet.

The curve pulleys (Figs. 6 and 7) are two feet in diameter and have no bottom flange, the rope being held in place by carrying pulleys placed between the curve pulleys. They are mounted in adjustable frames, their position with reference to the slot being regulated by set screws. The wheels turn on a fixed spindle which is provided with a gun metal washer on which they rest. The bearings are lined with babbitt, and the spindle has an oil passage drilled as shown, with an oil cup attached to the top.

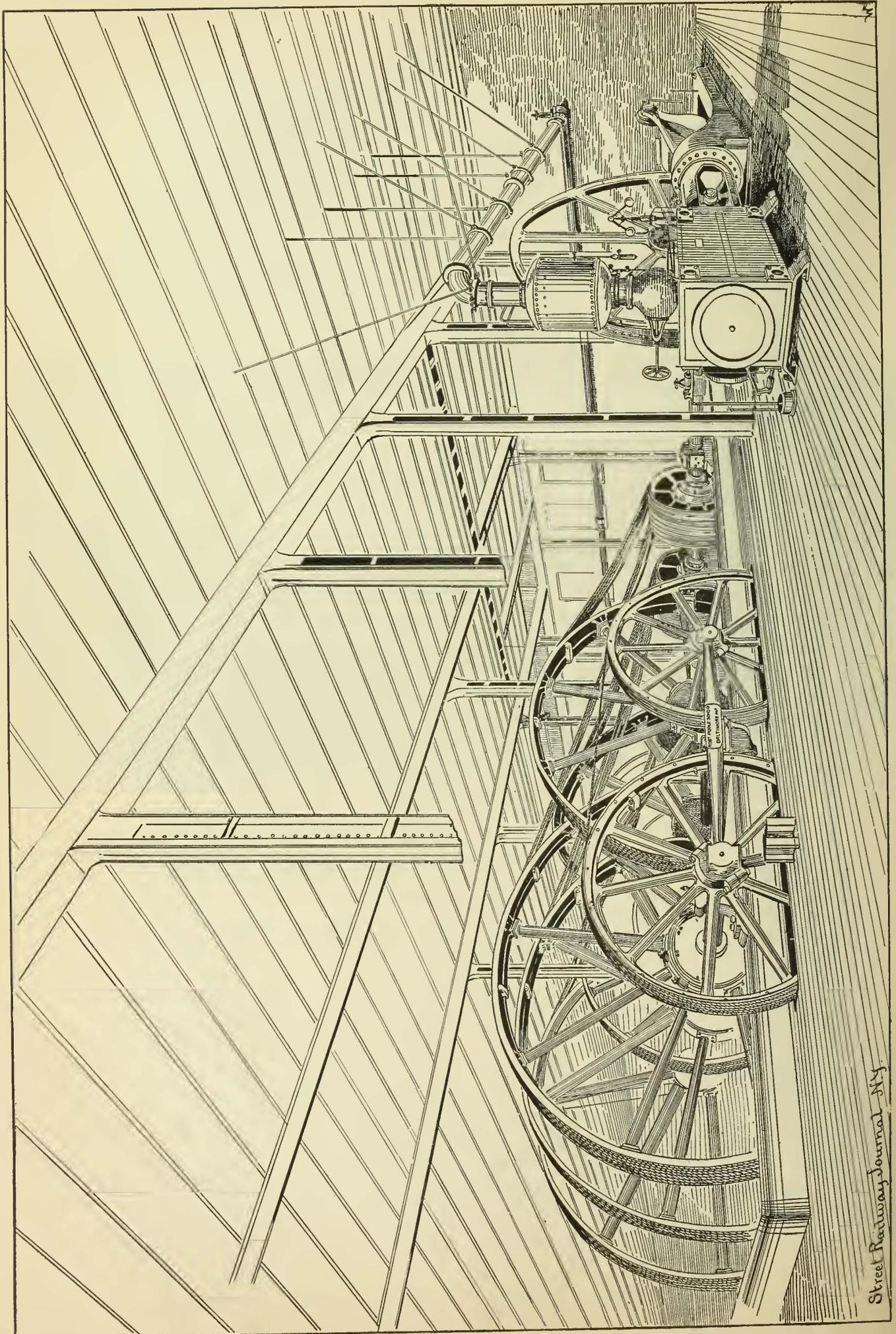
The carrying pulleys are of cast iron with a chilled face, and are about fourteen inches in diameter. The arms are cast very dishing to prevent shrinkage checks. They are pressed on a plain steel spindle and mounted in self-centering babbitt bearings enclosed in a grease cup with a leather lined cover. The box contains a wooden thrust block and dust collar. This type of sheave has been adopted in preference to the wrought iron arm pulleys used on the Seventh Street line. The wrought spokes frequently became loosened and rendered the sheave unserviceable.

The boilers are eight in number and arranged in two batteries, one of which is shown in Fig. 8 and are each 184 h. p., and were manufactured by the Babcock & Wilcox Co. The same type of boilers is employed in the Seventh Street station and they have given excellent satisfaction. The boilers are equipped with the Roney mechanical furnaces which are operated by a Westinghouse compound engine,

weight was devised and patented by Mr. W. B. Upton, chief engineer of the company, and has been working for some time at the Seventh Street power house in a very satisfactory manner. From the illustration it will be seen that the weight is graduated automatically according to the strain on the rope, two carriages being connected by wire ropes.

In addition to the power equipment for working the lines, there has been installed another 250 h. p. Reynolds-Corliss engine for supplying power to the tenants. Rope belts will be employed for transmitting power to the different floors, which will operate in a vertical shaft directly above the driving drum which has grooves for forty-eight three-quarter inch ropes, the intention being to lead a set of ropes out at each floor according to the power required.

Another novel feature about the power house is the drainage system. The basement floor being located, as we have noted in former articles, below tide water and several feet below the city sewers, some means of getting rid of the seepage water was necessary. Accordingly a number of iron tanks were sunk, to which sub-drain pipes were led and which deliver all the water to the tanks, from which it is lifted and discharged into the sewers by means of Shone pneumatic ejectors, manufactured by Hughes & Lancaster, Chester, Pa. The compressed air for operating the ejectors is provided by a small air compressor located near the engine room. The sanitary pipes of the building lead directly into the sewers, so that only the surface water reaches the seepage tanks.



Street Railway Journal N.Y.

FIG. 3.—NEW CABLE POWER PLANT—WASHINGTON & GEORGETOWN RAILWAY CO.

switch and passes along on the straight track to a point between the two crossovers. The train is then run by gravity over the surface crossover, the grip car takes the cable for a short distance and shunts over and couples to the other end of the train and starts out on the straight track. This arrangement requires but one grip car at the

The chief engineer of the company, Mr. W. B. Upton, of Kansas City, designed all the plans of the road, and has frequently been on the ground to watch the construction and in consultation with Mr. D. Bontecou, the consulting engineer of the company, of Kansas City, but the execution of the work has been mainly under the direction of

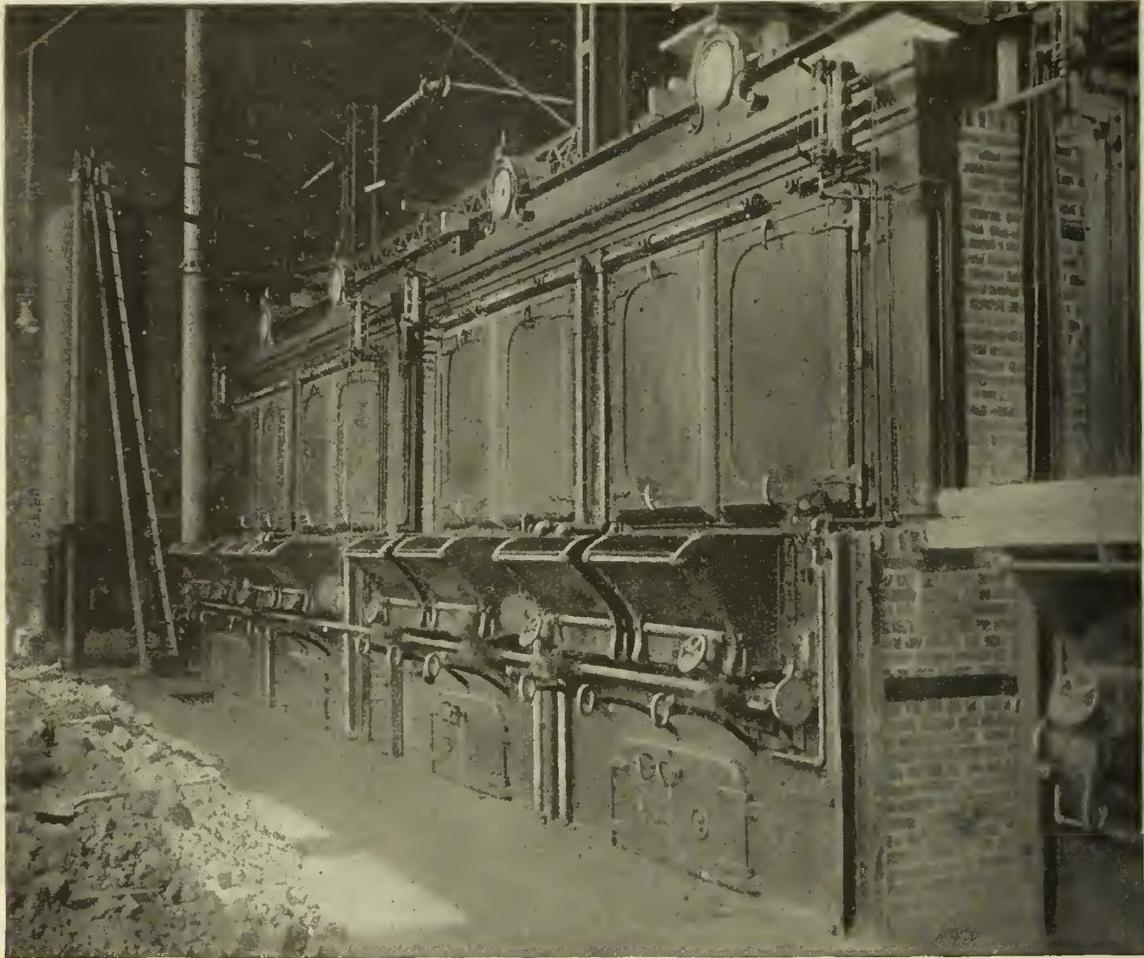


FIG. 8.—HALF VIEW OF BOILER ROOM, CABLE POWER PLANT—WASHINGTON & GEORGETOWN RAILWAY CO.

terminals, and an extra grip is not kept in waiting as on the Seventh Street line.

The ordinary gypsy pickups are provided at the terminal switches, but at the crossing at Seventh Street and at the branch switches the rope is automatically replaced in the grip by a new gypsy recently devised by the chief engineer and which is working very satisfactorily.

Nearly all the special iron work required in the construction of the line has been gotten out in the company's own shops. One of the old stables near the foot of Seventh Street was converted into a machine shop and equipped with steam power and a complement of iron working tools. With this equipment the switches and crossings have been gotten out, the carrying and curve pulleys bored, frames drilled and fitted, and the grips (over 150) made.

Besides the power house above described, the new equipment includes two commodious car barns, one near the Navy Yard terminal, with a capacity for 150 cars, and one at Mount Pleasant near the Fifteenth Street terminal, having a capacity for 300 cars, which we have before illustrated. These buildings are handsome brick structures and are provided with all modern conveniences, including a steam equipment for operating the car elevators and electric light plants. The receiver's room, waiting room, conductors' and drivers' rooms are nicely furnished and provided with lockers and elaborate sanitary arrangements.

The entire cost of the system, including the buildings, has been about \$3,500,000. Exclusive of the buildings and rolling stock, the lines have cost about \$100,000 per mile of double track.

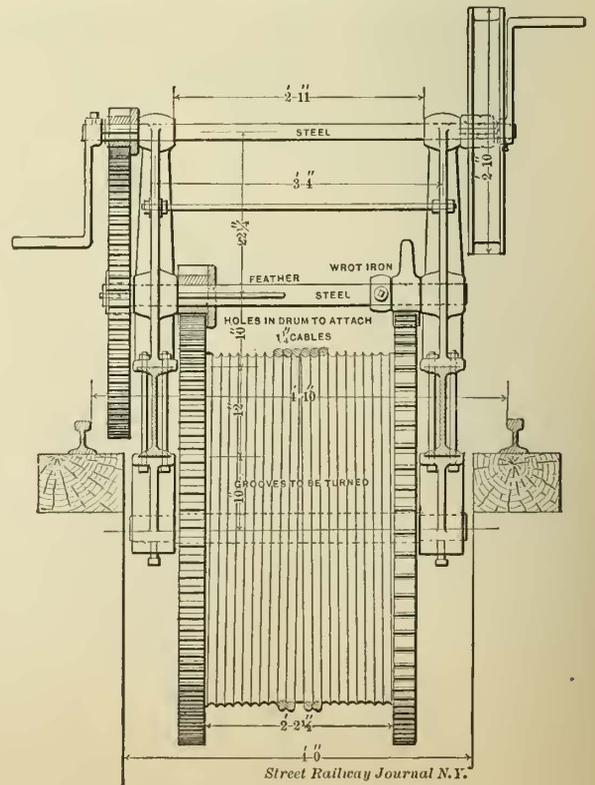
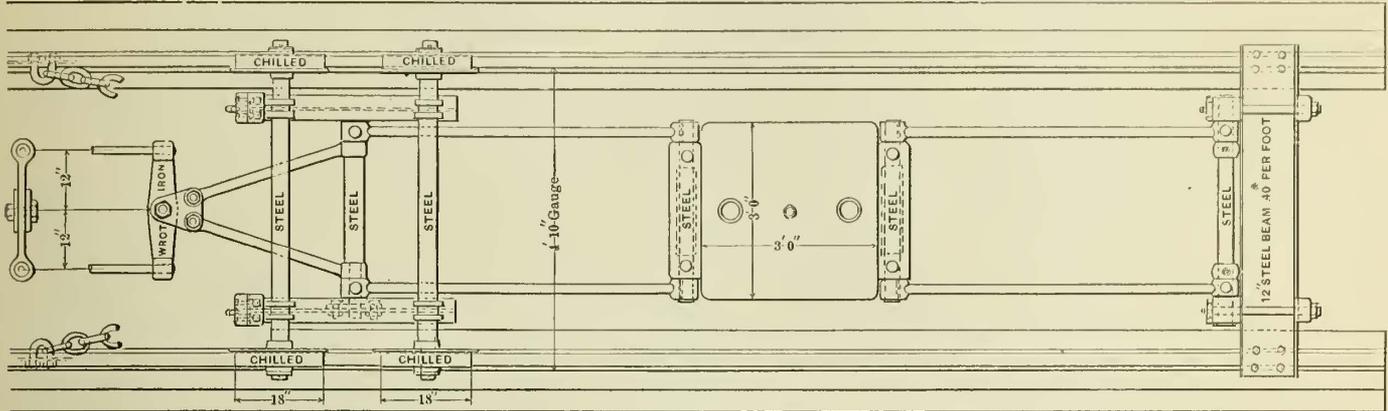


FIG. 9.—TENSION CARRIAGE REEL.

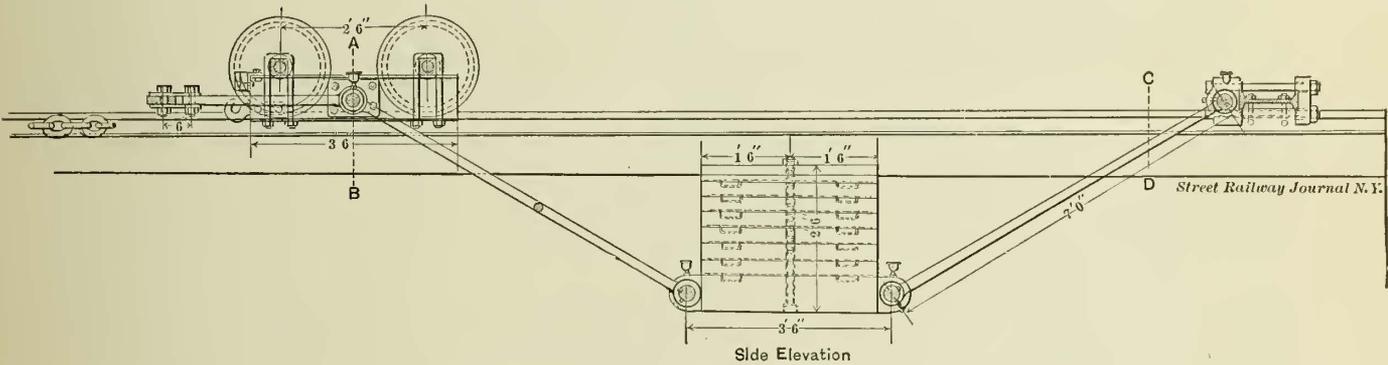
Mr. David S. Carll, to whom and to the contractor, Mr. E. Saxton, great credit is due for the substantial character of the work and the successful manner in which the lines are operating. Mr. Walter C. Root, of Kansas City, was the architect of all the buildings.

The contractors for material and work, other than

detriment; still the road is doing a good business. At the present time the officers are planning for a loop terminal. W. W. Gurley, the attorney of the company, states that the line will probably go north on Wabash Avenue as far as Madison Street or Randolph, returning by way of Dearborn or Clark Streets to Congress Street



Street Railway Journal N.Y.



Street Railway Journal N.Y.

FIG. 10.—UPTON'S TENSION REGULATOR.

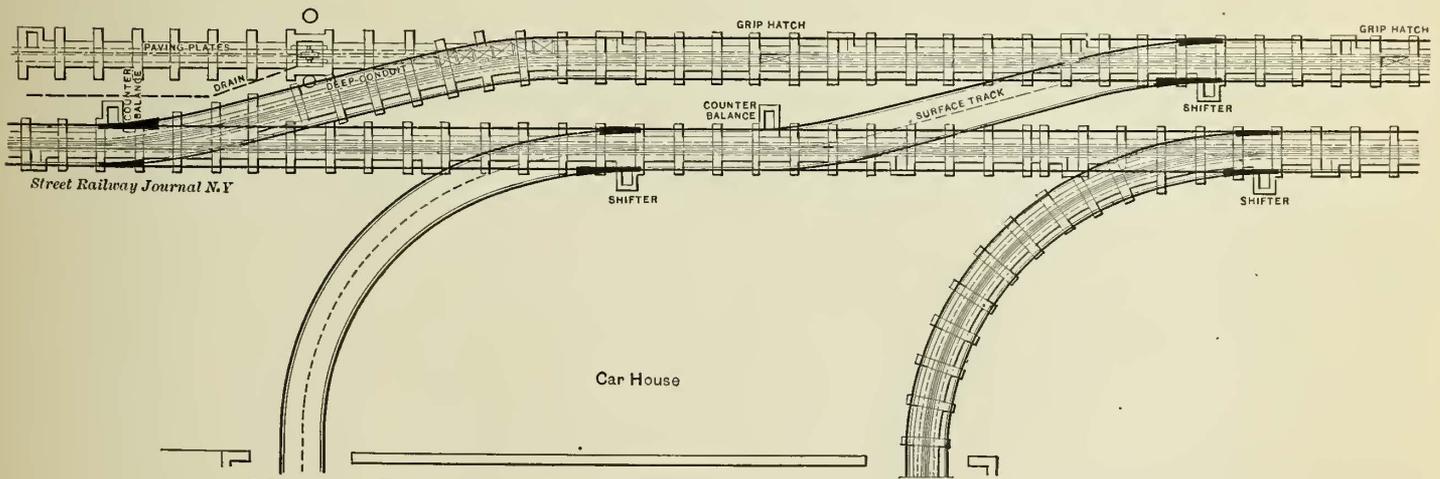


FIG. 11.—SWITCH AT WEST TERMINAL—WASHINGTON & GEORGETOWN RAILWAY CO.

those already named, were The Chapman Iron Co., of Kenton O., iron work on power house; Pennock Bros., of Philadelphia, general contractors of power house; Pullman, of Kansas City, power house foundations; C. W. Hunt Co., New York, manilla rope belts; Steadman Foundry, Aurora, Ind., carrying pulleys and boxes; Chester Steel Castings Co., Chester, Pa., grip castings; General Electric Co., all the lighting; Smith & Vaile Co., Dayton, O., yokes, etc.; J. L. Parsons, Washington, D. C., contractor Mt. Pleasant car house; S. H. & P. F. Adams, Navy Yard car house; Thos. C. Bosshor, of Baltimore, steam heating.

South Side Elevated Road, Chicago.

It has been said of the Alley L road in Chicago, that it starts from nowhere and does not go anywhere. There is truth in the statement. The fact that the line stops considerably south of the business centre is a decided

and joining the main line, and that the plan of supporting two tracks on a single line of supports will be adopted. These supports will be placed between the present street car tracks. Plans are now under consideration and a move in this direction will be taken in the near future.

The road, up to August 15, had been operated only as far south as Thirty-ninth Street. On that day the extension to Forty-seventh Street was included in the regular line. The structure will soon reach Fifty-first Street, at which point Washington Park begins.

THE People's Electric Street Railway of Beaver, Pa. was put in operation August 13, with appropriate ceremonies. The road is equipped with Thomson-Houston W. P. motors. The cars are carrying a large number of passengers.

THE Haverhill (Mass.) & Amesbury Street Railway Co. have decided to issue bonds to the extent of \$300,000.

Central Power Station, West End Street Railway Co., Boston.

The first half of this mammoth plant, which has been three years in building and which we illustrated in our January, 1890, issue, is now completed and is in daily operation. The ultimate steam capacity of the plant is to be 26,000 H. P., of which 12,000 H. P. is now installed. The original plans of the company provided for equipping this station with fine machinery better adapted to railway purposes than that of any other line in the world, and that they have succeeded the accompanying engravings show.

Fig. 1 illustrates half of a cross section of the building and shows the relative position of engines and generators, while Fig. 2 shows very accurately the position of the three cylinders and other details of the triple cross

flywheels are each twenty-eight feet in diameter, with a ten foot seven inch face, and weigh eighty tons. Each engine is coupled to a countershaft by means of two belts, fifty-four inches wide and about 150 ft. in length.

A very complete system of belt tighteners, with adjusting mechanism is provided both for the engine and generator belts (Figs. 3, and 5), the large tightener and pulleys being six feet in diameter. The countershafts, which are located on each side of the sub-gallery are 120 ft. long, in three sections of forty feet for each engine, and nine inches in diameter. The driven and driving pulleys are eight feet in diameter, and the former are mounted on hollow shafts encircling and connected by Hill clutches to the main shaft. The three

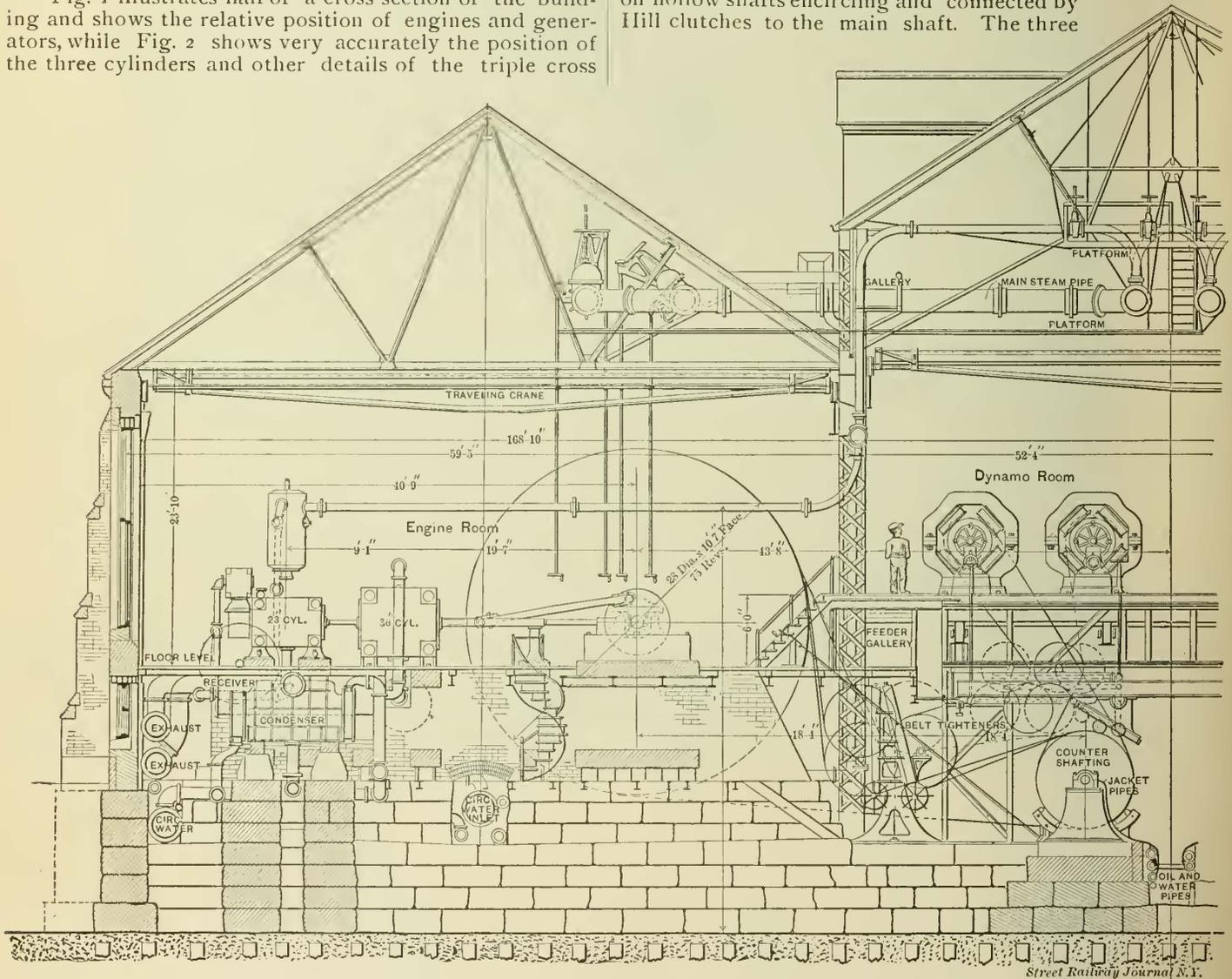


FIG. 1.—HALF CROSS SECTION, CENTRAL POWER STATION—WEST END STREET RAILWAY.

compound engines, of which there are six in place, three on each side of the main floor.

The engines and shafting were manufactured after specifications and plans furnished by the engineers of the West End company, the engines being designed by Mr. Edwin Reynolds, superintendent of the E. P. Alhs Co., who were the contractors for the entire machine work at the station, including shafting and appurtenances. The dimensions of the three cylinders of the engine are, respectively, 23, 36 and 52 x 48 in. stroke, and the steam pressure of each is 160, 35 and 5 lbs. The piston of the tandem cylinders is coupled to one end of the crank shaft, and that of the third cylinder to the other end, and the speed is from seventy to seventy-two revolutions per minute. These engines were designed to develop 1,000 H. P. under the most economical conditions and to work up to 2,000 H. P. as a maximum. The builders guaranteed the steam consumption per hour, under a load of 1,000 H. P., should not exceed thirteen pounds per horse power, and careful tests show it to be less than this amount.

The condensing pumps are shown on the left of the engraving, but the condensers are beneath the floor. The

lengths of shafting are connected together by similar clutches, all of which are operated from the floor of the engine room by means of a long shaft and hand wheel set at an angle as shown in Fig. 4. The drivers are coupled by means of thirty-inch belts to the 500 H. P., Thomson-Houston, M. P. generators which are located directly above the shafting on an iron platform constructed of heavy plate girders and channel iron posts. A portion of the station was equipped temporarily with 100 H. P. generators, but as soon as the larger generators are completed they will be substituted as shown in the figure. These generators were manufactured after specifications furnished by the engineers of the West End company, and are operating in a very satisfactory manner.

The water tube boilers are of the well known Babcock & Wilcox type, and are arranged on each side of the boiler room as illustrated in Fig. 6. Those on the right are already in place and consist of six batteries of 500 H. P. each. The left line is being erected and will ultimately supply the steam for operating the other seven engines. The arrangement of the steam domes and piping is shown in the left of the engraving. The steam pipes and mains

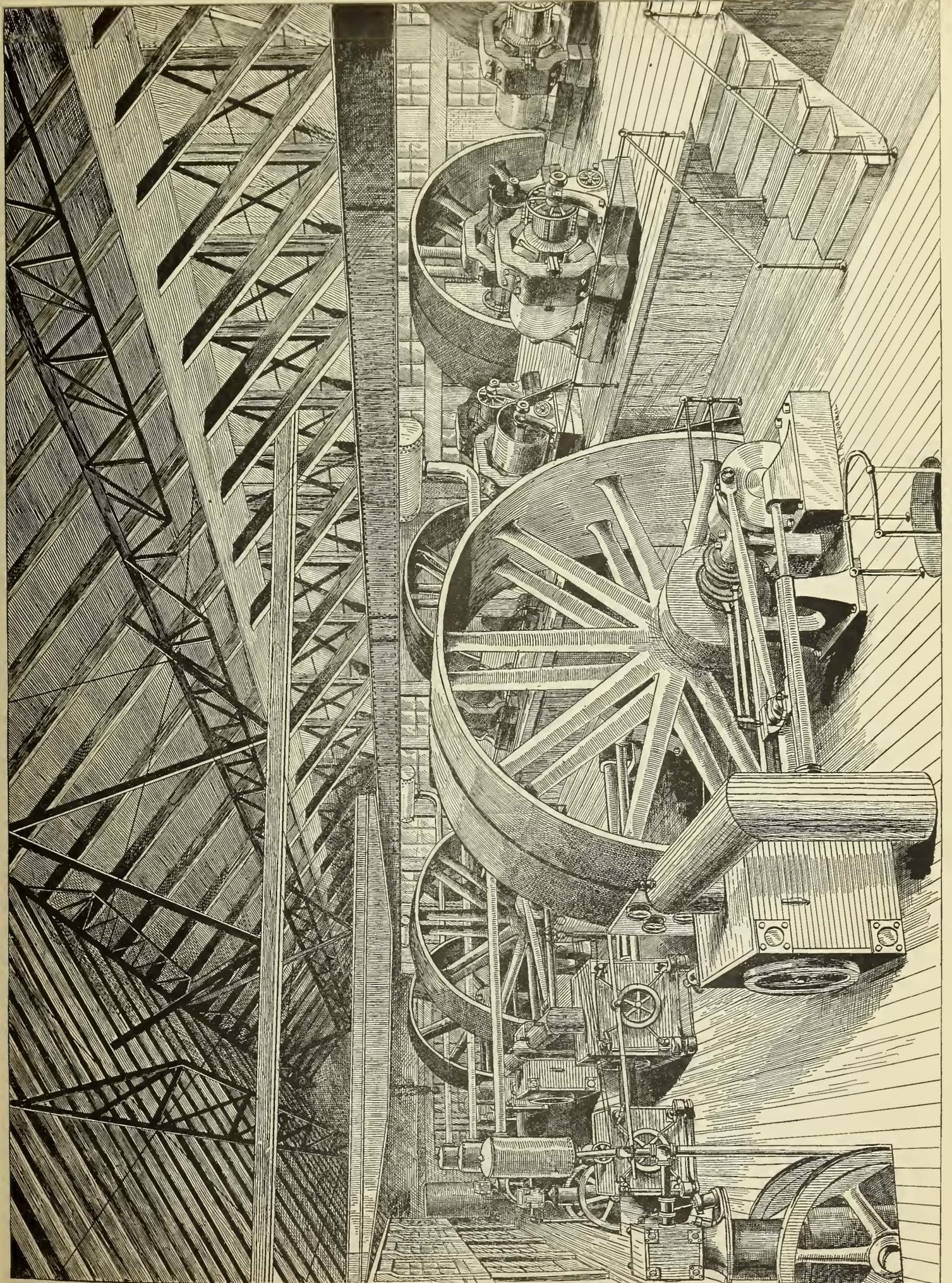


FIG. 2.—SIX 1,000 H. P. TRIPLE EXPANSION ENGINES—CENTRAL POWER STATION, WEST END STREET RAILWAY.

leading to the engines are in duplicate throughout, and the mains are led along near the roof over the generator floor (Fig. 1), from which the connections to each engine curve down, and pass under the truss to the high pressure cylinder, a separator being located in each at the point of entering the engine room proper.

The mammoth condensers are of the Wheeler type, and from these the condensed water is discharged into the hot well tanks, from whence it is pumped through the feed water pipes to the two economizer chambers located near the base of the smoke stack (Fig. 6) into which the boiler flues lead, so that the hot gases from the fires are utilized for heating the feed water before the escape into the chimney. Each of these chambers contains two Lowcock economizers with a total of 24,000 ft. of four inch pipe. A valve room is located near by, and with this all the oil and water pipes, equipped with Chapman valves, communicate, so that one attendant can regulate the flow from all the pipes. Salt water for condensing purposes is drawn from the bay through two thirty-six inch iron mains, each 600 ft. in length.

All the bearings of the main and counter shafts are water jacketed, and from these the water pipes communicate with the boiler feed pipes. All journal bearings are automatically oiled by means of pipes which communicate with a reservoir to which the oil is pumped, and from which it flows by gravity to the journals, thence to a filter when it is pumped again to the reservoir.

The switchboard is located in the feeder room adjoining one of the economizer rooms, and all the conductors from the generators will communicate with this room, the wires being led under the floor, so that one attendant can watch the requirements of each division of the extensive system and regulate the current accordingly. The traveling cranes, one each over the engine and generator floors are provided, handling the heavy parts. The tracks extend the entire length of the building.

The boiler room (see Fig. 7) is also equipped with every facility for handling the coal and ashes; the latter are removed by means of tram cars located beneath the

efficiency of the generators. These consist of wooden tanks about four feet wide and eight feet long, having adjustable metal plates to which the circuit terminals are attached. These tanks are about four feet deep and contain a weak solution of sulphate of soda.

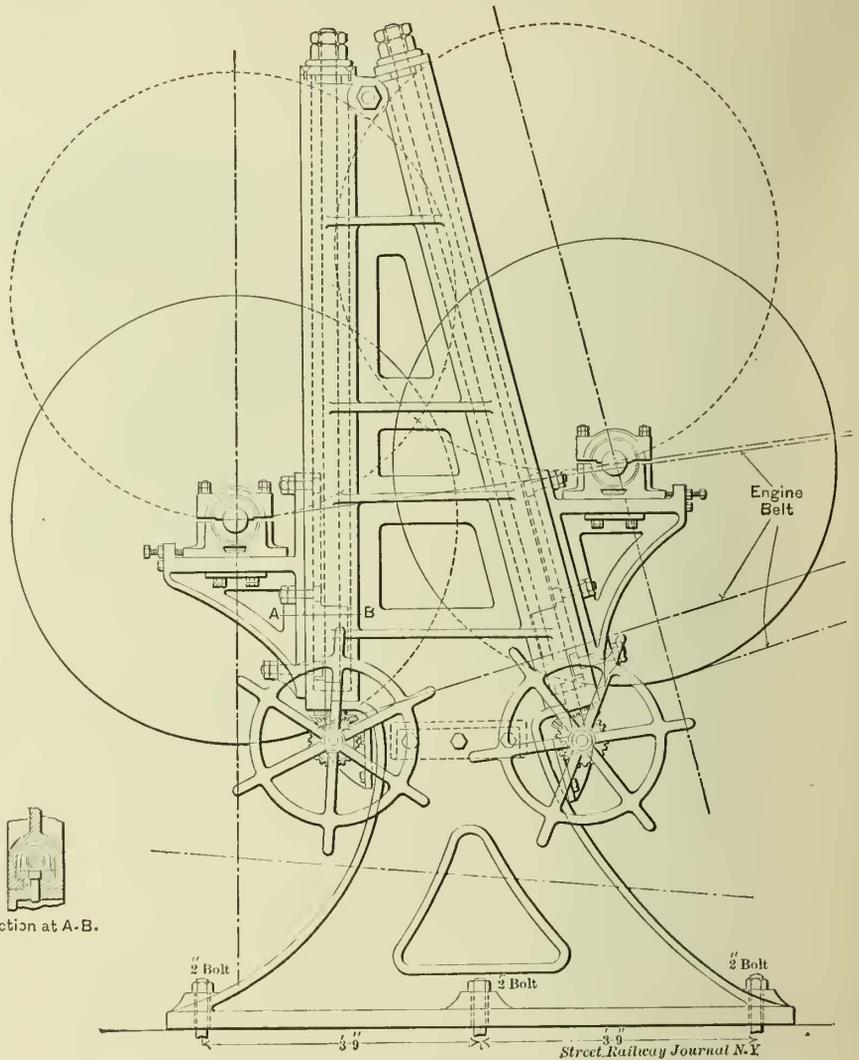


FIG. 3.—ENGINE BELT TIGHTENERS—CENTRAL POWER STATION.

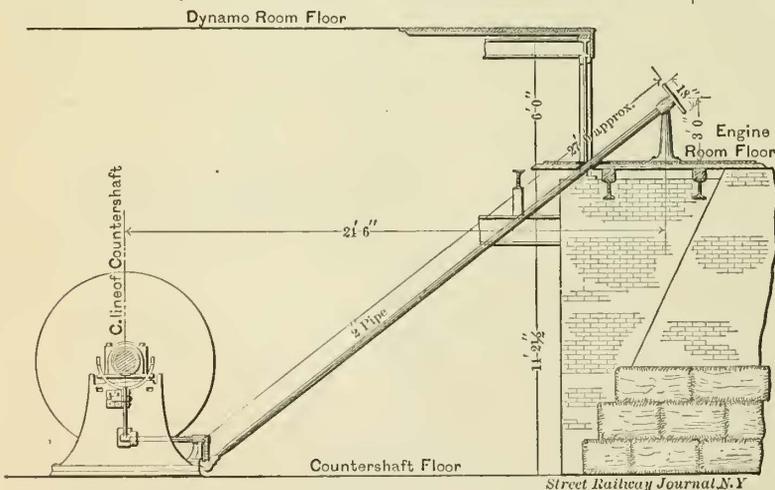


FIG. 4.—HAND WHEEL AND SHAFT FOR OPERATING CLUTCHES ON MAIN SHAFT.

floor on a track running the entire length of the boiler room and connecting with the yard and outside shipping facilities.

In front of the main building, just outside the temporary wall, are located four water rheostats for testing the

The central power station building is of brick with iron and slate roof, and the interior dimensions of the engine and generator room are 169×160 ft. The ultimate length will be 319 ft. The boiler room is 163×84 ft. The smokestack is 250 ft. high, circular, with a double brick shell. The diameter at the base is twenty-six feet and at the top seventeen feet, the flue being of a uniform diameter of 13 ft. 8 ins. Massive granite foundations are provided for the engines, boilers and smokestack, and these rest upon piling, there being 816 piles forty-five feet in length beneath the stack, and a total of 600 piles under the building foundations.

Such are the outlines of this interesting station which is designed to operate, in connection with the Cambridge plant, the largest electric railway system in the world, as the temporary plants which have heretofore been employed will now be abandoned. The magnitude of the undertaking illustrates very forcibly the faith that the West End company early had and still has in electricity as a motive power for street railways, and the planning and erection of the plant which is one of the boldest engineering feats in the history of street railway practice, reflects great credit upon the company's chief engineer, Mr. F. S. Pearson.

The following well known firms were the manufacturers of the various appliances above noticed: Engines

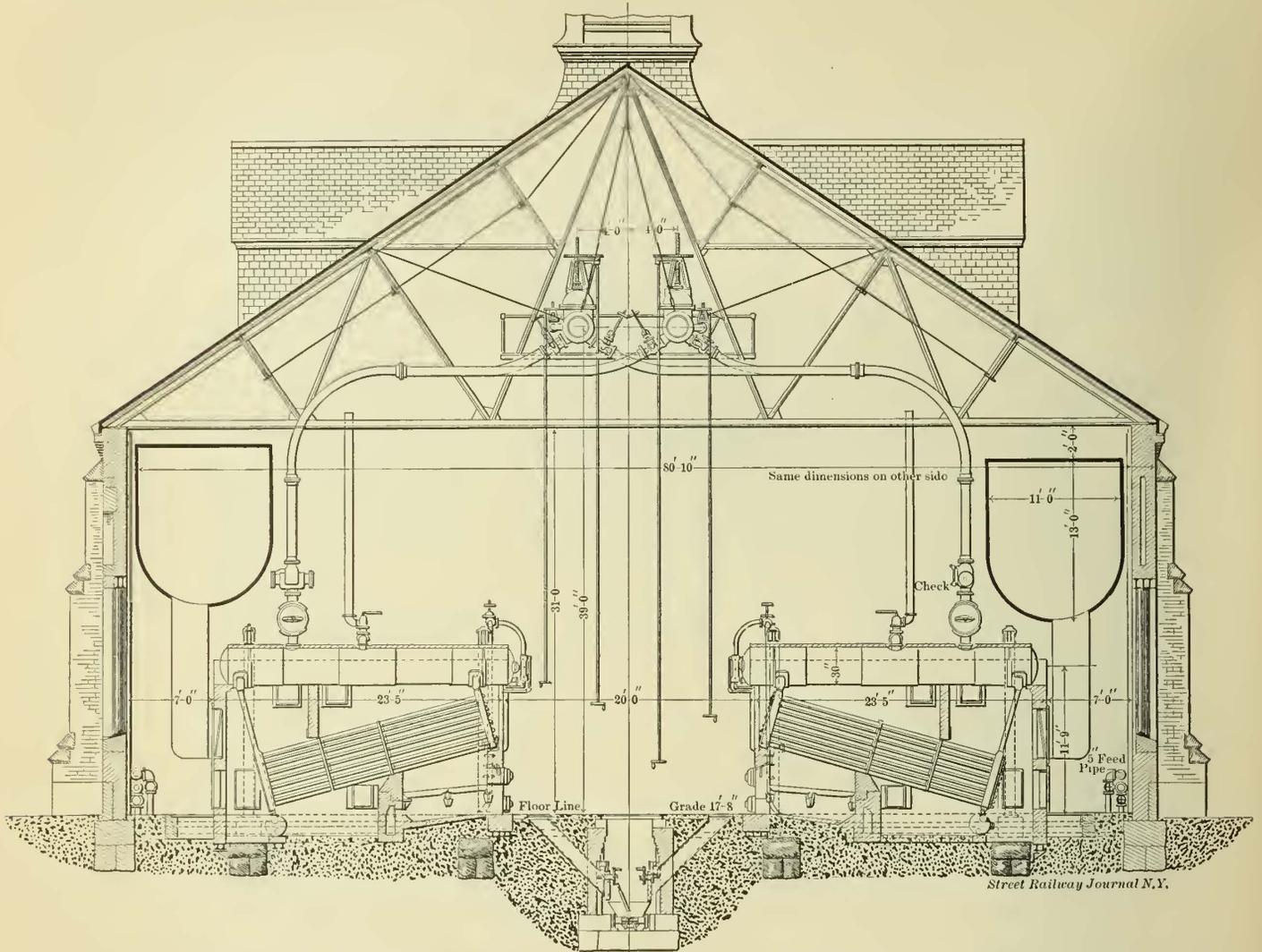


FIG. 7.—CROSS SECTION BOILER ROOM, CENTRAL POWER STATION.

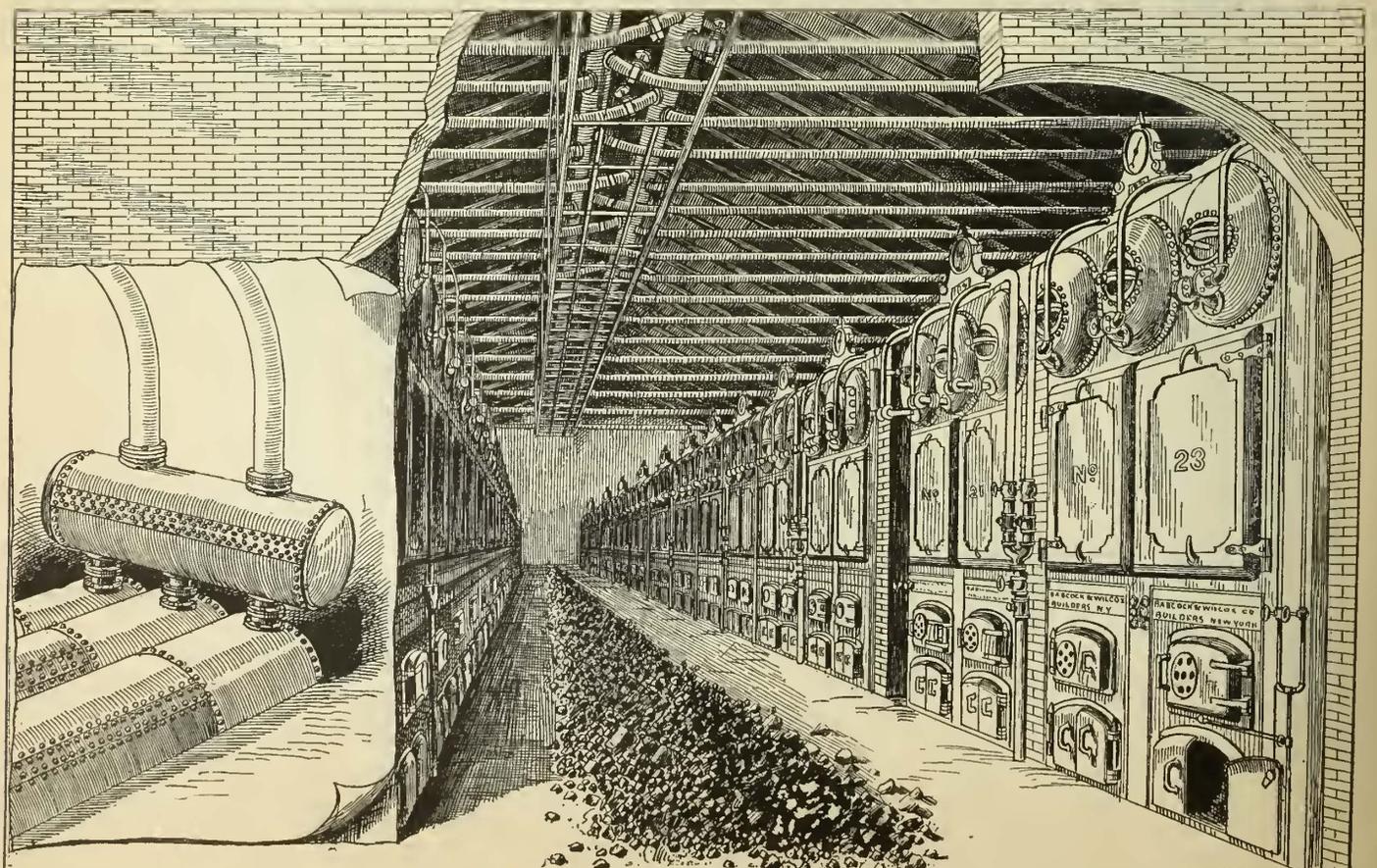


FIG. 8.—13,000 H. P. BOILER EQUIPMENT, CENTRAL POWER STATION.

The Cleveland Convention.

There is every reason to believe that the Convention of the American Street Railway Association at Cleveland, October 10, 20 and 21, will be of marked interest. The local committee of arrangements is daily receiving letters which indicate that a lively interest is being taken in the meeting by railway men and manufacturers. The former promise to be present in large numbers, and the latter give assurance that they will send exhibits which will prove a great attraction.

The local committee have engaged Army and Navy Hall as a place for the exhibition of apparatus. The location is exceedingly convenient, as it is on Superior Street, almost opposite the Hollenden, where will be the headquarters of the Association. The accompanying diagram shows the dimensions of the exhibition hall and the general arrangement of the available space. It will be noticed that the corridor, sixty feet in length, will offer advantageous location for exhibits as well as the main hall. On the second floor the committee has secured a large room, 33 x 54 ft., which will also be used for the exhibit of apparatus. An abundance of room for out-of-door exhibits will probably be available, as, fortunately, the vacant lot immediately adjoining the exhibition hall on the east can be used for this purpose. Other exhibits will be located in the lot directly back of the Hollenden.

It has been definitely decided that the sessions of the convention will be held in the Y. M. C. A. building, which is one of the handsomest structures in the city.

The arrangements for the entertainment of visitors have been nearly decided upon by the local committee, and a most enjoyable time may be anticipated by those who attend the meeting.

Twenty-second Street to Thirty-fifth Street. The company are allowed to use five kinds of motive power, cable, gas motor, compressed air, animal power and electricity. Beyond all question electric motors will be used, as the only restric-

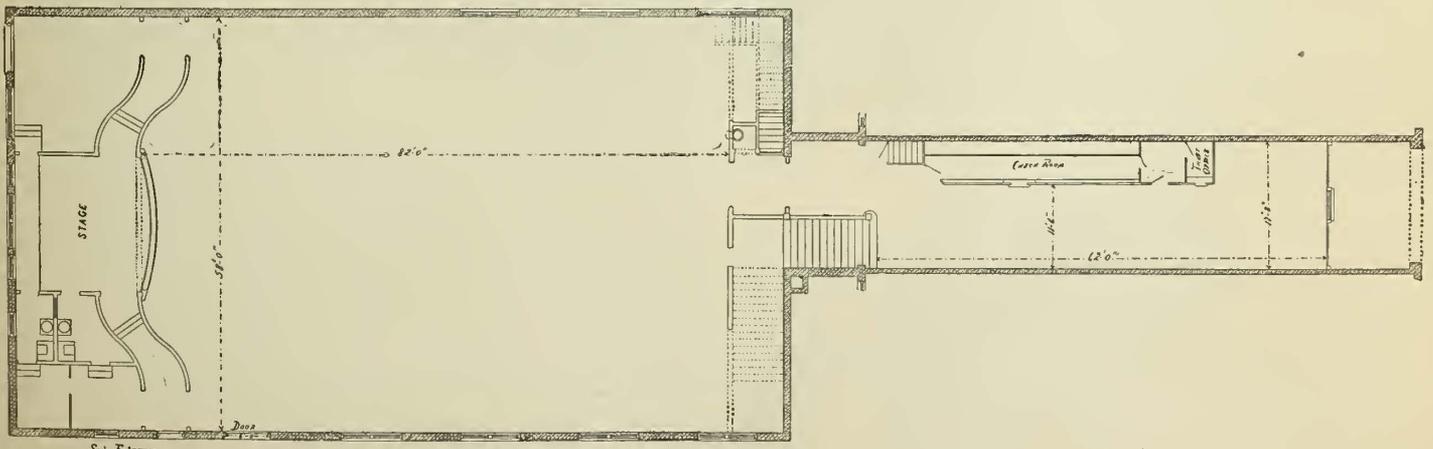


CONVENTION HALL BUILDING, CLEVELAND.

West & South Towns Electric Railway, Chicago.

It is stated that work on the West & South Towns Street Railway Co., of Chicago, will be commenced at

tion on the overhead privilege is that the feeders shall be underground. The vice-president of the company is Congressman Lawrence W. Gann. A great many rumors have been in circulation about the policy of the new



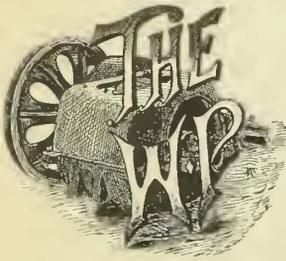
PLAN OF EXHIBITION HALL—CLEVELAND CONVENTION.

once, and that cars will be running by January next. The company have an ordinance granting them to operate a street railway on Twenty-second Street from Grove Street to Crawford Avenue, and on Lawndale Avenue from

company. It has been stated that in all probability they would lease crosstown lines of other companies and operate them as a belt road, as their franchise gives them the right to operate on the tracks of other corporations.

RAILWAY DYNAMOS AND THEIR MANUFACTURE.

Part II.—Shop Practice as Found at the Thomson-Houston Electric Co.'s Works, Lynn, Mass.



MOTOR, which is a modification of the single reduction type, was originally designed for narrow gauge lines, but it proved so efficient and popular that it was tried on lines of standard gauge, and has now become a universal favorite, having superseded nearly all the other types of Thomson-Houston motors; in fact, the manufacture of the double reduction motors has

almost ceased with the company, except as they are made to order to replace disabled motors on such lines as were originally equipped with this type, and which wish to keep the equipment uniform. Its popularity is evidenced by the fact that about 140 motors per week are now being turned out of the Lynn shops; a large number are also being made at the Schenectady shops, formerly known as the Edison Works.

In the previous number of this series we described in detail the manufacture of the M. P. generators, and we have now to study the construction of the popular W. P. motor. Naturally, since we learned that M. P. stood for multipolar in reference to generators we would expect that W. P. would have a similar significance when used in connection with the motor, but this is not the case, and our W. P. simply means "waterproof," a name given to this machine because its vital parts are so thoroughly protected from moisture by the peculiar shape of the frame or fields.

As will be seen from the initial figure, the general outline of this motor is spherical, the frame being formed in two parts with the corners of the lower half of the frame rounded off to facilitate the passage of the car over obstacles, should such be met with in the way. The parts of the frame or the field magnets are of soft cast steel, having the poles on the inner surface slightly projecting towards the centre, while there are depressions on the outer surfaces of the fields to compensate for the metal on the poles. The present form of frame has been developed by successive steps, and is very complete, even containing chambers which serve as grease cups so that only covers, are required.

The castings being delivered, the first work consists in planing the faces and bearings to insure close fitting joints. This work is done in some cases on ordinary planers, but a three-spindle universal milling machine

(Fig. 3) is employed for doing the most of this work, which saves three or four days' work on a frame. As will be seen from the illustration, one passage of the frame through this machine brings all the numerous surfaces to a perfect fit. Each spindle is supplied with a variety of cutting knives (seventeen in all) adapted to the shape of the surface to be planed. One spindle as it revolves cuts off the rough or outer surfaces, and the next as the frame passes under it cuts a little deeper and finishes the work. To prevent the cutting tools from heating, water is allowed to flow continually over the spindles, being conducted by strings to each cutter from an overhead perforated supply pipe, as shown. The two halves of the frame are then joined, the journal boxes adjusted, when it is placed in a two-spindle, horizontal, boring mill in which the bearings for the armature shaft and car axle are reamed out, insuring a parallel bearing for each. For

this work ten boring mills are employed.

Following the work, we next find the frame mounted in a machine where the inner faces of the poles are planed to correspond to the curve of the armature. The shaft of the revolving cutting tool is mounted in the bearings of the armature shaft, which insures a surface on the pole faces equally distant at all points from the periphery of the armature when mounted. The frames being completed, they are stored in convenient positions (Fig. 4) to await the completion of the armature, to the details of which we will now give attention.

The cores for the armature are constructed of laminated iron, in about the same manner as described for the generator core. The disks

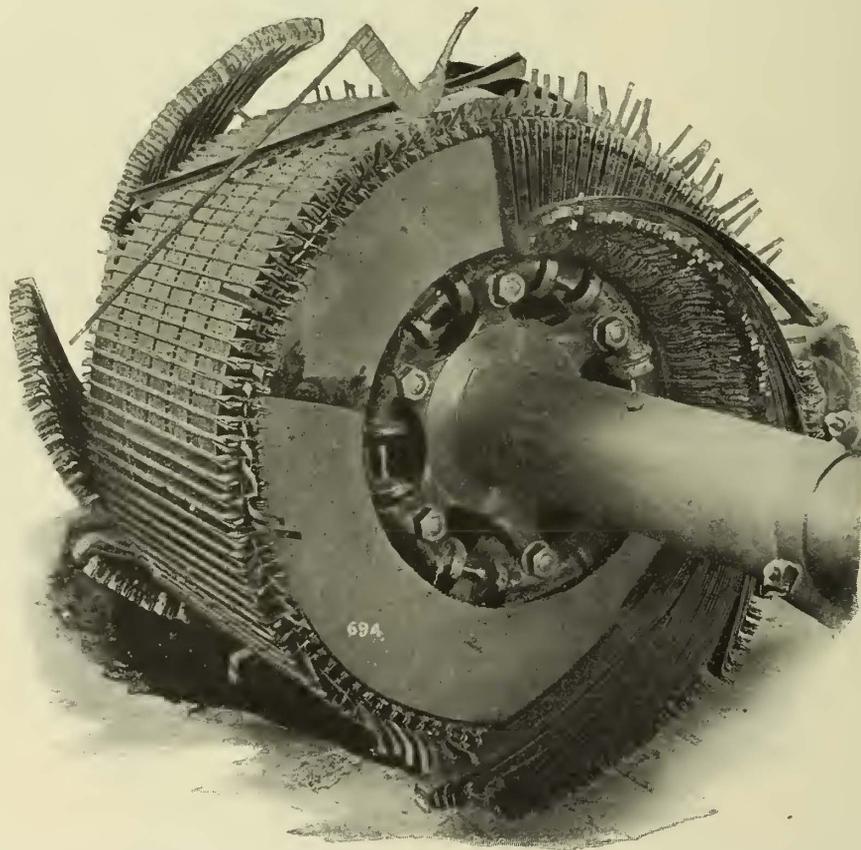


FIG. 2.—METHOD OF WINDING M. P. 500 H. P. GENERATOR ARMATURES
(See page 455.)

of which it is composed are stamped from sheet iron (Fig. 5), and each separate piece has its edge notched so that when laid up the notches form slots or peculiar shaped channels across the face of the core, which are designed to receive the wiring. The disks are then annealed, when they are laid up with tissue paper between each plate, and when a sufficient thickness has been secured the core is transferred to a powerful hydraulic press, and the plates are firmly compressed, making the core almost solid. Several small presses are provided for this work, each receiving its power from a common reservoir. For this purpose only one pump is provided, which runs continually and acts upon a piston which is loaded with twenty tons of metal. Each press is connected by suitable piping with this reservoir, and by opening a faucet the entire weight is at once utilized for compressing the plates. The core is then

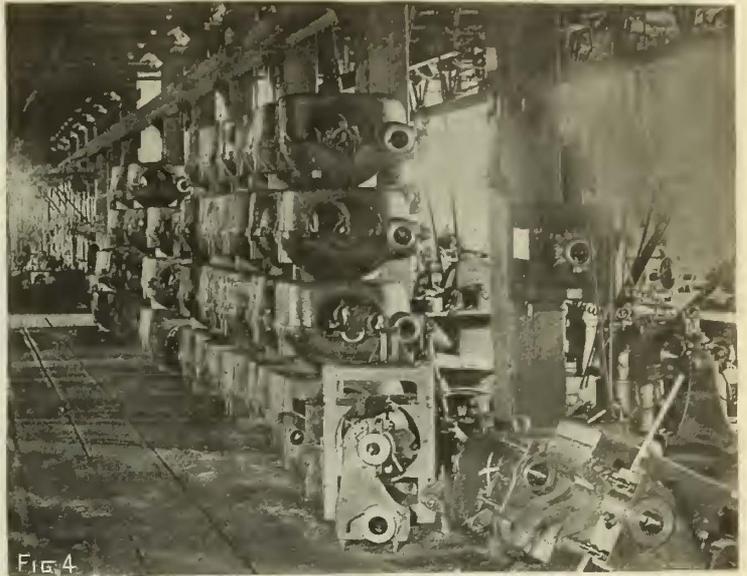
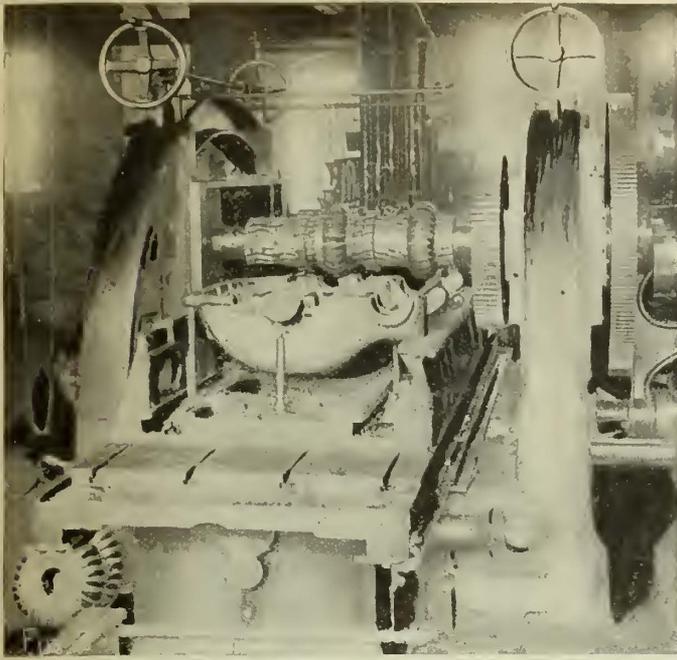


FIG 4

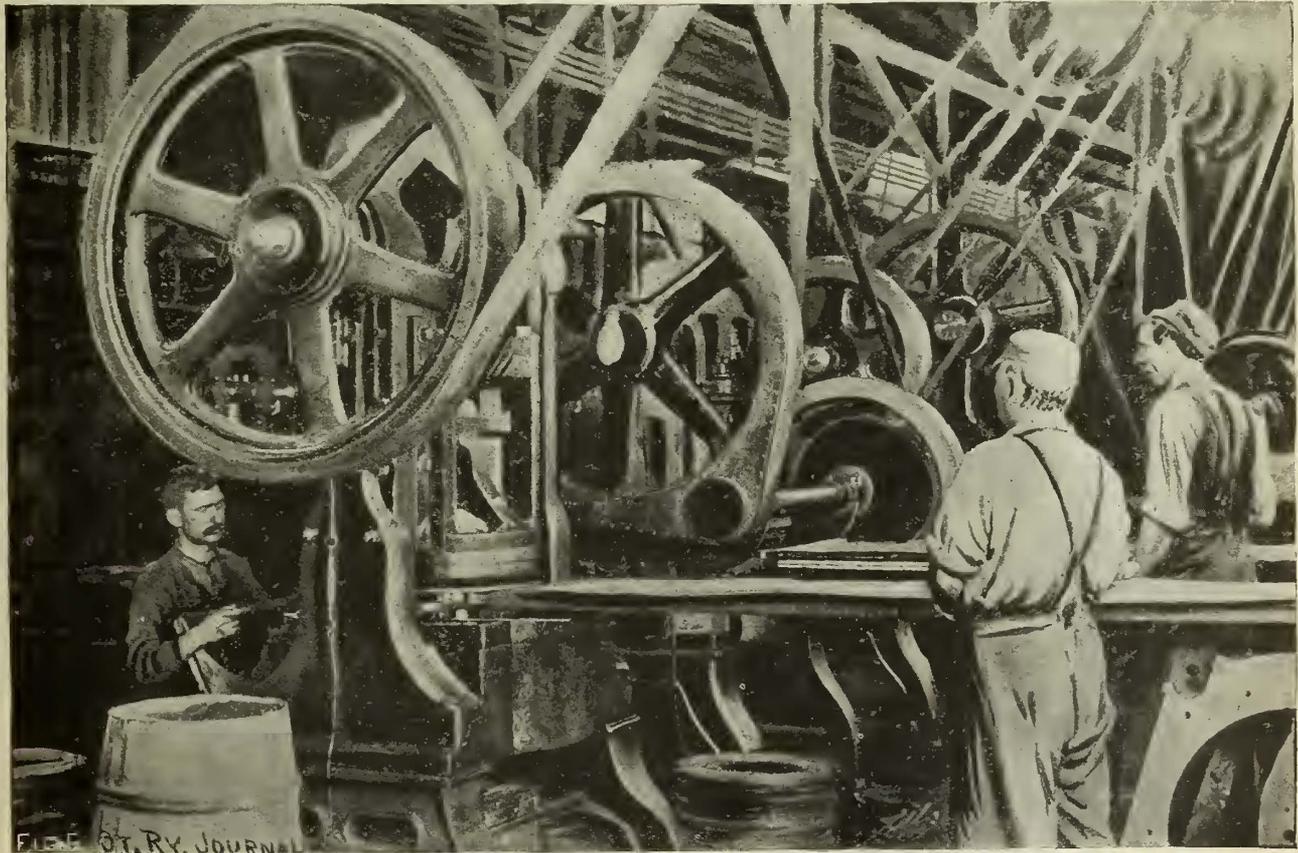


FIG 5 ST. RY. JOURNAL

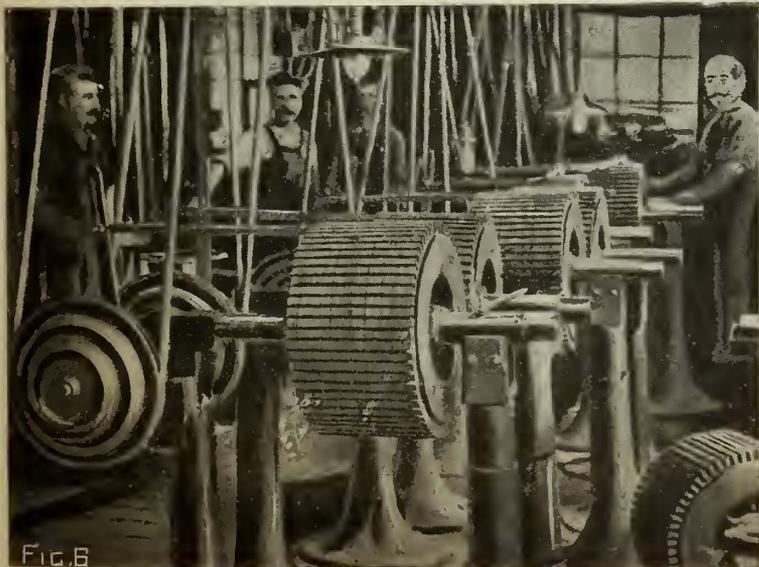


FIG 6

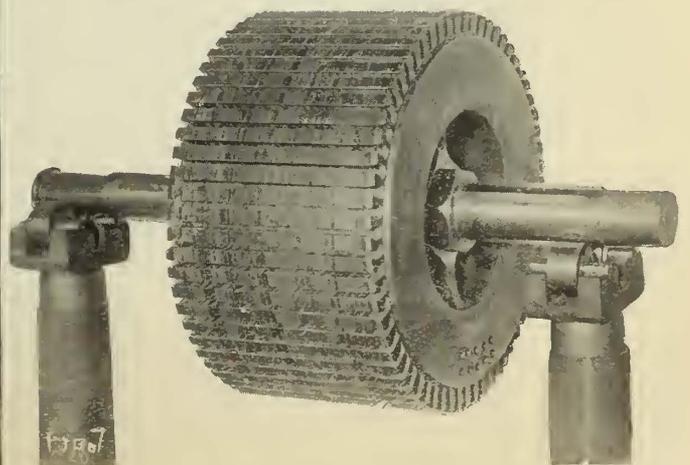


FIG 7

mounted on a gun metal spider similar to that employed in generator construction, and then pressed onto the shaft and secured by a collar nut, when the piece is mounted in a convenient position for filing out the channels, which is done mechanically as shown in Fig. 6.

The core with its shaft (Fig. 7) is now ready for the winding; those for the twenty-five horse power machines being twenty inches in diameter, and those for the fifteen horse power motors eight inches.

The motor winding department (Fig. 8) occupies a gallery on one side of the machine shop building L and

ferule which is then placed for about half its length between the jaws of a powerful press which flattens it out and bends it to the desired angle. A small hole is then punched through the ferule and wires at the flattened end, for the purpose of receiving the square headed screw which attaches the lead to the commutator bars. The screw being in place, the end of the ferule is then split and a portion turned up against the head of the screw thus forming a complete "nutlock." The armature is wound in sixty-four bobbins, and it requires about a week or fifty-eight hours for one man to wind an armature.



FIG. 8.—WINDING W. P. MOTOR ARMATURES.

here about 300 hands are employed during the day, and the work is continued by a night gang. The process is a very interesting one, and the life of the armature largely depends upon the care exercised in the winding.

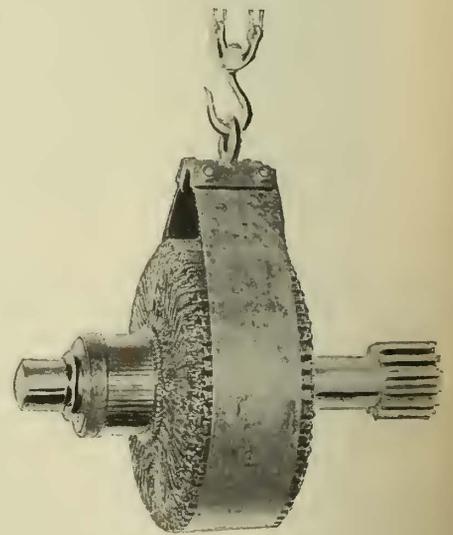
Round wire is employed in winding the fifteen horse power armatures, and flat wire for the larger machines. Each armature is wound with a continuous wire, the breaks being united by electric welding, for which purpose a small portable welding machine is provided, which is moved about from stand to stand, the current being conveyed to it by means of an insulated flexible connection. The wire is first wound upon long narrow shuttles, by means of which the operator, by passing it through between the arms of the spider, wraps the rim of the core until each channel, which has previously been lined with insulating material, is filled. The bobbins are each composed of from eight to fourteen turns of wire, depending upon the desired speed; those of the high speed, twenty-five horse power motors, have nine turns and the slow speed thirteen turns. The wiring is secured in the channels by means of wooden wedges in the same way as described for the generator. The flexible leads which connect the bobbins with the bars of the commutator are composed of exceedingly fine copper wire, and are attached to the bobbins at the middle of the face of the core, the insulation being first removed from the wire and lead, when the parts are laid alongside of each other for three or four inches and carefully bound with insulating tape. So carefully is this work done that burnouts seldom occur with this machine. No solder is used in attaching the flexibles either to the bobbins or commutator bars, and thus an element of weakness which was common in the old motors is eliminated. The commutator end of the flexibles is inserted in a short copper tube or

The winding room is equipped with a number of light traveling cranes with hand hoists to facilitate the handling of the armatures, and for safe handling a steel sling is employed as shown in Fig. 9.

While we have been watching the winding the construction of the commutator has been going on in another department. The process is about the same as described and illustrated for the generator commutators, and so we leave it in place without further comment.

The pinions, only a few of which are manufactured in the Lynn shops (the most of them being purchased from outside par-Fig. 9.—SLING FOR HANDLING ARMATURES. ties), are next attached to the shafts, and the completed armatures are stored in an adjoining department to await the assembling of the parts (Fig. 10).

The field spools, a number of which are shown in the right of the last figure, are wound the same as before described for generator spools. These are bolted



in place over the shallow poles, and are so placed that they nearly embrace the armature, insuring the utilization of nearly all the lines of force. All the bolts are provided with nutlocks to prevent their working loose.

The gear casings, a number of which are shown in

process of testing for electrical efficiency. For this purpose two motors are coupled together and are run alternately as generator and motor, the results being measured and recorded. The upper field of one motor is removed, and we are able to note that the lower field is supported

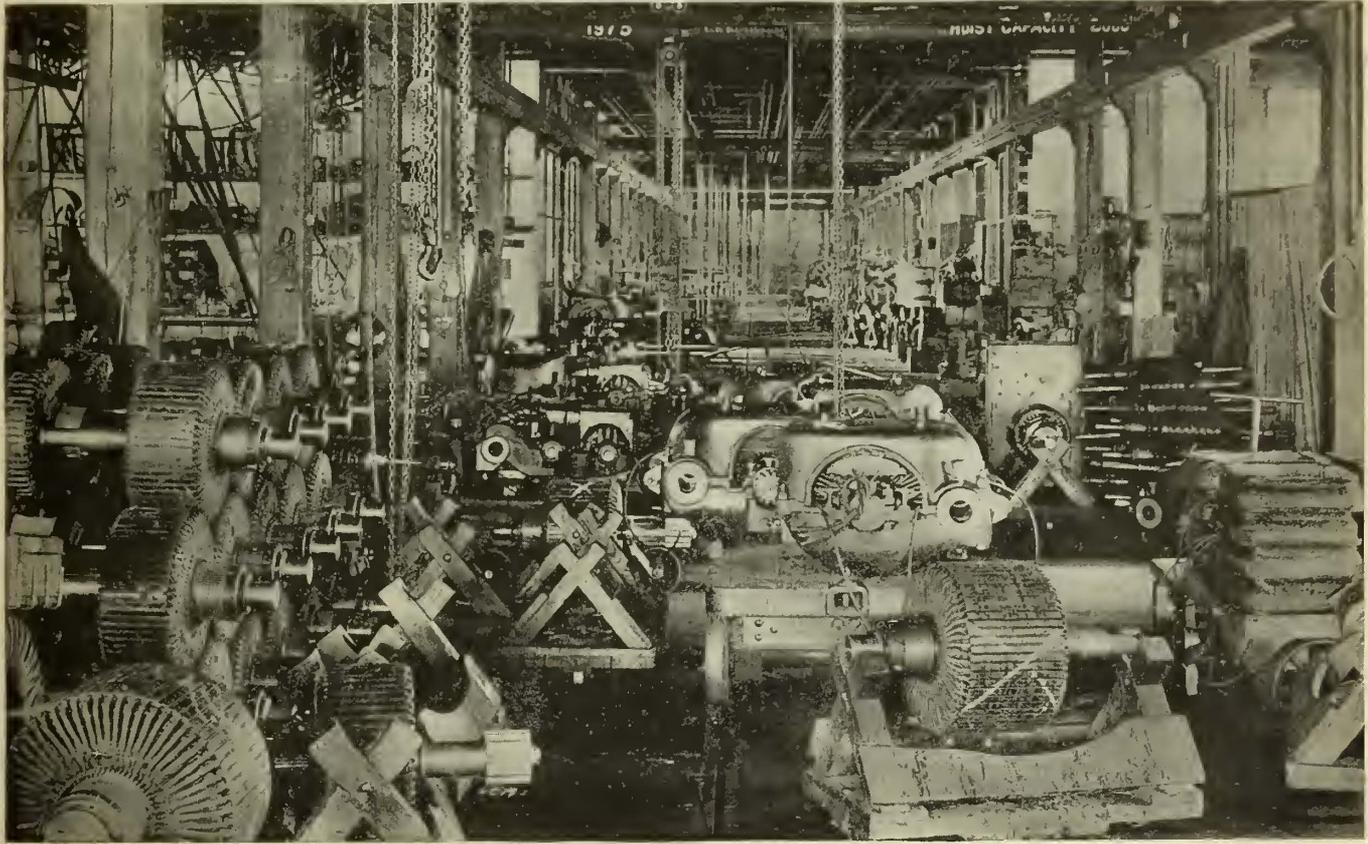


FIG. 10.—INTERIOR OF ASSEMBLING ROOM.

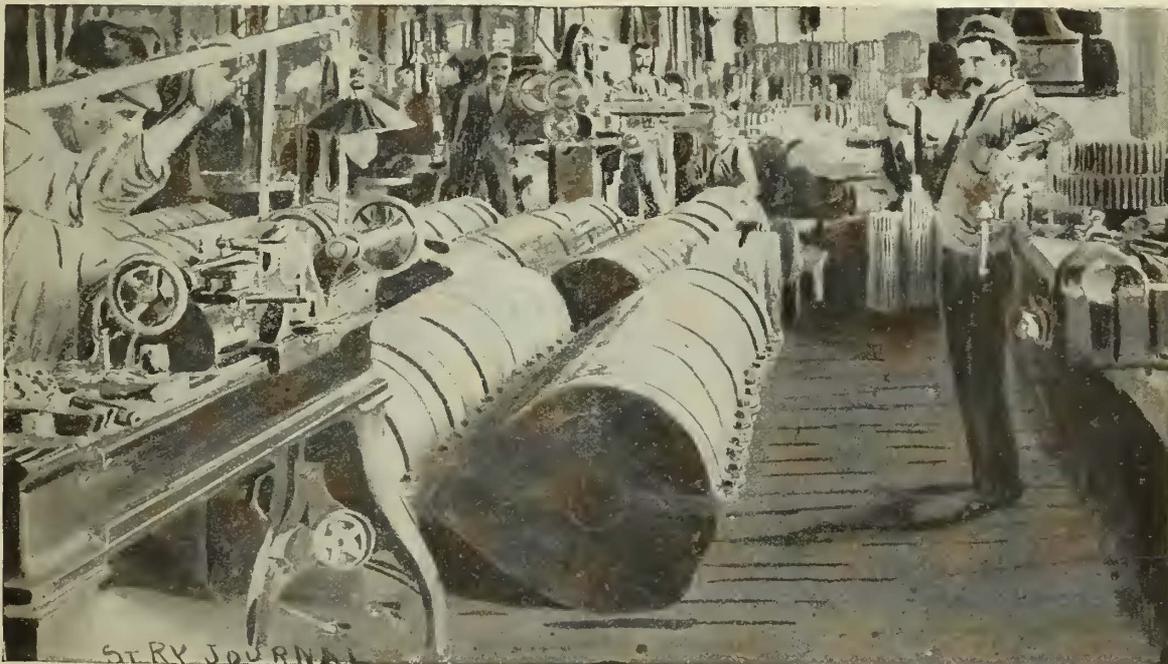


FIG. 11—FINISHING GEAR CASINGS.

Fig. 11, consist of a very thin shell of malleable iron, and are carefully fitted so that the joints are oil tight, and serve to exclude dust and provide for thoroughly lubricating the gears. A small hand hole on the top, with cover provides for inspection and the introduction of the lubricant. The parts of the motor, including the brushes and holders, being completed and having passed the inspectors, are assembled, and in Fig. 12 we witness the

and held in place at the back by means of a flat hook which embraces the car axle—a very ingenious arrangement, for without it the lower field would fall to the ground whenever the frame was opened. Our machines are now boxed and made ready for shipping, and for this purpose freight cars are brought directly to the shop by means of sidings from the steam lines, which convey them to all parts of the country where they are put in

service and minister to the comfort of untold numbers of people, and at the same time serve as dividend earners to those who have invested in this popular means of transit.

The manufacture of electric railway apparatus is, however, only a small part of the product turned out from the Lynn shops, a birds-eye view of which is presented in Fig. 13, but it is not our purpose in this connection to describe in detail the work in each department; we can only name them and pass on to general equipment and management.

The lighting department is by far the largest in extent of product, and embraces the manufacture of generators, transformers, lamps, both arc and incandescent, together with switches and other auxiliary appliances. Both direct and alternating current generators are made for lighting purposes, and for incandescent purposes three sub types are manufactured. To show how an alternating current machine differs from a railway generator, the former is presented in Fig. 14. Five different types of transformers are also made.

In the mining department we note the manufacture of electric drills, coal cutters, hoisting motors and various apparatus for mining work. The welding department is set off in a separate building, and is devoted to the manufacture of generators and

The Thomson watt-meter has a department exclusively devoted to its manufacture, and very large numbers (about 100 per day) are turned out. This is a tiny

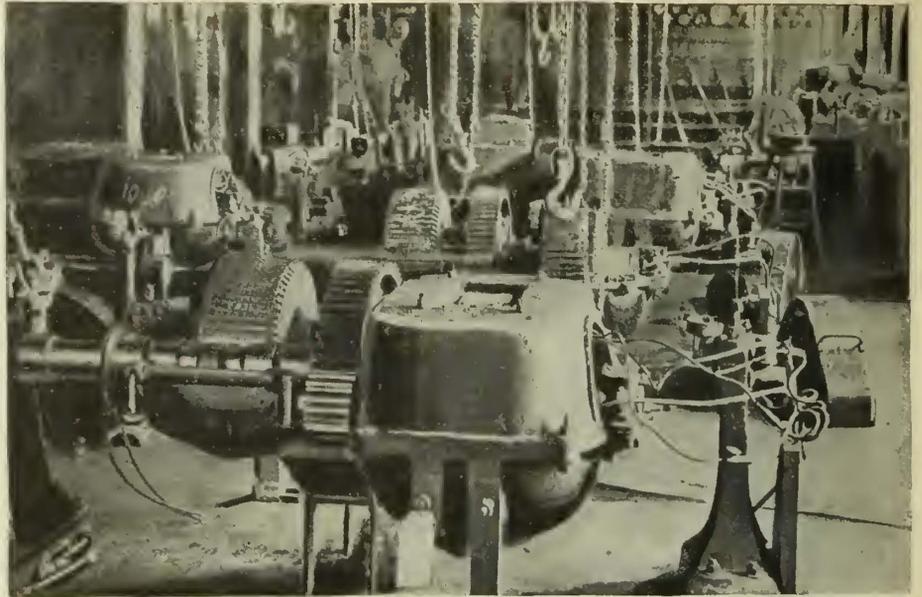


FIG. 12.—W. P. MOTORS COUPLED FOR TESTING.

but an exceedingly interesting machine, and is employed, the same as a gas meter, to measure the amount of current delivered to customers for operating stationary motors (Fig. 15). The armature of this meter, which is only

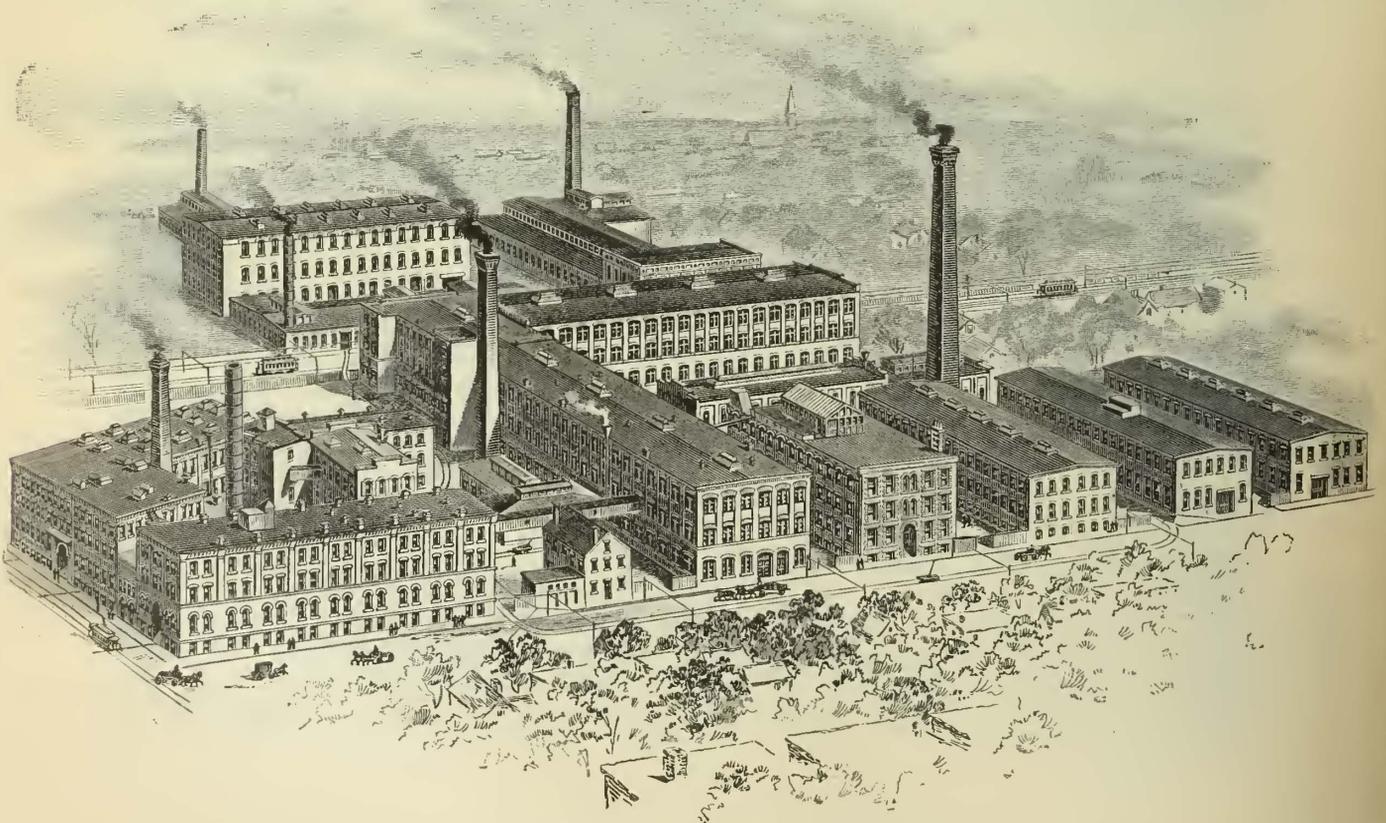


FIG. 13.—THOMSON-HOUSTON ELECTRICAL WORKS, LYNN, MASS.

electric welding machines. This is a growing industry, and quite marvelous results are obtained by the use of welding machines, some of which are designed for railway work, such as welding rails, welding chairs to rails, and attaching the base to the new type of electric rails which are now being introduced.

about three inches in diameter, is mounted on a vertical shaft or spindle and is driven with fields consisting only of spools without cores. To the lower end of the spindle is attached a thin copper disk which revolves between the poles of three U magnets placed in a horizontal position and which exert a retarding force in proportion to the current

employed. A revolving mechanism is attached to the frame above the armature, and the results are read from dials the same as in gas meters. In order to increase the output of these machines, a third story is being added to one of the buildings, which will be equipped with suitable tools for meter manufacture.

Electric locomotives are also receiving considerable attention, and the 400 h. p. machines for hauling steam cars through the Baltimore tunnel are now being designed.

Stationary motors are also manufactured in great numbers and in all

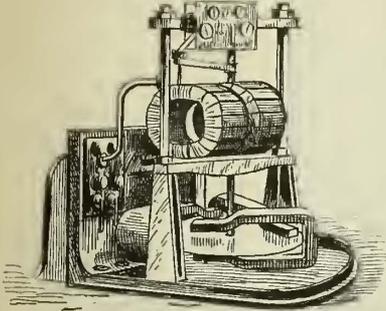


FIG. 15.—WATT-METER.

sizes from a one horse power machine up to 100 H. P., or any capacity required.

Not only do the Thomson-Houston company manufacture electrical apparatus for others to use, but they show their faith in their own products and in this subtle fluid as a mechanical agent adapted to a variety of purposes by employing it in nearly every possible way. Stationary motors, Fig. 16, are brought into extensive use in nearly every department for driving the shafting from which the tools are operated, no less than forty-five machines being thus employed. The posi-

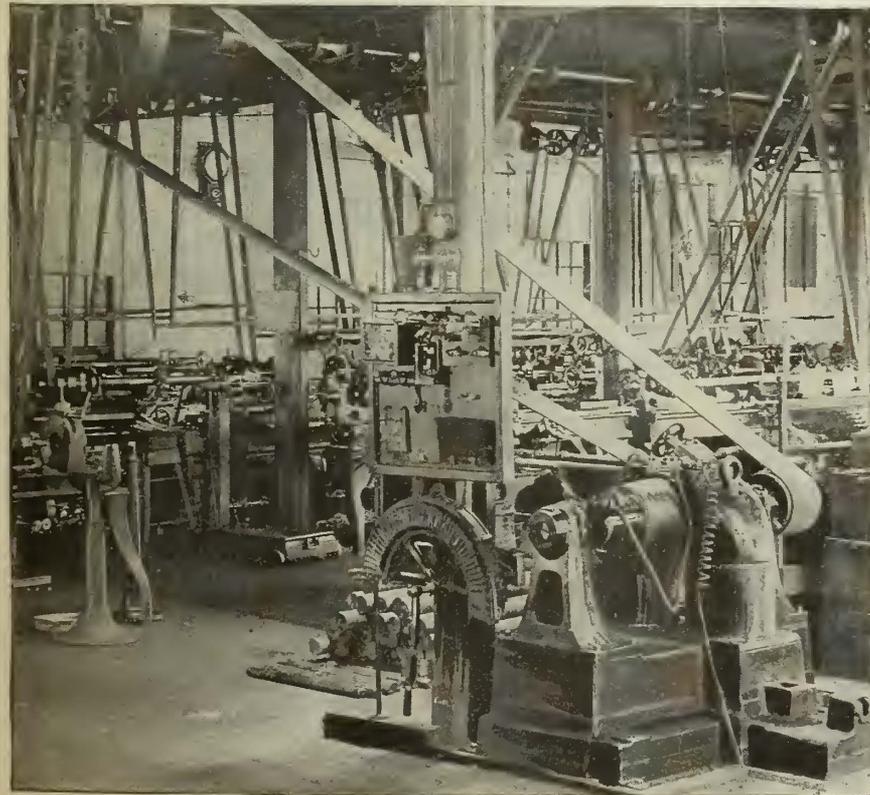


FIG. 16.—STATIONARY MOTOR DRIVING SHAFTING.

tion of the motor with its rheostat, and the method of belting to the shaft, is clearly shown in the figure. Not only are the specially constructed motors thus employed, but in a few cases W. P. railway motors are utilized for

shop power purposes. When thus employed they are usually suspended from the ceiling or mounted on a bracket at the side of the room. This use of railway

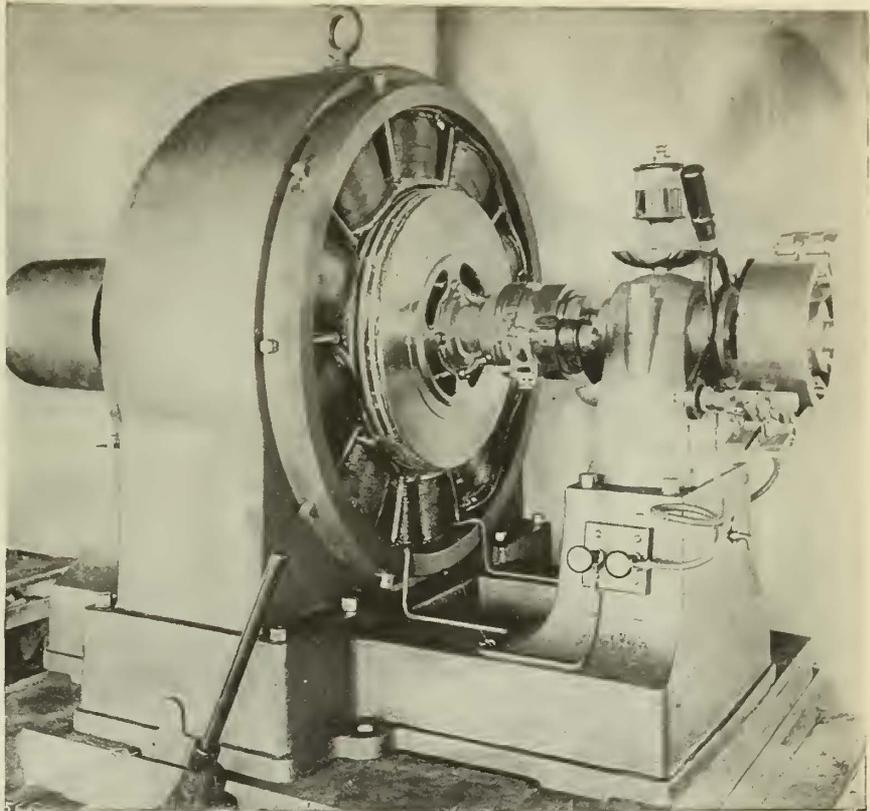


FIG. 14.—ALTERNATING CURRENT DYNAMO.

motors will suggest to street railway managers the possibility of employing old car motors for operating the repair shop tools. Not only are the W. P. motors employed for shop purposes, but, as previously noted, the traveling cranes are equipped with double reduction railway motors.

A very elaborate system of transfer tracks is provided in the yards, adjacent streets and through the buildings, upon which are operated, by means of electric motors, low trucks or flat tramway cars (Fig. 17) for the purpose of transmitting material about the works. This equipment consists of eight shop motors, and forty tow cars. The motor cars are provided with a folding trolley pole, as shown, which has two wheels, so that the cars can be run beneath the low ceiling of the basement floors or in the yard from a trolley at ordinary height. There is also an electric locomotive of forty horse power (Fig. 18) with which the freight cars from the steam lines are shifted about the shops. This machine will handle a train composed of a number of freight cars, and place the cars in convenient position for loading or unloading.

The electric current is also employed for lighting the shops, and for this purpose there are about 300 arc lights and more than 3,000 incandescent lamps. The current for power and lighting purposes is generated by a number of dynamos distributed about the works, with an elaborate system of switchboards so equipped that the current from the machines under test can also be utilized for lighting and power purposes.

The telephone system of the shops is also very com-

plete, there being a telephone in every main office, and in the offices of the shop foremen, with a complete telephone exchange having a switchboard containing seventy-one drops. There are also private lines to the head offices in Boston, and connections with the city and long distance services. There are also the usual fire alarm signals and the watchman recording disks.

Steam is, of course, the prime motive power for operating the shops, and for this purpose a number of engines have been installed in the different departments,

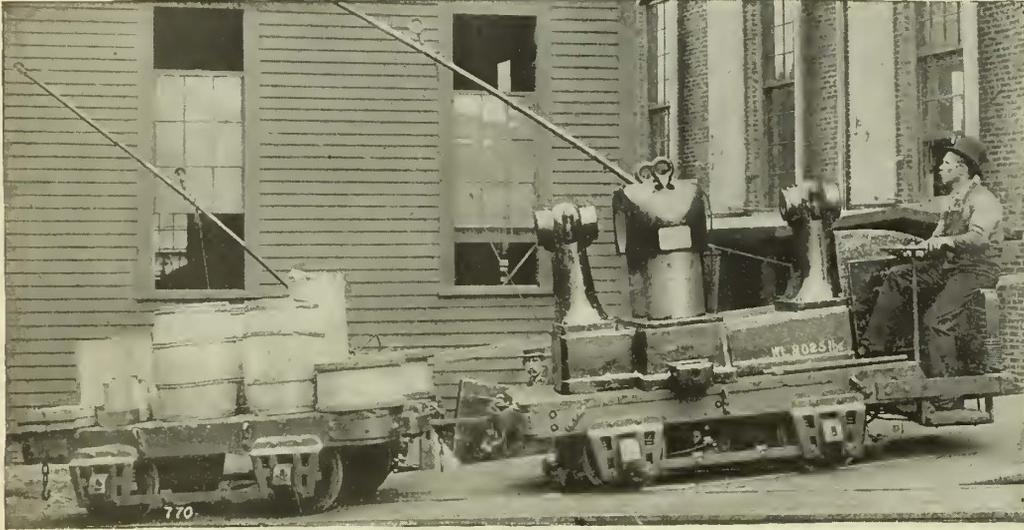


FIG. 17.—ELECTRIC YARD TRAMWAY.

aggregating in all about 2,500 H. P. The main power house adjoins the testing room, and here is located a 1,000 H. P., Greene, tandem, compound engine (non condensing), manufactured by the Providence (R. I.) Engine Co. The flywheel is eighteen feet in diameter, with a five foot face, from which two belts are driven. This engine is employed almost exclusively in testing the large M. P. generators, to which they are belted direct with suitable belt tighteners. The shaft of the flywheels is also extended and provides for coupling direct to the ten pole generators when these are being tested.

The engine room is equipped with a powerful fire pump made by the George F. Blake Manufacturing Co., of Boston, capable of throwing three streams aggregating 750 gals. per minute. A second Armington & Sims 400 H. P., high speed engine is also employed in the testing room. This drives three 100 H. P. shop generators, and is at times employed for testing. There are also three other engines in other departments, one being a 120 H. P. Corliss and one a double Greene of 500 H. P. The steam generating equipment of the principal power station consists of two batteries of longitudinal tubular boilers manufactured by Abendroth & Root and four vertical Manning boilers. The exhaust steam is utilized for warming the buildings, and for this purpose the rooms are provided with a direct overhead system of steam piping.

Steam is referred to above as the prime motive power of the works, and so it is in a physical sense, but every machine which has its origin in the brain of the inventor must be designed before it can be manufactured in the shops, so that the draughting room becomes the most important factor in keeping the wheels moving. A large room (Fig. 19) on the third floor of the office building is devoted to this purpose, and here nearly 100 draughtsmen are employed in completing the various designs. In connection with this department is a blue print and photograph room. There are also storage vaults and racks for holding the prints, any one of which can be easily found, as a very complete ready reference index system is employed.

Notwithstanding the extent of the works, which now have a floor space of 342,000 sq. ft., or about eight acres, as shown in the illustration (Fig. 13), the business has outgrown the capacity of the factories, and the company

have already begun the erection of large buildings on the Saugus River, about one mile from the present plant. A part of the new plant will be employed as a foundry for making heavy castings, and here will be located the steam and electric power plant. Being near tide water, condensing engines can be employed, and the current for operating and lighting the present plant will be transmitted by suitable conductors.

EMPLOYEES.

The organization and discipline of a shop force is not less interesting than the manufacturing details just described, and the effect of a wise administration is evidenced by the diligent and conscientious manner in which each individual of the nearly 4,000 operatives performs his tasks, and by the orderly manner in which they conduct themselves in public while going to or from their work or when off duty.

The employes enter the works through two main doors which lead from the street into a check room which is in charge of a timekeeper and assistant, and it is an interesting sight to see the hands gathering from every direction as the hour of work approaches. Upon the walls of this room are hung a number of check boards each containing 100 numbers with brass checks having corresponding numbers, attached by a hook to the numbers on the board. The men are known by numbers, and each man as he enters takes his check from the board and deposits it in a box as he passes from the check room into the yard. As soon as the hour for reporting is up, which is 6:30 A. M. and 1 P. M., the box containing the checks is removed, and another put in its place, which remains for half an hour, and all checks found in this are marked a half hour late. At the end of the half hour this

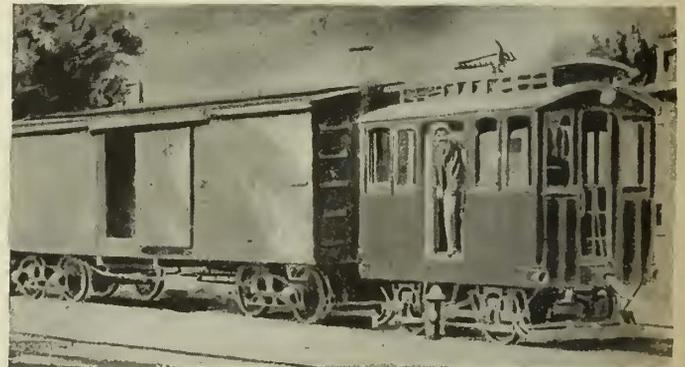


FIG. 18.—ELECTRIC SHIFTING LOCOMOTIVE.

is removed, and all checks deposited during the next half hour are marked one hour late, when the doors are locked and no one is allowed to enter.

All checks remaining upon the boards are marked absent, and the checks are then sorted by the attendant and replaced upon the boards. Should a man remain in the works during the noon hour, he is required to go and draw his check the same as those entering. In case an employe wishes to leave the works before the hour of closing, he secures a pass from the foreman of his department, which he deposits with the timekeeper at the check room, who notes the hour of leaving and turns the pass in with the owner's time card. The hours of work in summer are from 6:30 to 12 A. M., and from 1 to 6 P. M.

with a half holiday on Saturday. Each department is in charge of a foreman who keeps a record of all work, and reports to the production department daily the progress on each piece of work under his supervision. A mechanical record in the office of the production department indicates the condition of every machine and principal part that is progressing through the shops.

In addition to the regular shop force, the regulations provide for the employment of a certain number of "students" and "apprentices" who are under the supervision of the expert department. The organization of this department consists of a general manager and foreman. The manager is assisted by a clerk, stenographer and general expert, and the foreman by a clerk and office boy. Under these in the Lynn factory are eighty students and twenty-five apprentices, with two special experts for trouble work, the duties of the latter being to hunt for and remedy the trouble that may occur in the operation of any machine in the different departments.

The students take a regular course, covering a period of one year, and are assigned for a certain number of

rates. The employes in the expert department associate freely with the heads of the departments, and every facility is offered them for becoming acquainted with all the details of the works. The management are besieged with applications for entrance into these courses, and they are annually sending out a number of graduates who secure lucrative positions in all parts of the country.

HISTORY.

The name of the company, Thomson-Houston, is derived from those of Prof. Elihu Thomson and Prof. E. J. Houston, founders of the industry. Professor Thomson was born in Manchester, Eng., in 1853, but at the age of five years came to this country with his parents who located in Philadelphia, where young Thomson was educated in the public schools. In 1870 he was appointed as Assistant Professor of Chemistry and Physics in the central high school, and in 1876 to the Chair of Chemistry and Mechanics in the same school. As early as 1874 he began work on a dynamo machine for lighting purposes, and afterwards associated with himself Prof. Edwin J. Houston who had before built an eight light dynamo in a



FIG. 19.—DRAUGHTING ROOM—THOMSON-HOUSTON ELECTRICAL WORKS.

weeks to different kinds of work in each of the departments. The pay of the students is five cents per hour for the first three months, seven cents per hour for the second three months and ten and twelve cents for the successive periods; and should they remain after completing the course they receive fifteen cents per hour, unless they secure regular employment in the shops, when the pay is such an amount as may be agreed upon.

The regulations require that applicants for admission to the expert department must be twenty-one years of age and graduates from some technical school or college, either as mechanical, mining, civil or electrical engineers, or shall have had experience for two or more years in general electric construction work or machine shops. On completing the course in a satisfactory manner, the students are given a handsomely engraved certificate of graduation, signed by the manager and foreman of the expert department, stating that the holder is deemed competent to install and operate the particular apparatus named in his certificate.

Applicants for admission to the apprentice course are required to be not less than eighteen or more than nineteen years of age, and must have graduated from some public high school or its equivalent. The course covers a period of three years, and the pay is five, six and seven cents per hour for each year in order. On becoming twenty-one years of age, and having a satisfactory record, they are transferred to the student course, and receive eight cents per hour for the first six months, and then regular student

small shop in Philadelphia, with whom several joint patents were taken out. Upon these patents the American Electric Co., was organized in 1880 under the laws of Connecticut, and Professor Thomson became its electrician when he resigned his position at the high school and removed to New Britain, Conn., where the works were first established. Professor Thomson still retains an active interest in the company, and is employed as expert in charge of the chemical and patent department. In 1882 the majority of the stock of the company having come into the hands of certain Lynn capitalists, headed by Mr. C. A. Coffin, who is still the executive head of company, the business was re-organized and the name of the company changed to that of Thomson-Houston. A building with a floor space of 26,962 sq. ft. having been erected in Lynn, the machinery was removed from New Britain 1883, and the factory facilities have naturally increased to their present magnitude, while the capital stock of the organization is now \$18,400,000, reflecting creditably upon the financial ability of the general manager, Mr. C. A. Coffin. The Edison General Electric Co., was recently merged into this company, and they now constitute the General Electric Co., with a capital of \$50,000,000.

PERSONAL.

The management of the Lynn factory is in the hands of Mr. E. W. Rice, Jr., who, in all problems relating to the factory and employes, consults with a "factory committee," consisting of the heads of some of the depart-

ments. The members of this committee, besides Mr. Rice, are Mr. D. M. Barton, manager of the production department, Mr. I. F. Baker, mechanical superintendent and Mr. G. E. Emmons, auditor.

Mr. W. H. Knight is chief engineer of the railway department, and he devotes all his time to railway work, being assisted by Mr. H. F. Parshall. Mr. Knight was engineer of the original Bentley-Knight company, and in that capacity built and operated the first commercial

The Otis Elevating Railway, Catskill Mountains.

During the last month the longest single lift cable incline railway in this country, and the second in the world, was put in operation on the eastern slope of the Catskill Mountains. The lower terminus of the road is at Otis, a station on the Catskill Mountain Railroad, and the upper terminus is about 200 yds. from the Catskill Mountain House. The total length of the incline is 7,000

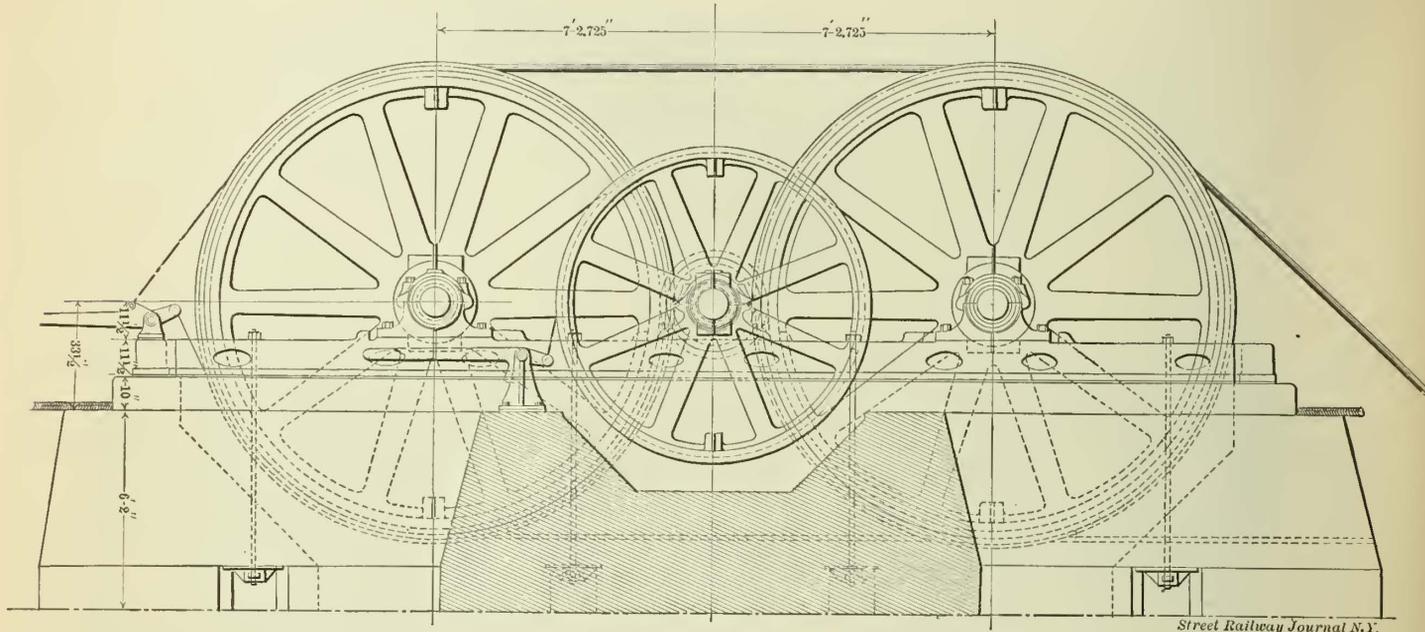


FIG. 2.—SIDE ELEVATION OF DRIVING MACHINERY—OTIS ELEVATING RAILWAY.

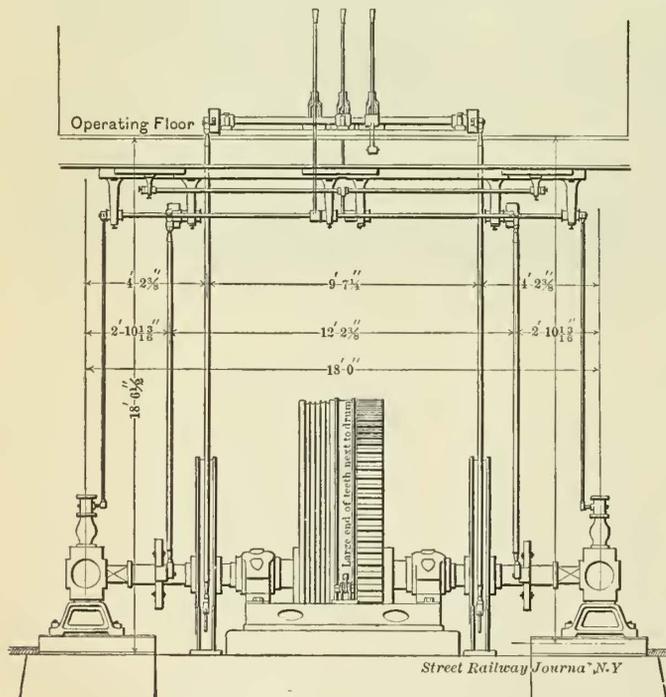


FIG. 1.—END ELEVATION, SHOWING CONTROLLING DEVICES—OTIS ELEVATING RAILWAY.

electric street railway in this country, and has since been closely identified with electric railway work.

The management of the expert department is in the hands of Lieut. J. B. Cahoon, who has supervised the organization of the forces in this and nearly all the departments, and his success in this direction reflects creditably upon his ability. Lieutenant Cahoon is a graduate of the U. S. Naval Academy, and spent fifteen years in active service, but having been injured at the torpedo station he was retired in June 1889 and since then has been identified in various capacities with the Thomson-Houston Electric Co. To him and to the managers of the other departments our thanks are tendered for courtesies shown.

ft. and the rise 1,630 ft. The grades vary from 4 to 34.4 per cent. The ascent is made in ten minutes or at the rate of about eight miles per hour. Only two incline railways in the world exceed this in length; one at Mt. Vesuvius, Italy, which, however, is operated in two sections, neither of which is as long as that mentioned above, and one at Mt. Soperga, Italy, which has a rise of less than the Catskill incline.

The road was surveyed during the latter part of last year, but owing to certain delays, active construction was not begun until about the middle of last May. The incline is of the three-rail, gravity type, the middle rail being used by both the ascending and descending cars, and a turnout 100 ft. long being provided midway between the two termini. The two trestles on the line have a total length of 2,600 ft. and maximum height of seventy-two feet, are made of Georgia yellow pine and required in their construction nearly 1,250,000 ft., board measure. On the line of the road there are also four heavy rock cuts, one of which is forty-five feet in depth and from which about 70,000 cu. yds. was removed.

The gauge adopted is three feet, the same as that of the Catskill Mountain Railway with which it connects. Tee rails thirty-five pounds in weight are used, laid on 6 x 6 ins. x 8 ft. cross ties, spaced two feet between centres. These ties, with the exception of 1,000 ft. at the lower end where they are ballasted with broken stone, are laid on longitudinal stringers, 6 x 10 ins. and these, except at the trestles, are mounted on subsills six feet from centre to centre. The structure is made still more rigid by two longitudinal guard rails of wood, 6 x 8 ins., which are bolted to the cross ties and which also serve for safety rails, as will be described later.

The engine and boiler houses are at the summif terminus, the latter being located at the side of the track about fifty feet below the former, so that the fuel can be dumped from the railway cars directly in front of the door. The boilers are two in number, of the Manning upright tubular type, were manufactured by E. Hodge & Co. of East Boston, Mass., and were furnished by the Q. N. Evans Construction Co. Each boiler has a nominal capacity of 150 h. p., contains 152 tubes fifteen feet long and two and a half inches in diameter, and is run under

a pressure of 100 lbs. A Wortlington pump is used. The hoisting machinery (see Figs. 2 and 3) consists of two 12 X 30 reversible Corliss engines, manufactured by Hooven, Owens & Rentschler of Hamilton, O., operating one shaft on which is a pinion geared to two Walker differential drums. Each drum is twelve feet in diameter and has six rings. The driving machinery is controlled from a lookout station above the engine room by an operator who, from his position on a clear day, can see the greater part of the line. This operator has before him three levers, shown in Fig. 1, one of which controls the throttle valve, another reverses the machinery, and the third sets two friction brakes operating drums seven feet ten inches in diameter mounted on the pinion shaft. The operator is also in electrical communication with each train; this is accom-

plished by the use of two conductors, one for each train, upon each of which runs a trolley attached to the forward car. The conductors are carried on bell insulators mounted on the ties, and the return circuit is made through the rails. A signal bell, operated by a relay circuit, is located in the lookout station, and one is carried on each car, so that signals can be given from either car to stop the machinery at any point. When such a signal is given from either car the operator in the lookout station, before stopping the machinery, answers by a return signal that the request is understood. As an additional safety precaution at the station, friction brakes are also being placed on the drums themselves which will be operated automatically when the speed of the cable exceeds twelve miles per hour.

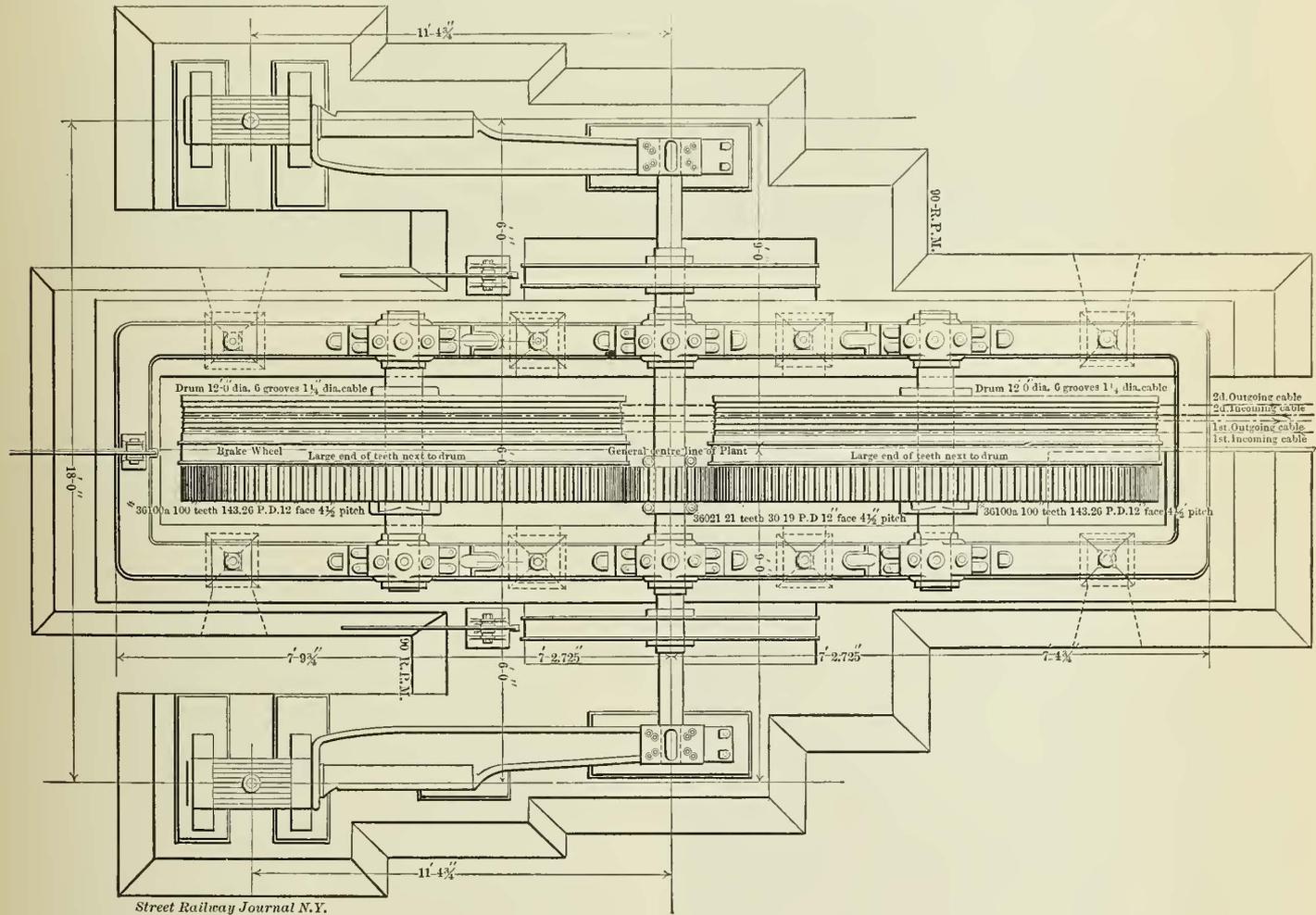


FIG 3.—PLAN OF DRIVING MACHINERY—OTIS ELEVATING RAILWAY.

plished by the use of two conductors, one for each train, upon each of which runs a trolley attached to the forward car. The conductors are carried on bell insulators mounted on the ties, and the return circuit is made through the rails. A signal bell, operated by a relay circuit, is located in the lookout station, and one is carried on each car, so that signals can be given from either car to stop the machinery at any point. When such a signal is given from either car the operator in the lookout station, before stopping the machinery, answers by a return signal that the request is understood. As an additional safety precaution at the station, friction brakes are also being placed on the drums themselves which will be operated automatically when the speed of the cable exceeds twelve miles per hour.

The cables were manufactured by John A. Roebling's Sons Co., and are two in number. Each is of steel with a hemp centre, 7,250 ft. long, one and one-quarter inches in diameter, ten tons in weight, and with a tensile strength of fifty-two tons. The greatest strain that can come on either is ten tons, so that there is a very high factor of safety. The ends of the two cables are attached to the two forward cars of each train as described later. At

The rolling stock consists of two passenger and two baggage cars, each train being made up of a car of each kind. The passenger cars, which are run ahead of the baggage cars, are open, forty-six feet long, and can seat comfortably seventy-five passengers each. The benches, which are fifteen in number, are arranged transversely to the car, with backs toward the front platform, and are similar to those in the elevators of the Eiffel Tower. The ends of the cars are glazed, and one of the sides has fixed horizontal iron rods, while the other, or entrance side, has wooden bars which are dropped in place when the passengers are seated. The ceilings are painted white, and the body of the car wine color. Each is mounted on two four wheel trucks. The baggage cars are of the ordinary platform type, and, with the passenger cars, were manufactured by Jackson & Sharp, of Wilmington, Del.

The safety grip used on these cars is especially ingenious, and is operated automatically when either or both of the cables break or become slack, or when the speed of the car exceeds twelve miles an hour. The ends of each of the cables are fastened to opposite sides of a pivoted metal disk, placed under each passenger car about in the centre. While both cables have the same tension, the disk

remains stationary, but should the tension on one relax beyond a certain amount, the displacement of the disk will throw the safety grip into action. This grip consists of two

speed is excessive, permitting the setting of the grip. These grips are similar to those used on the Weehawken elevator, have been thoroughly tested by the manufacturers, the Otis Brothers, of New York, and have been found to be perfectly reliable.

An especially interesting and novel feature of the road is the grade line which is a combination of two tangents and several circular, compound and parabolic curves, so arranged as to compensate for the difference in weight between the long and the short ends of the cables. By this device the cars with equal loads will exactly balance each other at any point of the trip, making the load on the engine simply that required to overcome the frictional resistance of the plant, and with ordinary variations in loading, the work on the engines will be constant at all points of the incline. The credit for the application of this principle for the first time is due to the designing engineer of the road, Mr. Thos. E.



FIG. 4.—UPPER TRESTLE—OTIS ELEVATING RAILWAY, CATSKILL MOUNTAINS.

toothed surfaces and a toothed dog, which when actuated will engage with the wooden guard rail on three of its surfaces. The device for operating the safety grip auto-

Brown, Jr., to whom we are also indebted for the accompanying details of the railway.

The grade line in detail is as follows, all the distances being measured on a horizontal projection from a point directly in front of the summit station. From the top of the incline, which is about fifty feet beyond the point selected as a starting point, for a distance of 816 ft. from the starting point, the grade line is a uniform descent of 30.5 per cent. From 816 ft. to 1,390 ft. from the starting point the grade line is a vertical circular curve, convex upward, the maximum grade on the line, 34.6 per cent., being at the point 1,390 ft. From 1,390 ft. to 2,614 ft. there is a vertical circular curve, concave upward, of 62,985 ft. radius, thence to a point 3,861 ft. distant, a vertical circular curve, convex upward, of 21,515 ft. radius. From 3,861 ft. to a distance of 5,131 ft. there is a vertical circular curve, convex upward, of 14,572 ft. radius, and from 5,131 ft. to 6,596 ft. a parabola, convex upwards. For the remaining 404 ft. of the line there is a uniform grade of 4.04 per cent. The average grade is about 23.7 per cent.

The road was built by the Otis Elevating Railway Co., of New York, at a cost of \$275,000. The assistant engineers were Gaylord Thompson, of New York, W. G. Howell, of Washington, and Charles F. Parker, of New York. The contractor for the entire line was Charles L. Bucki, of New York; sub-contractors for grading and track laying, Pennell, O'Hern & Co. of New York; for timber work Mairs & Lewis, of New York. The contractors for the machinery were Otis Bros. & Co. Figs. 4 and 5 are from photographs taken by J. W. Rusk.

World's Fair Passenger Cars.

The cars which the Illinois Central Co. are building for use in drawing crowds to the World's Fair ground are similar to an open street car. They are made of this special design in order that they may readily be converted into freight and platform cars after the Exposition is closed, for the company could not afford to build 600 passenger coaches for six months' service. The cars will be built with no centre aisle, and the fares, therefore, will be collected before the passengers enter. A lever at the top is connected with the doors so that all entrances can be closed at once.



FIG. 5.—VIEW OF INCLINE FROM NEAR LOWER TERMINUS—OTIS ELEVATING RAILWAY.

matically consists of a governor wheel which runs on the guard rail ahead of the grip, and contains two weights which are thrown out by centrifugal force when the

THE Akron Street Railway Co. have been experimenting with a thirty horse power electric motor designed by Mr. John Seiberling of that company. The motor has given very good results in practice.

A Novel Combination Car.

Several weeks ago a new car, which is illustrated in the accompanying engravings, was put into service on the Euclid Avenue line of the East Cleveland Railroad Co. The officers of the road were at first doubtful if in

narrowness of the passage way, as the feet of passengers do not offer any obstruction. At the ends of the aisle ready exit is afforded by side doors opening on roomy platforms which have accommodated eighteen persons on special occasions.

When the car is closed by the panels a door is arranged at the side to facilitate entrance and exit, making three doors in all. Those interested in the car lay stress on the fact that the seats are arranged transversely. They state that one reason that open cars are so popular is because seats are arranged in this way.

The car is reached by a double step, which has not been found to cause any inconvenience even to those who board the car when it is in motion. The car has straight

sides, and it is stated that the cost of construction is not high. The car used in Cleveland was built by the East Cleveland Railroad Co. The inventor is J. A. Mehling, who, with S. D. Dodge, of Cleveland, owns the patent.

One Company and Two Presidents.

The Atlanta Traction Co., at present presents the condition of a railway company with two presidents. The stock of the company, which controls a number of the most important lines in Atlanta, was divided among Messrs. Hoppie and Lanier who together owned 1,499 shares, Mountain and Woodward who owned the same number of shares, and A. T. Stewart who owned two shares. The first two mentioned gentlemen with Mr. Stewart held the control of the company until recently, when Mr. Lanier transferred his half interest of the 1,499 shares to a number of purchasers. These latter, soon after the purchase, proceeded with Messrs. Woodward and Mountain to elect a new board of directors by whom a new set of officers was chosen. Mr. Hoppie still claims to be president stating that the half interest held by himself and Mr. Lanier was owned jointly, and that, consequently, all sale of the stock was void. The courts will decide the matter.

A Long Lived Cable.

On July 2, the Los Angeles (Cal.) Cable Railway Co. took out of use the Grand Avenue cable which had been in use since September 11, 1889, lasting 1,026 days. It was 23,400 ft. long and was the only cable that has ever been on the line, and had run 163,944 miles. The cable is one and one-quarter inches in diameter and is composed of 114 steel wires in six strands of nineteen wires each, wound about a hemp coil. It was made by the Hazard Manufacturing Co. of Wilkesbarre, Pa.

The cable is not yet worn out. It would have lasted longer in the condition it was in on July 2, but the management feared to trust it to haul the heavy loads which had to be carried on July 4, and did not want stoppage of travel to occur on that day.

THE North Chicago Street Railway Co. have decided to adopt a new grip car made by the Brownell Car Co., St. Louis.

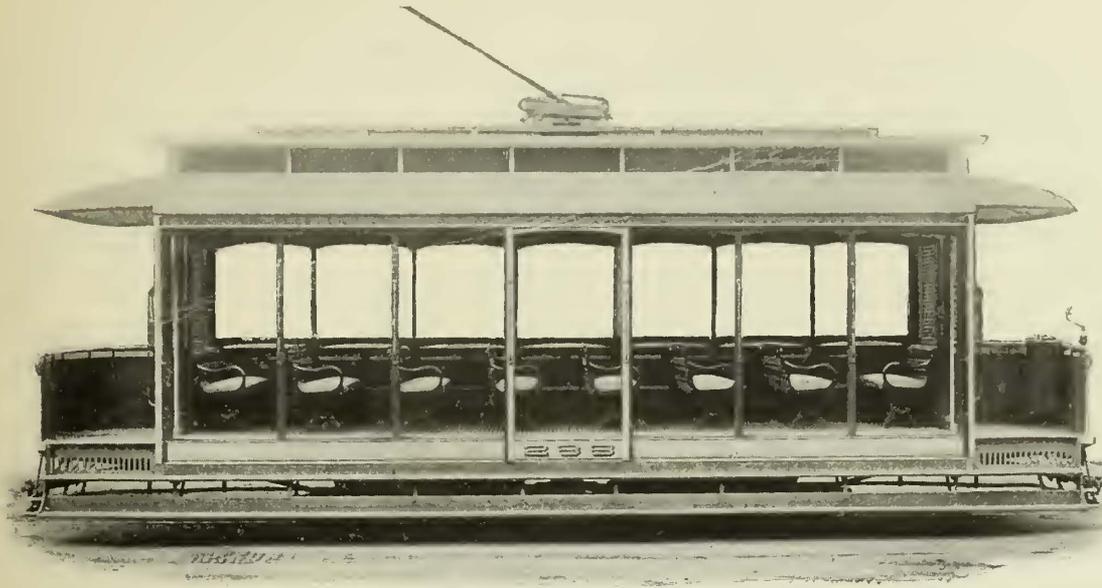


FIG. 1.—SIDE VIEW OF CLEVELAND COMBINATION CAR.

actual use the changes introduced in the plan of the car named would prove successful, but after several weeks' trial they are emphatic in their endorsements. The Mehling car, which is twenty-one feet in length, is intended for both winter and summer use. The work incident to changing it from the one style to the other will not require over an hour or two at the outside. The engravings



FIG. 2.—END VIEW OF CLEVELAND COMBINATION CAR.

represent the car with the panels removed adapting it for summer use. The panels are of such construction and are so fitted into position that they cause no rattling when in place.

The removable panels are a feature of one side only; the windows on the other side are so large and are built so low in the body that when lowered the air has full sweep.

It will be noticed that the car is constructed with a side aisle, which is narrower than that ordinarily allowed in a centre aisle car. No inconvenience results from the

The Trenton, N. J., Electric System.

The Trenton Passenger Railway Co., of Trenton, N. J., has recently completed and has now in operation a well equipped electric railway system which is deservedly an object of pride to the citizens of that city as well as an evidence of the able and efficient management of the street railway company under whom the recent improvements have been made.

The Trenton Passenger Railway Co. was formed last year by the consolidation of the Trenton Horse Railway Co., the City Railway Co. the Hamilton Township Street Railway Co., and the South Clinton Avenue & Broad Street Railway Co., and now owns all the street railway lines in that city. Soon after the consolidation had been effected contracts were let for the

42, made by the Watts-Campbell company of Newark, N. J. The flywheel of each is 18 ft. in diameter, has a 54 in. face and weighs 28 tons. Each engine is belted directly to two 100 k. w., Short multipolar generators. Electric belting, manufactured by Chas. A. Schieren & Co., is employed to transmit the power. The station is designed to accommodate three additional engines and six additional generators or to have, in other words, a total ultimate engine capacity of 2,500 H. P. The piping between the present boilers and engines is arranged in duplicate so that either or both of the engines now installed can be supplied with steam from either set of pipes.

The permanent switchboard for the station has not yet been put in place, but will be a very handsome addition to the station equipment. The material selected for the board is slate, and all the appliances will be furnished



FIG. 1.—EXTERIOR OF POWER STATION—TRENTON PASSENGER RAILWAY CO.

station and electric equipment of the road, which was designed to be, and is, first class in every particular.

THE POWER STATION

is of brick, one story in height and very substantial in appearance. A tablet on one of the walls shows that it was designed and erected by Lewis Lawton under the direction of Lewis Perrine, Jr., president of the company. The mechanical engineer employed in its construction was John B. Bates, and the electrical engineers the Field Engineering Co. The location was chosen with a special regard for its fuel and water facilities, and is at a point about midway between the termini of the line. A steam railway siding runs directly in the rear of the boiler room, so that coal is dumped almost at the doors of the furnaces. Water for condensing purposes is also near at hand, being supplied from a branch of the Delaware River flowing within a few feet of the boiler room.

The station is divided into two rooms by a fire wall. That portion occupied by the boilers is 94 × 44 ft., and contains at present four 200 H. P. return tubular boilers 18 ft. long, manufactured by the Kensington Engine Works of Philadelphia, and equipped with the McClave shaking grate. A Worthington pump and Watts-Campbell condenser also form part of the equipment of this department. The engine room, shown in Fig. 2, is 126 ft. long and 69 ft. wide in its widest, and 44 ft. in its narrowest part, and is well lighted and ventilated. The engine equipment consists of two 500 H. P. compound condensing Corliss engines, with cylinder dimensions 16 × 29 ×

by the Short Electric Railway Co., and will be installed by the electrical engineers of the station, the Field Engineering Co. One peculiarity of the board will be that the break switches will be of the single pole type with a positive leg. Each generator will also be supplied with a double pole switch, the intention being to break the circuit of the generators when necessary at the generator itself instead of at the switchboard. The equipment of the present switchboard includes four Cleveland circuit breakers and Short volt and ammeters. The lamp switches are of the Johnson type; all other switches and all lightning arresters will be of the Van Nuis type. In the station wiring, Habirshaw wire has been employed, and all the connections and wiring are in full view, and all wires are mounted on porcelain insulators. The feeders when brought to the station are fastened to an outside bracket and are then brought through the wall, instead of being attached to the roof.

THE STACK

belonging to the station is the highest in that section of the state, and was completed August 1, 1892, when the last brick was laid by Mrs. Lewis Perrine, Jr. The dimensions of the stack are: Total height from bottom of foundation to top of cap, 168 ft., size of base at bottom, 26 ft. square, depth of foundation, 11 ft., distance of collar below cap 21 ft., diameter of shaft at base 14 ft., at collar 8.6 ft., across head 12.4 ft., diameter of flue 6.4 ft. The stack rests upon a bed of gravel. Upon this is a layer of concrete 3 ft. 6 ins. thick and 26 ft. square. There

were used in the construction of this foundation, 200 tons of broken stone, 250 barrels of German Portland cement and 500 barrels of sand. Upon this concrete base, large stones weighing from one to two and a half tons each were laid and grouted with best Portland cement.

The stack will be surmounted by an iron cap, not shown in the view, which will be 12 ft. 4 ins. in its largest dimension, and 6 ft. 6 ins. high. Iron bands are built in the stack every five feet of height.

THE MOTOR CARS

are fifteen in number and are equipped with Short single reduction electric motors. These motors, it is almost unnecessary to say, have given good satisfaction, and the managers of the company are so well pleased with the showing made by them that they have recently awarded the Short Electric Railway Co. an order for seven additional equipments. Three-fourths of the traffic occurs during the early morning and evening hours, and during this time every motor car draws a trail car, and often both are crowded, so that the work which the motors are required to do is by no means light. The cars themselves are from the works of the St. Louis Car Co. and are painted a yellow ochre with silver and gold lettering. The motor cars are thirty-two feet over all, are provided with extra large six foot platforms, and are mounted on Brill trucks. The open trail cars are sixteen in number, and twenty-five feet long.

THE ROADBED

is constructed with seventy-eight pound Johnson girder rails laid on seven inch oak or chestnut ties placed two feet six inches between centres. Chairs are used on part of the line and extra ties are placed at the joints. The rails are connected with galvanized iron bonds with cross connections.

Span wire construction is used on the overhead line, supported by Syracuse Tube Co.'s iron tubular poles for about half the line, and by painted octagonal wooden poles for the remainder. The overhead line is divided into four sections. The trolley wire is hard drawn copper

fering with the use of the tow path on one side. In the construction adopted two poles with bracket arms, one fifty feet long, and one slightly shorter were placed on each side of the street about thirty feet from the bridge, and these bracket arms were made to support a cross bar to which the trolley wires are attached. The electric

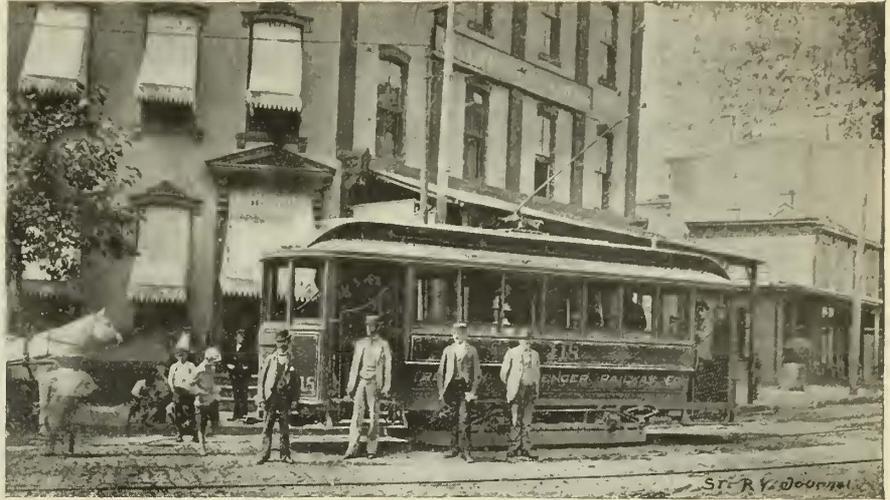


FIG. 3.—STREET SCENE—TRENTON PASSENGER RAILWAY.

line in Trenton is giving good satisfaction to the citizens of that city, and there is a general call to extend the use of electric power over the other branches as rapidly as possible. It is interesting to note that with ten motor cars the company handle 56 per cent. more passengers than formerly with eighteen horse cars.

The officers of the company are: President and general manager, Lewis Perrine, Jr.; vice-president, S. K. Wilson; secretary, J. H. Solomon; treasurer, G. H. Parker; superintendent, P. E. Hurley.

The first electric car of the Toronto Street Railway was run August 10, and the regular service on Church Street was put into regular operation August 15. The cars were built by the Toronto Railway Co. and are fin-



FIG. 2.—INTERIOR OF STATION—TRENTON PASSENGER RAILWAY.

No. 0 B. & S. The span wires are of twisted galvanized iron, and insulators are used between the span wire and side poles as well as at the trolley wire hanger. The feed wires are of Habirshaw No. 000, and all the overhead line material is of the Anderson type.

The most difficult piece of construction met with on the line was at a point where the road crossed a canal on a swing bridge. At this place the usual drawbridge connections had to be made without at the same time inter-

ished inside with oak and other light wood. The bodies are eighteen feet inside, and the cars are twenty-six feet over all, and equipped with twenty horse power, Edison, single reduction motors each. The overhead work was done by the Cleveland Construction Co. The rails are of English make, and the ties are of cedar and laid in concrete.

The Sioux City & Morningside Street Railway, of Sioux City, has been opened for traffic.

The Broadway, New York, Cable Cars.

The accompanying engraving shows the type of car adopted for the Broadway Cable Railway in New York City. The car has a seating capacity for thirty persons, and the platforms are large and capacious. Special provision is made for convenient and quick ingress and exit



CABLE CAR FOR THE BROADWAY, N. Y. LINE.

as the doorways are larger than usual, and the approaches nearer the steps. Safety gates are provided which close the platforms on the left side, and quiet, ease and comfort are provided by the superspring running gear and bronze metal sashes.

The interior finish is neat and tasteful, and is in wood of light shades, while the architecture, in style of the Bombay roof, is particularly pleasing, because of its lightness and tastefully curved lines. The 100 cars for this road are now being built by John Stephenson Co., Ltd., of New York City. Other particulars of the car were published on page 471 of our last issue.

VISITORS to the World's Fair will be enabled to pass from one end of Machinery Hall to the other at an elevation, and thus gain a birdseye view of the vast area of exhibits, and see many of the larger exhibits to much greater advantage than will be possible from the floor. To accomplish this three mammoth electric traveling cranes will be installed in Machinery Hall, each with a lifting and carrying capacity of 40,000 lbs. Contracts for their construction have been let to the Yale & Towne Manufacturing Co. of Stamford, Conn., the Morgan Engineering Co. of Alliance, O. and the Edge Moor Bridge Works of Wilmington, Del. Previous to the opening of the Exposition these cranes will be used for the moving of heavy exhibits; afterwards they will be covered with broad platforms capable of carrying several hundred people at each trip.

A COMPANY has been granted the privilege of carrying visitors by lake to and from the World's Fair grounds. It is the plan to run at least fourteen steamers. Between the "lake front" in Chicago and the grounds, four large boats, two of them whalebacks, and all having a capacity of 5,000 each, will make trips every half hour. The charge will be fifteen cents one way and twenty-five cents for the round trip.

Detroit Motor Hauling Four Trailers.

The cut accompanying this article shows a recent performance of a Detroit forty horse power motor equipment on the road of the Chattanooga Electric Street Railway Co., Chattanooga, Tenn. The car body on the motor truck is twenty-eight feet long, having been made out of two fourteen foot bodies joined. In addition to carrying this double car body, the motor equipment hauled four trailers, which, as will be seen by the cut, were fully loaded, the entire number of passengers on the motor and trailer cars having been 355. This load is far beyond what any other motor equipment on this road is ever called upon to haul, but no trouble whatever was experienced by the motor car which still maintained the

regular schedule time. The special event leading to the load shown was bringing passengers from a recent ball game at Chattanooga. This same motor equipment has often been timed on its regular trips when running without trailers, and has been found to run for a short distance at the rate of from twenty-five to twenty-eight miles per hour. This may be questioned by some, but Mr. Young, superintendent of the road, certifies to this fact. The Chattanooga Electric Street Railway Co. have, since putting on the Detroit motor shown in the cut, been investigating the different systems with a view to purchasing additional motors, with the result that they have now placed an order with the Detroit Electrical Works for three thirty horse power motor equipments, as they consider that motor to be the most economical in operation, and, having a great amount of traction, that it can draw more trailers than any other of the same capacity.



MOTOR CAR DRAWING FOUR TRAILERS.

A MEETING of the Massachusetts Street Railway Superintendents' Association was held August 24 at Lovell's Grove. The members were the guests of Superintendent Weeks, of the Quincy & Boston Street Railway Geo. A. Murch, of Worcester, presided.

THE Newton (Mass.) & Boston Electric Railway has commenced operations.

The Street Railways of New York.

PART II.

SECOND AVENUE RAILWAY CO.

A grant to build the Second Avenue line was secured from the city of New York in 1852, and the Second Avenue Railway Co. was chartered by the grantees January 21, 1853. Right to build on First Avenue was granted by an act of the legislature, passed May 6, 1884, and the consent of the city authorities was secured the same year. The company has a capital stock authorized by charter of \$2,500,000, of which \$1,862,000 has been issued. The funded debt of the company consists of \$1,600,000 5 per cent., general consolidated mortgage bonds due 1909 and \$1,500 5 per cent. debenture bonds due 1909.

The main line of the company extends from Fulton Ferry via Peck Slip, Pearl Street, Park Row, Bowery and other streets to the corner of Houston Street and Second Avenue, from whence it extends on Second Avenue to 129th Street. The Astor Place or First Avenue division has one terminus at Broadway and Astor Place, and extends thence by Stuyvesant Place, Second Avenue, 59th Street and First Avenue to 129th Street. There are also branches to Astoria Ferry at the foot of East 86th Street and to the corner of Worth Street and Broadway. The second division cars are painted blue, the others are of a yellow color. The total length of track owned by the company is twenty-eight miles. The company also leases one and one-eighth miles of track from the Bleeker Street & Fulton Ferry Street Railway Co. now controlled by the Houston Street, West Street & Pavonia Ferry Railway Co.

The line is laid with sixty pound stringer rail, and the number of cars owned by the company is 338, divided equally between box and open cars. Most of the cars are from the works of the John Stephenson Co. The cars make an average of about sixty miles daily each, or have a total car mileage of about 12,000. The main depot of the company extends from Second Avenue to First Avenue with sides on 96th and 97th Streets. There is also a depot at the foot of First Avenue. The officers of the company are: President, G. S. Hart; secretary, J. B. Underhill; treasurer, H. E. Doremus.

THIRD AVENUE RAILWAY CO.

The Third Avenue Railway Co. was chartered October 8, 1853, with a capital of \$1,170,000. The company was organized to take over a street railway which had been built by a firm a short time previously, from Park Row through the Bowery and Third Avenue to 61st Street, and continued the construction of this road to the Harlem River. In 1870 the company leased a line on 125th Street from the East River to the Hudson River then operating twenty one-horse cars, and later, in 1880, acquired full control of the road. This line was changed to a cable road in 1885. In 1883 the Third Avenue Railway Co. commenced the construction of a cable line on Tenth Avenue from 125th Street to 186th Street, and this was put into operation in August, 1885. The company, as the readers of the STREET RAILWAY JOURNAL well know, is now cabling the main line of the road from Park Row to 129th Street. The authorized capital stock of the company consists of \$5,000,000, of which \$4,000,000 have been issued. The funded debt of the company consists of \$5,000,000 5 per cent. mortgage bonds due in 1937, all of which have been issued.

The main line extends from City Hall to 130th Street a distance of eight and a quarter miles, which is double tracked. The power stations for operating the line by cable power will be two in number, one of 7,000 H. P. capacity at Third Avenue and 65th Street, the site of the present stables, and one of 2,500 H. P. capacity at Bayard Street and the Bowery. These stations are being installed by the Pennsylvania Iron Works Co. of Philadelphia, and a full description of the machinery was given in our issue of September, 1891. The road construction has been completed for the greater part of the distance between 130th Street and the City Hall, and the remaining portion is being rapidly finished by the contractor, Mr. T. E. Crim-

mins. Duplicate cables will be used. A full description of the system of cable construction adopted will be found in our issues of November, 1890, and May and July of the present year. The type of rail used is a seventy-nine pound, grooved, girder rail, part of which has been furnished by Wm. Wharton, Jr., & Co., and part by the Johnson Co. The cars for the main cable line are being built by the Laclede Car Co., and the open cars are thirty-eight feet eight inches over all, and the closed cars thirty feet over all, both having four-foot platforms at each end. These cars were illustrated and described in our February and March issues.

In the old track construction of the main line a sixty pound, stringer, centre bearing rail was used. The horse cars are of different styles, the open cars seating forty-two to fifty passengers, and the box cars being all of the ordinary sixteen foot type. These cars are painted vermilion, and some were furnished by Stephenson, while others were manufactured by the railway company themselves.

The 125th Street and Tenth Avenue branch, which is operated by cable power, is five and a quarter miles in length, all of which is double track, making with the main line an equivalent of twenty-eight and three-eighths miles of single track owned by the company. The power station for this division is at 128th Street and Tenth Avenue, and contains two 350 H. P. Wright engines, and one 1,200 H. P. Dickson engine, which was installed recently. The rolling stock of this branch consists mainly of cross seat cars, seating thirty-two passengers, twenty-two feet body and thirty feet over all, which are used as open cars in summer and closed cars in winter. The company has also a number of regular closed cars with twenty-two feet body, twelve open grip cars and two long open cars forty feet over all and thirty-two feet body, seating forty-eight passengers. All the cars on this branch are painted carmine body, balance white, and were supplied by the J. G. Brill Co., Philadelphia, with the exception of the two forty foot open cars, which were supplied by the Laclede Car Co.

The company has two depots. The first built was erected in 1861 and enlarged in 1872, is located at the corner of 65th and 66th Streets and Third Avenue, and contains the offices of the company. The main cable station is now being erected in the rear of this building, and the latter will be reconstructed to fit it for the uses of the cable road. The company has also a very extensive depot occupying most of the block bounded by Third Avenue, 129th Street, Lexington Avenue and 128th Street. This depot is of brick, three stories in height, is fitted with all the latest car house appliances and was finished in the spring of 1891. Each of the three floors has a capacity for 110 of the forty foot cars, or 150 of the thirty foot box cars belonging to the company. The number of horses owned by the company is 1,750 and the number of horse cars 336. All these cars will be disposed of by the company when they commence operations by cable power.

The officers of the company are: President, A. J. Elias; vice-president, Henry Hart; secretary, Alfred Lazarus; treasurer, J. Beaver; superintendent, John H. Robertson; mechanical engineer of Tenth Avenue and 125 Street, C. G. Bliss; chief engineer of construction, A. H. Lighthall.

NEW YORK & HARLEM RAILROAD CO.

The New York & Harlem Railroad Co. has a capital stock authorized and issued of \$10,000,000. The funded debt of the company consists of \$12,000,000 7 per cent., consolidated mortgage bonds due in 1900, and \$5,000 6 per cent., consolidated mortgage, sinking fund bonds due in 1893. This was the first street railroad ever built for carrying passengers, and was constructed in 1831-32. The line was laid with strap iron rails, first laid on stone and afterwards on wooden stringers, and originally extended on Fourth Avenue, from Prince Street to 14th Street. A statement of the early history of this railway was given in our February, 1891, issue. In 1873 the portion of the road which was then operated by steam was leased to the New York Central & Hudson River Railway Co. for 401

years. Under this lease the latter pays, as rental, an 8 per cent. dividend on the entire stock of the New York & Harlem Railroad Co., as well as the interest on the \$12,000,000 consolidated mortgage bonds. The dividend paid last year by the New York & Harlem Railroad Co., from the earnings of the horse railway, was $2\frac{1}{2}$ per cent., making a total of $10\frac{1}{2}$ per cent.

This company attempted early in 1888 and subsequently to operate a number of storage battery cars, and has probably operated more cars of this kind at one time than any other street railway company. The system used was the Julien, and the electric company who supplied the electric apparatus the Julien Electric Traction Co., afterwards the United Electric Traction Co. These cars were withdrawn from service some time since.

The portion of the railway now operated by horse power consists of seventeen and three-quarters miles of track, extending from the Post Office, via the Bowery, Fourth Avenue and Madison Avenue to Mott Haven. There are also branches to East 34th Street Ferry, Broadway and Astor Place and East 86th Street Ferry. The line is divided into six divisions; from the Post Office to 86th Street; from 86th Street to 138th Street; from the Post Office to 42d Street, and the three branches mentioned above. All the cars are painted yellow, with the exception of the Astor Place cars which are wine color on the body of the car.

The rolling stock consists of 185 box cars, which, with the exception of six ten foot cars in use on the 34th Street branch, are all sixteen feet in length. Most of the cars are from the works of the John Stephenson Co., though the railway company also owns some built by J. M. Jones' Sons Co., and some of their own manufacture. Most of the track is laid with a forty-seven pound stringer rail, but some recent portions have been laid with a Johnson girder rail and the Duplex Track rail.

The main depot of the company occupies a block bounded by Fourth Avenue, 32d Street, Lexington Avenue and 33d Street. The company also has a depot at the corner of Madison Avenue and 86th Street. The stock of the company includes 1,600 horses.

The average daily car mileage for the year ending June 30, 1892, was 8,508, an increase of about 580 car miles over the record for the preceding year. The company has no immediate plans for extensions or change of motive power. The officers are: President, C. Vanderbilt; vice-president, C. C. Clarke; secretary, and treasurer, Ed. V. W. Rossiter; superintendent, Alfred Skitt; purchasing agent, A. Bourne.

EIGHTH AVENUE RAILWAY CO.

The Eighth Avenue Railway Co. was chartered January 10, 1855, and the road was built by an association, and transferred to the Eighth Avenue Railway Co. for \$762,500 in stock. The company have at present a capital stock authorized and issued of \$1,000,000 and a funded debt of \$1,000,000 in 6 per cent. bonds, due in 1914, and entitled "certificates of indebtedness." These certificates were issued to the stockholders as a special dividend and as representing earnings.

The line is twenty miles in length, all double track, and it extends from the corner of Broadway and Vesey Street to Eighth Avenue and 154th Street, with a branch to the corner of Broadway and Canal Street. For ease in operation, it is divided into two divisions, part of the cars running between the lower terminus and Central Park, the rest between Broadway and Canal Street and the upper terminus. The box cars belonging to the latter division are painted a canary color; those on the first division are red, and all the open cars are painted canary color.

The rolling stock of the company consists of 176 cars, of which 125 are box and 51 open. The open cars were built by the Lewis & Fowler Manufacturing Co., are twenty-seven feet two inches in length, width six feet six inches, have seven seats, and a total seating capacity of thirty-five passengers. The box cars are of the sixteen foot type, and were built in the railway company's shops. A total car mileage of about 6,000 is made per day.

The weight of rail used per yard is sixty pounds, and it was supplied by the Pennsylvania Steel Co. The number of horses is 1,200 and the main depot is at the corner of Eighth Avenue and 50th Street. The officers of the company are: President, George Law; vice-president, Jacob Hays; secretary and treasurer, T. G. Affleck; superintendent, E. R. Sherman, being the same, with the exception of superintendent, as with the Ninth Avenue Railway Co.

CENTRAL PARK, NORTH & EAST RIVER RAILWAY CO.

The date of the charter of the Central Park, North & East River Railway Co. is July 19, 1860. The present capital stock authorized and issued is \$1,800,000, and the funded debt consists of \$1,200,000 7 per cent. mortgage bonds due in 1902. This railway is commonly called the Belt Line, and extends from South Ferry on the West Side of the city, by the way of West Street and Tenth Avenue, and on the East Side by a number of streets including South Street, Avenue B, Avenue A and First Avenue. The cars cross the city on 59th Street.

The total length of all tracks and sidings owned by the company is twenty-six miles, all double track, and a side bearing tram rail weighing sixty pounds to the yard and manufactured by the Pennsylvania Steel Co. is in use on all tracks owned by the company. The depot of the company is a substantial brick building on the corner of Tenth Avenue and 53d Street, and is well constructed and appointed. A complete system of stable ventilation, which was described in our March, 1891, issue is employed and gives very satisfactory results.

The total number of cars owned by the company is 196, consisting of 136 sixteen foot box cars manufactured by Stephenson, Brill and Jones, and sixty twenty-six foot open cars manufactured by Stephenson. The cars run on a headway of from two to four minutes during the day, and twenty minutes during the night, and cover about sixty miles each per day with a total car mileage of 7,000 per day. All cars have bodies painted canary, except those which operate on 59th Street only, which are painted red and lettered instead of being numbered. The total number of horses owned by the company is 1,157, and each covers on an average twelve miles per day. For dealing with snow in the winter the company have four snow plows and three sweepers.

The officers of the company are: President, G. Hilton Scribner; vice-president, C. Densmore Wyman; secretary and treasurer, J. L. Valentine; superintendent, J. H. Oakley.

DRY DOCK, EAST BROADWAY & BATTERY RAILROAD CO.

The Dry Dock, East Broadway & Battery Railroad Co. was chartered December 8, 1863, and has a capital stock authorized and issued of \$1,200,000, and a funded debt of \$840,000, 7 per cent., first mortgage bonds due in 1893, and \$1,100,000, 6 per cent. certificates of indebtedness due in 1914, and issued to stockholders for surplus earnings undivided.

The length of line owned by the company is eighteen and a half miles, laid with a sixty pound, centre bearing, stringer rail, manufactured by the Pennsylvania Steel Co. The line is divided into four divisions, viz: The City Hall, Avenue B & 34th Street line which extends from the corner of Ann Street and Broadway, via Park Row, East Broadway, Avenue B and First Avenue to East 34th Street Ferry; the Dry Dock & East Broadway line from the same lower terminus, via Park Row, East Broadway, Avenue D and Avenue A to 23d Street Ferry; the Grand & Cortlandt Street line, which extends from Cortlandt Street Ferry to Grand Street Ferry by Greenwich, Canal and other streets; and the Debrosses, Vestry & Grand Street line which extends from the foot of Desbrosses Street on the West Side by Washington, Vestry and other streets to Grand Street Ferry. The cars on the first and fourth divisions are painted blue, the second division cars are distinguished by their green color, and the third are painted yellow.

The total number of cars owned by the company is 181, of which 173 are box cars and eight open. The third

division uses twelve to fourteen foot box cars. All the other box cars are sixteen feet in length and all the open cars eighteen feet. The company manufacture their own cars. Each car in use covers on an average fifty miles per day. The total number of horses owned by the company is 943, and they have three snow plows and the same number of snow sweepers. The office and main depot of the company is at 605 Grand Street, and the uptown depot at the corner of 44th Street and Avenue B. An 8 per cent. dividend was declared last year on the capital stock. No important changes or extensions are contemplated by the company. The officers of the company are: President, William White; secretary and treasurer, Richard Kelly; auditor, E. T. Landon; superintendent, Fred. F. White.

CENTRAL CROSSTOWN RAILWAY CO.

The Central Crosstown Railway Co. received its charter March 28, 1873, and purchased its line and franchises from the original grantees during the same year. The present capital stock of the company, authorized and issued, is \$600,000, and the funded debt consists of \$250,000, 6 per cent. first mortgage bonds due in 1922. The company also operates the line of the Christopher & Tenth Street Railway Co. under a perpetual lease which went into operation, May 28, 1892.

The line is divided into four divisions; the main, or blue line which has one terminus at the foot of Christopher Street, North River, and which extends to the foot of East 23d Street, through West 11th Street, 14th Street, Broadway, 17th and other streets; the white line, formerly that of the Christopher Street & Tenth Street Railway Co., which has one terminus at the Christopher Street Ferry and which extends to the corner of East Tenth Street and Avenue A by way of Greenwich Avenue, 8th Street and Avenue A, the cars returning by a different route; the yellow line which extends from Christopher Street Ferry to the corner of Fourth Avenue and 14th Street, through Ninth Avenue; and the red line which extends from the 23d Street Ferry to West 14th Street. The daily car mileage on all of these lines averages 5,830, divided about as follows: blue line, 2,900; white, 1,625; yellow, 846; red, 460.

The length of line owned by the company is four and one-fifth miles, and leased by the company seven and a half miles, making a total of 11.7 miles. The track is laid with a forty-five to fifty-two pound, centre bearing, stringer rail. The number of cars owned by the company is 157, mostly from the works of the Stephenson company, though the Lewis & Fowler Manufacturing Co. is also represented. Both twelve and sixteen foot cars are used. The company has also two snow sweepers and two snow plows. The main depot of the company is at 170 Christopher Street, and the number of horses owned by the company is 846. The company pays an annual dividend on the stock of 7 per cent. The officers are: President, Geo. S. Hart; vice-president, A. Cammack; secretary, Milton I. Masson; treasurer, E. Burton Hart.

CHRISTOPHER & TENTH STREET RAILWAY CO.

The road of this company is operated by the Central Crosstown Railway Co. as described above. The officers are: President, J. Downey; vice-president, I. Hendrix; treasurer, Geo. W. Linch.

FORTY-SECOND STREET, MANHATTANVILLE & ST. NICHOLAS AVENUE RAILWAY CO.

The Forty-second Street, Manhattanville & St Nicholas Avenue Railway Co. received its original charter August 29, 1878, but before commencing operations in 1885 was granted important extensions of franchise. The capital stock of the company at present consists of \$2,500,000 authorized and issued and a funded debt of \$1,200,000 6 per cent. first mortgage bonds due in 1910, and \$1,525,060 6 per cent. second mortgage bonds due in 1915.

The length of the road is 19.82 miles, all double track. The line is divided into four divisions: The main line which extends from the foot of West 42d Street to the foot of East 42d Street and by First Avenue to the foot

of East 34th Street; the Tenth Avenue line, which extends from East 34th Street over the main line as far as Tenth Avenue, thence by the Boulevard and 86th Street to Riverside Drive; the Broadway & Boulevard line, which extends from East 34th Street over the main line to Seventh Avenue, thence by Broadway, the Boulevard and Manhattan Street to 129th Street and Fort Lee Ferry; and the Manhattan Street & 110th Street line, one terminus of which is at Fort Lee Ferry and the other at 110th Street and First Avenue, the cars running by way of 129th Street, Manhattan Street and St. Nicholas Avenue. The cars on the latter division are from twelve to fourteen feet in length. The other cars are of the standard sixteen foot type, and white, blue, green and orange are the colors employed to distinguish the different lines.

The track is laid with sixty pound, centre bearing, stringer rail, and the company have two depots, one on 42d Street between Lexington and Park Avenues, and one at 119th Street, just west of the Boulevard. The number of cars owned by the company is ninety-one, part of which were built by the John Stephenson Co. and part by the company themselves. The number of horses owned by the company is 838. For dealing with snow in winter the company have three snow plows requiring from four to eight horses, and two Lewis & Fowler, ten horse sweepers. They have also recently ordered a third sweeper. No extensions are contemplated at present. The officers of the company are: President, John S. Foster; secretary, C. F. Naething; treasurer, Jacob Fleischhauer; superintendent, S. M. Sisson.

FORTY-SECOND STREET & GRAND STREET FERRY RAILROAD CO.

The Forty-second Street & Grand Street Ferry Railroad Co. was incorporated on February 21, 1863, and was successor to the Grand Street Ferry Railroad Co. incorporated only a short time previous. The company has a capital stock authorized of \$750,000, of which \$748,000 has been issued. The funded debt consists of \$236,000, 7 per cent., first mortgage bonds due in 1893.

One terminus of the line is at Grand Street Ferry on the East Side, and the other at 42d Street Ferry on the West Side, the route including Avenue A, 14th Street, Fourth Avenue, 23d Street, Broadway, 34th Street, Tenth Avenue and 42d Street. The entire length of the line owned by the company is ten and a quarter miles, all double track, laid with a fifty-six to sixty-four pound, centre bearing, stringer rail which has been down ever since the company commenced operations. The number of cars owned by the company is seventy-two of which fifty-two are box and twenty open. The car bodies are painted green, and they are from the shops of a number of car builders. The number of horses owned by the company is 480, and their only depot is at the 42d Street terminus of the line. The company contemplate no extensions or important improvements in the immediate future. The company paid a dividend of 16 per cent. last year. The officers of the company are: President, J. M. Calhoun; secretary, Chas P. Emmons; treasurer, R. J. Jacobs.

NORTH & EAST RIVER RAILROAD CO.

The North & East River Railroad Co. has a capital stock of \$300,000, all issued, and a funded debt consisting of \$250,000 6 per cent., twenty year bonds. The track of the company extends from Burling Slip near the corner of Water, by way of Water and Fulton Streets, to the Fulton and Barclay Street Ferries, on West Street. The distance is about one and a half miles, and for about one-half this distance the company uses the leased tracks of the Blecker Street and Fulton Ferry Railway Co. and the Ninth Avenue Railway Co. The track owned by the North & East River Railway Co., is laid with a forty-five pound, side bearing, tram rail.

The depot of the company is on Front Street, near Fulton Street, and the number of horses owned is seventy-five. The cars, which are twelve in number, have a length of body of twelve feet, and are painted magenta.

The line was constructed in 1888, and at that time was intended as an electric conduit line, and the conduit, which is still in position, was laid by the Bentley-Knight

Electric Co., but it has never been used for electric cars. The road is now being operated by the contractor of the road, J. H. O'Rourke, of 40 Court Street, Brooklyn.

The officers of the company are: President, O. W. Child; vice-president, E. P. McLaughlin; secretary, F. C. Gaffney; treasurer, Thomas F. Carney; superintendent, W. Farrell.

THE UNION RAILWAY CO.

The Union Railway Co., as mentioned in our last issue, is the title of a company recently formed by the consolidation of the Harlem Bridge, Morrisania & Fordham Railroad Co., the North Third Avenue & Fleetwood Park Railroad Co. and the Melrose & West Morrisania Railroad Co. The company is authorized by charter to issue \$2,000,000 capital stock, and has already issued one half of this amount. The authorized bonded indebtedness of this company is also \$2,000,000, of which one half has been issued. The Harlem Bridge, Morrisania & Fordham Railroad Co., the principal road of the three consolidated under the name of the Union Railway Co., received its charter May 1, 1863, and had a capital stock of \$350,000, and bonded indebtedness of \$76,000.

The territory covered by the lines of the Union Railway Co., lies in that portion of New York City which is north of the Harlem River. The line is divided into four divisions which have a common terminus at 129th Street and Third Avenue. The first or Boston Avenue division crosses the Harlem River and runs by Third Avenue to Mott Haven and Melrose and then by Boston Avenue to West Farms. The second or Fordham division crosses the Harlem River and runs by Third Avenue through Mott Haven, Melrose, Morrisania, Tremont and Fordham to Fordham Avenue. The third or Port Morris division extends by Third Avenue to 138th Street and Port Morris. The fourth division crosses Harlem River and then extends through 133d Street and the Southern Boulevard to West Farms. The main depot of the company is at the corner of 170th Street and Third Avenue, and the offices are on Third Avenue near 128th Street.

The length of line owned by the company is about twenty miles, of which fifteen have been equipped with electric apparatus. The work of electrical construction has been conducted under the superintendence of L. H. McIntire, and the company expected to have the first electric car in operation by October 1.

The power station, is located at West Farms on the Bronx River at about the middle point of the entire electric system when completed. The station is of brick, 75x235 ft., was designed for a capacity of 5,000 H. P. and is similar in general arrangement and appearances to the power station of the Lynn & Boston Railway Co. at Lynn, Mass., which was also designed by Mr. McIntire. The location of the station on the Bronx River gives facilities for the receipt of coal by barges, and plenty of water for condensing purposes. The engines, of which three are at present installed, are of 350 rated H. P. capacity each, are tandem compound condensing and were built by C. & G. Cooper & Co. of Mt. Vernon, O. The generators are of the Thomson-Houston, 300 k. w., multipolar type, and four are at present in position. They are driven directly from the engines by means of belts furnished by the Charles Munson Belting Co. The boiler equipment consists of four boilers of 250 H. P. each, supplied by the Babcock & Wilcox Co. The stack is of brick, and is 176 ft. high.

The rolling stock belonging to the company consists of sixty new motor cars and forty-nine horse cars. The former are exceedingly tasteful in design and consist of thirty open cars and the same number of closed cars. The car bodies of both the open and closed cars were manufactured by the St. Louis Car Co. The car electric equipment consists of Thomson-Houston motors, which are mounted upon Peckham trucks. The closed cars are eighteen feet long inside measurement, and the open cars are of the eight reversible seat pattern.

The track of the portion of the line equipped for electric cars is laid with a seventy pound girder rail six inches high, furnished by Wm. Wharton, Jr., & Co. The rail is mounted on a stringer which rests upon ties spaced

three feet between centres. Tie rods are also used. The rails are connected with copper rail bonds. A part of the line extends under the structure of the Suburban Elevated Railroad Co., and here the trolley wires are supported on the cross girders of the elevated railway. Elsewhere iron lattice poles, supplied by Milliken Bros., are employed to support the wires.

The Union Railway Co. have recently secured the right to make important extensions in the northern part of New York City. These include lines on Jerome Avenue from McComb's Dam Bridge, on Morris Avenue to Fordham Landing road, on Willis, Melrose and Webster Avenues, on Tremont and Webster Avenues and Riverview Terrace, on Olin Avenue, on Boscobel Avenue, on Sedgewick Avenue and Kingsbridge Road. The company expect to commence construction promptly and the system when completed, will comprise forty-seven miles of track.

The officers of the company are: President and general manager, Edward A. Mahar; vice president, Charles A. Stadler; secretary and treasurer, Thomas W. Alcott; superintendent, James Carrigan.

THE TWENTY-EIGHTH & TWENTY-NINTH STREET RAILWAY CO.

The Twenty-eighth & Twenty-ninth Street Railway Co. has a capital stock of \$500,000 and bonded indebtedness of the same amount. The company has considerable track in New York City, most of which was laid in the year 1890, but has not commenced to operate cars. The terminal points of the line on the East Side are at the 23d Street and the 34th Street Ferries, and on the West Side at the 14th Street, 23d Street and 42 Street Ferries. All the track of the company to be laid is in place, with the exception of two sections on 28th and 29th Streets between First and Second Avenues, and a section on Thirteenth Avenue between 23d and 14th Streets. The laying of the latter has been prevented by delay on the part of the municipal authorities in grading the street, and in Twenty-eighth and Twenty-ninth Streets, mentioned above, through a failure on the part of the railway company to reach an agreement with the Twenty-third Street Railway Co. who have exclusive right to the use of those streets for their tracks. The managers of the Twenty-eighth & Twenty-ninth Street Railway Co. hope to conclude negotiations with the latter company by which they can soon complete their system and put their cars in operation. The line is laid with a sixty pound grooved girder rail. The offices of the company are at 45 William Street, and the officers are: President, J. H. Crane; vice-president, D. D. Conover; secretary, D. J. Apgar.

The Electric Street Railway System of Little Rock, Ark.

On April 1, 1890, Mr. H. G. Allis, president of the First National Bank of Little Rock, Ark., to whom Little Rock is indebted for its electric street railway service, purchased a controlling interest in the Citizens' and Little Rock Street Railway companies, and organized the Capital Street Railway Co.

On July 22, 1890, this company secured authority from the City Council to propel their cars by electricity, and a short time later Mr. Allis secured control of the City Electric Street Railway Co. and the other lines were then leased to this company. The authority of the City Government to lease these grounds was passed on February 16, 1891, and on the same date, the Capital Street Railway Co. was granted additional rights.

In October 1891, the company closed a contract with the Thomson-Houston Electric Co. to equip the system with electricity. The local company built its own power house, track and roadbed. Mr. H. P. Bradford, general manager of the company, personally superintended the construction of the roadbed and track. The Thomson-Houston company's contract work, consisting of the overhead construction and the installation of the electrical machinery, was placed in charge of Mr. E. E. Downs, one of the constructing engineers of that company.

The engineering of the power station was placed in charge of Mr. B. J. Arnold, consulting engineer of the Chicago office of the Thomson-Houston Electric Co., who designed the plant and superintended its construction. Mr. Arnold was assisted by Messrs. Rickson & Thompson, architects of Little Rock, Ark., to whom should be given the credit of the artistic front and details of the upper stories of the building.

During this period of 131 days that elapsed, from the beginning of the construction to the opening of the road, thirty-two days were lost on account of Sundays and rainy weather, leaving but ninety-nine

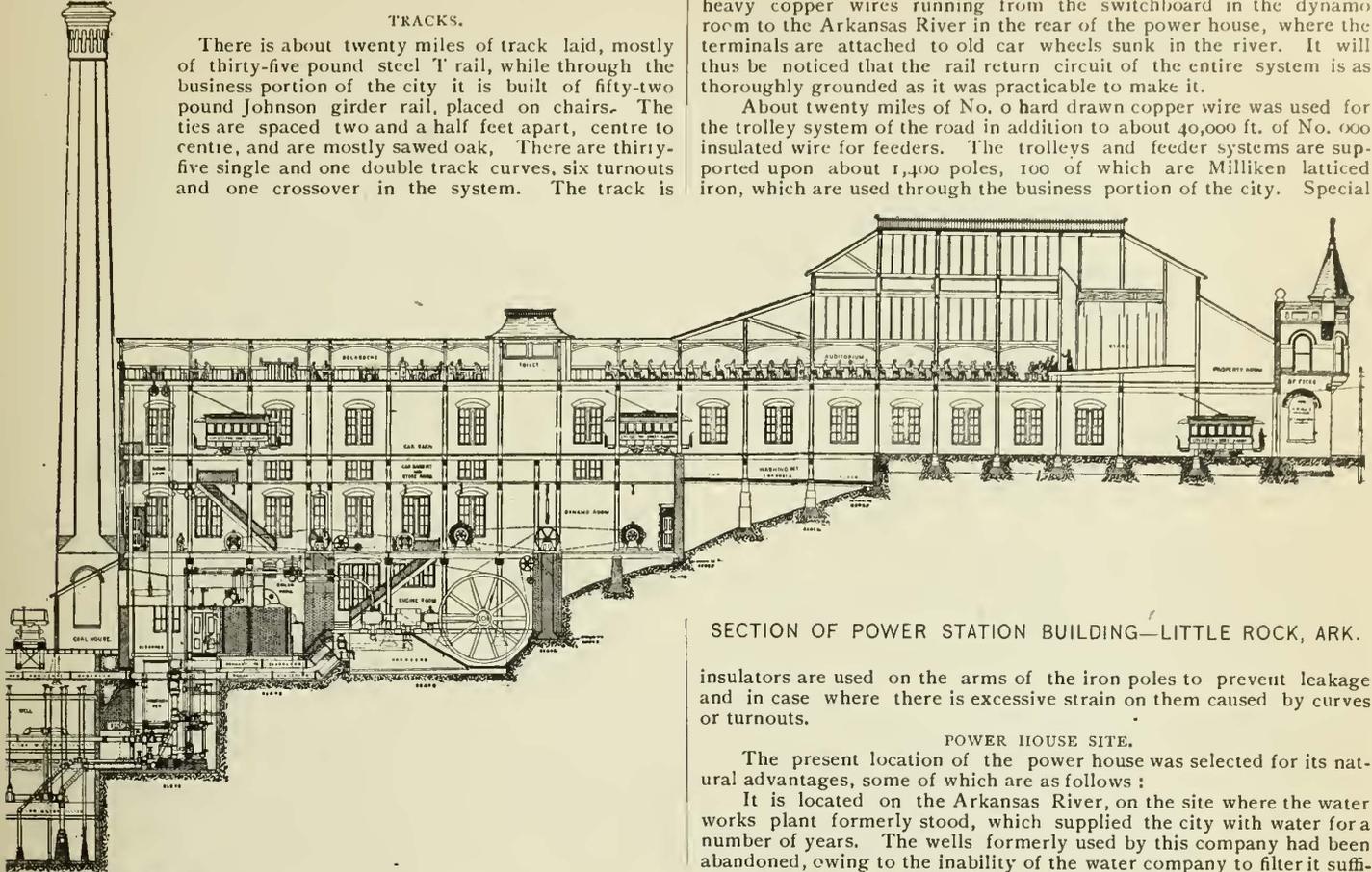
actual working days. During this time the entire system, of about twenty miles of road, was either taken up and new rails and ties laid or the track narrowed from broad to standard gauge.

TRACKS.

There is about twenty miles of track laid, mostly of thirty-five pound steel T rail, while through the business portion of the city it is built of fifty-two pound Johnson girder rail, placed on chairs. The ties are spaced two and a half feet apart, centre to centre, and are mostly sawed oak. There are thirty-five single and one double track curves, six turnouts and one crossover in the system. The track is

ravines at suitable distances along the road so as to secure as perfect a ground as possible. The return wires are also attached to the water-works pipes of the city wherever it is convenient. There are also heavy copper wires running from the switchboard in the dynamo room to the Arkansas River in the rear of the power house, where the terminals are attached to old car wheels sunk in the river. It will thus be noticed that the rail return circuit of the entire system is as thoroughly grounded as it was practicable to make it.

About twenty miles of No. 0 hard drawn copper wire was used for the trolley system of the road in addition to about 40,000 ft. of No. 000 insulated wire for feeders. The trolleys and feeder systems are supported upon about 1,400 poles, 100 of which are Milliken latticed iron, which are used through the business portion of the city. Special



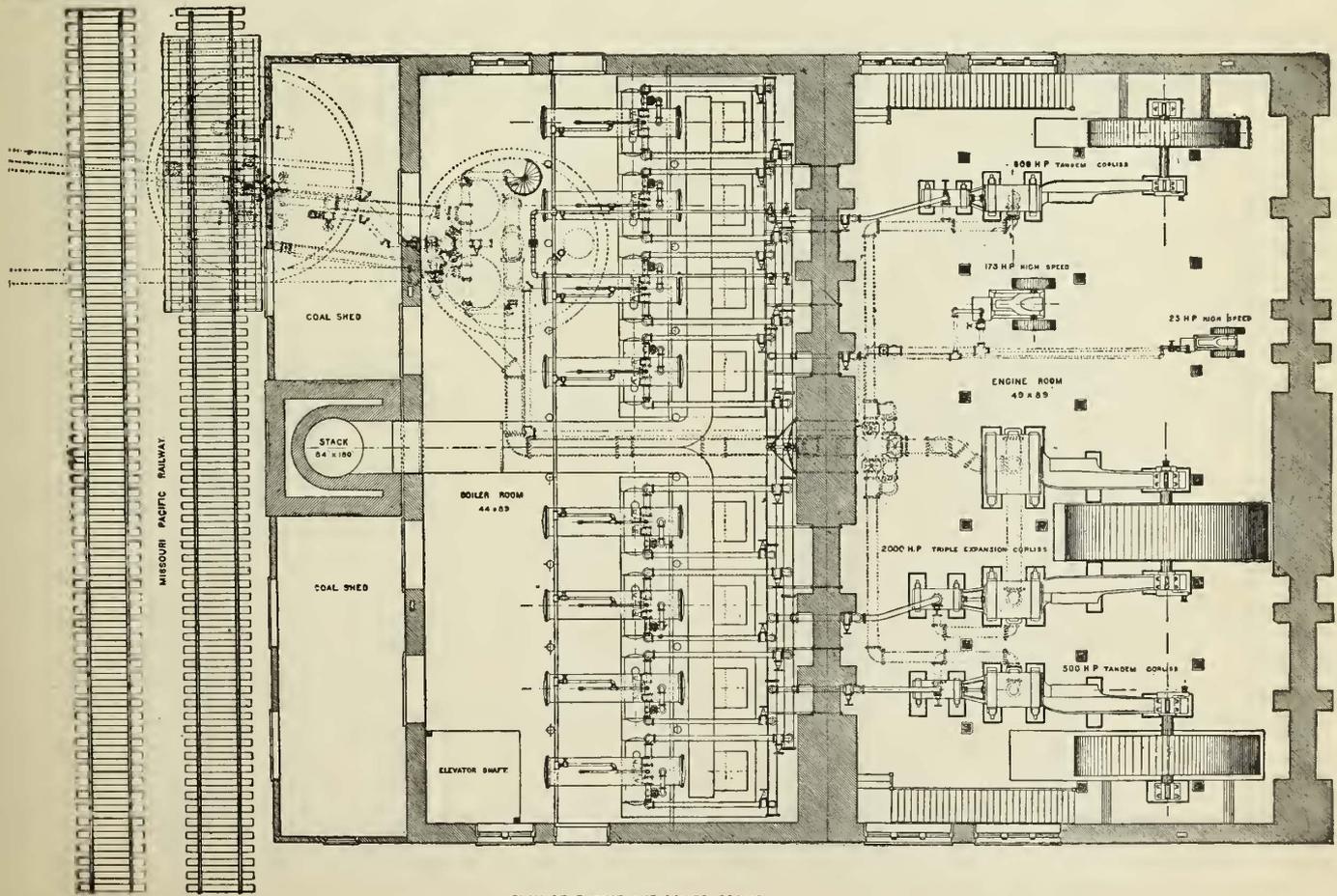
SECTION OF POWER STATION BUILDING—LITTLE ROCK, ARK.

insulators are used on the arms of the iron poles to prevent leakage and in case where there is excessive strain on them caused by curves or turnouts.

POWER HOUSE SITE.

The present location of the power house was selected for its natural advantages, some of which are as follows :

It is located on the Arkansas River, on the site where the water works plant formerly stood, which supplied the city with water for a number of years. The wells formerly used by this company had been abandoned, owing to the inability of the water company to filter it suffi-



PLAN OF ENGINE AND BOILER ROOMS.

SCALE IN FEET

bonded throughout with No. 6 bond wire, joined to the rails with the Wheeler channel pins. These bond wires are attached to a No. 0 copper ground wire running the entire length of the track and returning to the power station. These ground wires are attached to old car wheels and other metal plates which are sunk in the old wells and

ciently well for city use. The property that went with those wells consisted of a lot 100 ft. wide by 350 ft. deep, extending south to North Street, over which the principal line of the road extending from the depot to the city runs. This would bring most of the cars by the power station every trip if this site was selected. Again, there was a solid

slate substructure which would give a good foundation, and the profile of the lot was such that it enabled a building to be designed which brought the entire power station, car barn, repair shops, offices, etc., under one roof and on one set of foundations, making it thereby cheaper to construct than it would have been had two pieces of real estate been purchased and two distinct buildings been constructed. The main line of the St. Louis Iron Mountain & Southern Railway runs along the river bank in the rear of the building, enabling a side track to be built cheaply and fuel delivered directly into the coal house with but one handling. Again, being located upon the river at a point midway between Little Rock and Big Rock, overlooking the river for miles in either direction, and the Ozark Mountains on the north and west, it gives the most beautiful view that can be obtained in the city, which resulted in the designer providing for a summer theatre to be placed upon the roof. To those not familiar with the location of this plant, the idea of a theatre on the top of the power station may seem absurd, but when it is remembered that the roof of this building has an area of over six-tenths of an acre, and is located about 100 ft. above the river, entirely removed from the noise of the machinery and giving one of the most beautiful views that can be obtained in the Ozark Mountains, the idea may not seem so peculiar. Again, as the power station is located on the main line of the street railway, the theatre produces a source of revenue to the road that makes it quite an important factor.

On a level with the main track of the railroad formerly mentioned, is the side track shown on the longitudinal section. This track is carried across the outside well on trusses. Next to the side track comes the coal house which is twenty feet wide and extends the entire length of the building, and is capable of storing 300 tons of coal.

BOILER ROOM.

Passing through the coal house, we enter the boiler room which, as shown on the plan, is a room 44 ft. \times 89 ft. \times 25 ft. high; in it will be placed, when the plant is completed, eight 250 H. P. water tube boilers, three of which are at present installed. Over the top of these boilers is a sheet iron breeching extending to the space between the centre row of columns where they join the main trunk breeching leading to the smokestack located outside the main building. The plant is at present operated from an iron stack five feet six inches in diameter, and 180 ft. high, set off to one side so that the permanent brick stack can be constructed in its proper position without interrupting the operation of the plant. The permanent stack will be built of brick and will be eighty-four inches in diameter and 180 ft. high.

Just south of the boiler room comes the engine room with its floor located six feet higher than that of the boiler room, thereby providing for the exhaust piping system to be located under the floor. This room is 49 \times 89 ft. and will contain, when completed, 3,000 H. P. of engines; three of these, aggregating 1,000 H. P., are at present installed.

The dynamo room is 133 ft. \times 88 ft. 6 ins. wide. In this room will be located two distinct line shafts resting upon the tops of the partition walls of the building. From the north line shaft, which is at present installed, there will be belted eight 110 H. P. Thomson-Houston railway generators, five of which are now in use. There will also be an additional 110 H. P. railway generator, belted direct from a high speed engine, located below in the engine room, for the operation of the owl trains after the main railroad part of the plant is shut down. The other line shaft is located on the top of the wall at the south end of the engine room, and from it will be driven the lighting machinery. The two shafts will be cross connected at their centres with a fifty-four inch belt, thereby enabling any generator in the house to be driven from any engine in case of accident to any one of the engines. The railroad switchboard is located in the north end of the building as shown on the plan of the dynamo room, and the lighting switchboard in the south end, so that the leads from the dynamo to the switchboard may be as short as possible, also keeping the railway and lighting plants distinctly separate. Over each row of generators and the line shafting extends an overhead single track railroad with the necessary differential pulleys, etc., for lifting out of an armature or box caps. This railway runs to the elevator shaft so that the heavy part may be delivered directly into the elevator and transferred to the machine shop above with but little labor.

On each side of the dynamo room are stairways extending up to the pit room above. This room was placed in the plant to provide for easy access to the motors and cars for making repairs at all times without necessitating the changing of location of the cars. In the rear of this room, on the river end, is a machine shop fifteen feet wide and eighty-eight feet long, a portion of which is partitioned off for a supply room. The heavy portions of the machinery can be dropped down into this pit room, placed on hand trucks and drawn to the machine shop for repairs with but very little physical exertion on the part of the mechanics. It also provides an easy means for wiping the cars.

Extending fifty feet south of the pit room is the washing pit, having a tar concrete floor sloping to the south, so the drainage will run into the sewer connected at that end, thereby preventing the water from flowing over the dynamo room. This washing pit extends the entire width of the building under all of the tracks, so the cars from either track can be run over the pit, washed, drained and run back to place without any transferring.

On each side the pit room extend stairs rising into the car barn. This room is 88 ft. 6 ins. \times 297 ft., and contains eight tracks four feet and one half inch gauge and is capable of storing ninety-six motor cars. In the rear, on the river side, are located the small benches and stands for taking care of the headlights and other small repairs of the cars, giving a pleasant, airy room for the car barn employees.

The present electrical equipment consists of twenty-eight Thomson-Houston, double, fifteen horse power motor cars and five 100 H. P. multi-

polar railway generators with the switchboard and overhead construction and appliances, with provisions made for the adding of four more generators and other cars without any additional expense except for the purchasing of the machinery. The plant is designed for the addition of an electric lighting plant, having a capacity of 10,000 sixteen candle power incandescent lamps and 1,000 2,000 c. p. arcs, a portion of which will be added as soon as the necessary business arrangements can be made.

The present equipment of engines consists of Hamilton-Corliss tandem, compound, condensing engines, having cylinders 20 \times 36 \times 48 and 16 \times 30 \times 48 respectively. Also one 8 \times 10 Ideal, high speed engine for driving eighteen arc lights, now in operation in the building. The engine room was designed for an additional 2,000 H. P., triple expansion Corliss engine, which will drive the lighting plant when installed, and one 175 H. P., high speed engine for driving the railway generators to operate the owl trains, or those trains that run at night after the main plant is shut down.

There are now three 250 H. P. Heine boilers installed, and provision made in the boiler room for the addition of five similar boilers when the plant is extended.

There is at present one 1,000 H. P. Smith-Vaile, duplex condenser installed, and two Gordon steam pumps for the boiler feeders, each one of which is capable of supplying the entire plant. Provision is made for an additional 2,000 H. P. condenser.

The shafting now running consists of about eighty feet of six and a half inch hammered iron shaftings with 62 \times 15 in. friction clutch pulleys, tighteners and clutches to receive the power from the two large engines now installed. The shaft is divided near the centre so that one portion of it can be kept going on in case of a hot journal in either part. The cap stones are set and the bolt holes made in the foundations ready to receive the other line shaft for driving the electric lighting machinery when the time comes for placing it.

CONTRACTORS.

The machinery was supplied by the following contractors:

Electrical equipment, Thomson-Houston Electric Co.; engines, Hooven, Owens & Rentschler Co., Hamilton, O.; boilers, Heine Safety Boiler Co., St. Louis, Mo.; shafting, Hill Clutch Works, Cleveland, O.; belting, Chicago Belting Co., Chicago; condensers, Smith-Vaile Co., Dayton, O.; boiler feed pumps, Gordon Steam Pump Co., Dayton, O.; heaters, Wm. Baragwanath & Co., Chicago; live steam purifiers, Hoppes Manufacturing Co., Springfield, O.; steam piping, Nick, Peay & Co., Little Rock, Ark.; steam pipe covering, Chicago Fire Proof Covering Co., Chicago; smokestack, D. R. Wing & Co., Little Rock, Ark.

Success of Electric Traction in Binghamton, N. Y.

It is always a pleasure for us to record the success and prosperous condition of street railway lines, especially in cases where the success is due, not alone to natural causes, but is attained in spite of many adverse conditions, by the ingenuity and skill of the management. This applies fittingly to the Binghamton Street Railway Co., whose lines are under the management of G. T. Rogers, president, and J. P. E. Clark, manager, who have the hearty support of the press, the city officials and the general public.

The original line of this company extended from the State Hospital on the east through the city, a distance of about five miles, to Ross Park on the south, and this was one of the first roads in the country to be equipped for electric traction, the original motors being of the Van Depoele type. Two years ago, the line within the city limits was laid with a heavy Johnson girder rail, and the cars were equipped with Edison No. 6 motors which have since been in continuous operation, and we are informed by the management that after a service of three years the electric equipment is in better condition for service than it was when bought, and that it has rendered more service during the last year than during any other equal period. The terminals of the line are laid with a thirty-five and forty pound T rail, which with slight repairs has stood up remarkably well under the traffic. The turnouts where the T rail is employed are entered by means of a Leary spring switch, which has proven in every way satisfactory.

Two other lines have recently been consolidated with this company's system, and they now control all except the Court Street and East & West End lines, which use the tracks of the Binghamton company for a considerable distance. The company are about to equip their entire system with electricity and are erecting a large power station on Lewis Island near the present car barn and will equip it with power sufficient to operate the entire twenty miles of road.

In relaying the track of the recently acquired lines, a seventy-one pound, half grooved, seven inch girder rail

is being employed on the paved streets, and a forty-eight pound T rail on the unpaved portion. The diamond turnouts for the new construction have been ordered from the Pennsylvania Steel Co. The overhead construction has already been begun on the Port Dickinson route, and it is expected that the line will be in operation by January 1. The cars are to be equipped with Thomson-Houston W. P. motors of fifty horse power.

As a means of promoting traffic, the company, some time since, leased Ross Park for the term of ten years, and have fitted it up with numerous attractions, and as a result of this and other enterprising strokes the lines carried during the month of July over 200,000 passengers. This park embraces about 100 acres, and has been laid out in one of the wildest mountain sections adjacent to the city, and consists of deep gorges and steep bluffs covered with a dense natural growth which has been preserved as far as possible in laying out the walks and drives through the park. Some of the attractions which the company have provided consist of a well assorted "Zoo," including a deer park and cages of bears, birds, monkeys, rabbits and many other animals. There is a long switchback railroad, an archery range, an electric gallery, swings and a dancing pavilion. A building is provided in which is a large dining room and kitchen with tables for picnic parties, and also soda water fountains, pony carriages and photograph galleries, and on the top of the mountain an observatory 120 ft. high, giving an extended view of the surrounding country. The company also employ a string band and orchestra which give concerts from a band stand every pleasant afternoon and evening.

The park is lighted by rows of incandescent lamps and oil headlights, making it as attractive in the evening as in the day time. By an act of the legislature the sale of beer and liquor is prohibited within the park, and within one half mile therefrom, so that the premises are exceptionally free from disorderly characters, and the very best citizens patronize it almost daily. Frequently the families of business men go to the park in the afternoon, where they are joined by the husbands after business hours, and sup together at the park and spend the evening. Not only are the Binghamton citizens patrons of the park, but the street railway company are in communication with the church and other societies of the villages within a radius of 100 miles of the city, and by proper efforts succeed in bringing a large number of excursion parties to the cars who come on the steam lines and take the electrics to the park.

Binghamton is one of the most beautiful and attractive cities in the state, and doubtless this fact assists the company greatly in inducing excursion parties, but the efforts of the company in this direction may serve as a hint to other lines, as there are many other cities where street railway traffic could be greatly increased by the establishment of park attractions and the offering of sufficient inducements for people to patronize them.

The above will illustrate the foresight of the management as the gross earnings of the original line and two of the acquired short lines show that the gross earnings in two years have increased more than five times, and promise as good a showing this year, rendering the securities very valuable. The new bonds which the company intend to issue on the reconstructed lines are already in demand, as the earning capacity is at present in excess of the interest on the entire amount of bonds to be issued. Almost the entire stock is held by Binghamton people who are holding it as a permanent investment.

Meeting of the International Street Railway Association.

The seventh annual convention of the International Street Railway Association will take place at Buda-Pesth on September 8, 9 and 10, and will probably be largely attended. The speakers include representatives from street railway companies in Austria, Italy, Germany, France, Belgium and Holland.

The official programme of the meeting is as follows:

- 1.—Report on the condition of the Association.
- 2.—Auditing of accounts for the year 1891.
- 3.—Discussion of the following question:
 - In adopting the narrow gauge for a railway line, what are, according to your experience or in your opinion, the respective advantages of the three narrow gauges most in vogue, viz., 1 metre, 0.75 metre, 0.60 metre?

Speaker:—Herr Ziffer, vice president of Kolomaer local roads, Vienna.
- 4.—Debate on the following question: What requirements are prescribed by the steam roads to the street railroads in connection with the putting in and working of crossings? The subject is subdivided as follows:
 - A.—Arrangement.
 - a. Describe the construction of crossings by reference to respective plans for (a) Horse railroads, (b) Steam railroads.
 - b. Give an account of what is needed in the way of flag stations, gates, side track switches, signals, etc., for street railway working.
 - B.—Operation.

What further duties (signal and flag service, etc.) are assigned to the street railroads in the operation of crossings?

Speaker:—Signor Amoretti, manager of the steam tramways of the province of Turin, Turin, Italy.
- 5.—Debate on the following questions:
 - A. What proportions should be given to the repair shops for main and branch lines?
 - B. What are the dimensions of your shops?
 - C. Give, for the year 1891, the running expenses of the shops, the number of average working days, the number of kilometres run by cars, motors (or horses) and wheels.

Speaker:—Mr. Géron, manager of the Cologne Street Railroad Co., Cologne.
- 6.—Debate on the following question:

Give the merits and demerits of the different kinds of springs—rubber, flat, spiral and steel—as well as of combinations of these and other kinds of springs.

Speaker:—Mr. Thomas, manager of the Tramway company, Rheims.
- 7.—Debate on the following questions:
 - A. Have you made any study or trial of electric traction, and what are the results?
 - B. In what respects does it appear to you that electric traction has any advantage over the (animal and mechanical) methods now in vogue?

Speaker:—Herr T. Schmidt, engineer of the Great Berlin Horse Railroad Co., Berlin.
- 8.—Debate on the following question:

On what basis can rates be adjusted, or on what basis can they be reduced for stimulating traffic, under given circumstances, and assuming there is no competition?

 - A. Is it expedient to establish different classes?

To what degree is the increase of rates for higher classes desirable in order to obtain the most profitable business from the same?

Adjustment of rates according to locality (lines running through poorer sections, industrial districts and lines through large traffic centres).

Adjustment of rates according to circumstances (market days, Sundays and holidays). Round trip tickets, mileage tickets, special rates, expenses of ticket agent.

Commutation: Ordinary rates, school and workmen's rates.
 - B. FREIGHT TRAFFIC.

Adjustment of rates according to the value of the goods; according to the weight; special rate by the car load; rate on shipment at owner's risk.

Speaker:—M. Moyaux, of Brussels, manager of various steam and street railways in Italy.
- 9.—Debate on the following subject:

New methods of ticket selling and road inspection. Give the working length of the line, the number of miles run by cars and horses or engines, the number that each inspector has to examine on the average, including

 1. Section inspectors (local and traveling inspectors).
 2. Station inspectors (station masters, dispatchers, etc.).

Speaker:—Herr Roehl, manager of the Hamburg Street Railway Co.
- 10.—Debate on the following subject:

What lubricants have come into use for locomotives and cars? What practical results have been reached with them and what does their use cost per car kilometre.

Speaker:—Herr Billen, manager of the Hague Tramway Co.
- 11.—Expenditures for 1893.
- 12.—Election of Executive Committee.
- 13.—Miscellaneous business.
- 14.—Naming the place and date of the next convention.

ESTABLISHED 1884.

INCORPORATED 1890.



JAS. H. MCGRAW, Managing Editor.

C. B. FAIRCHILD, Editor.

C. E. STUMP, Business Manager.

H. W. BLAKE, Associate Editor.

H. W. POOL, Advertising Department.

PUBLISHED BY THE

STREET RAILWAY PUBLISHING COMPANY,

WORLD BUILDING, NEW YORK.

JAMES H. MCGRAW.....President
 CLARENCE E. STUMP.....Vice-President
 CURTIS E. WHITTLESEY.....Treasurer

WESTERN OFFICE, 537 THE ROOKERY, CHICAGO, ILL.

J. W. DICKERSON, Editor and Manager.

Subscription, \$4.00 per year. To Foreign Countries, \$6.00 per year.
 Postage Prepaid.

We heartily invite correspondence upon all subjects of interest to street railway men. Information regarding changes of officers, new equipment, extensions, etc., will be greatly appreciated for our official directory and news columns. We especially invite the co-operation of all interested to furnish us particulars that the directory may be correct and of the greatest possible value.

Address all communications to

Street Railway Publishing Co.,
 World Building, New York.

It is Unfortunate that the date of the Cleveland Convention of the American Street Railway Association comes so near the Columbus inaugural services attending the opening of the World's Fair at Chicago. The date of the Convention having been fixed previous to the date for the ceremonies, the executive committee were unable to make a change when the fact was presented to them, as they could neither secure the hall for the place of meeting nor the hall for the exhibits at an earlier or a later date. We think, however, that most people who desire to be present at both occasions will be able to spend two days at the Convention and reach Chicago in time to participate in opening ceremonies.

The Recent Heated Term served to illustrate very forcibly the superiority of mechanical over animal traction in the operation of street cars. The high temperature caused almost a suspension of traffic on many lines, while the service on all lines operated by horses was more or less demoralized. Passengers thoroughly appreciated the benefits of rapid transit in localities where improved systems have been introduced, as during the heated term the open seats on the electric and cable cars proved to be almost the only available places where even a semblance of a cooling breath of air was to be found. Riding on the rapidly moving cars was a luxury of which all classes of people availed themselves in vast numbers.

The Coming Saratoga Convention of the New York State Street Railway Association, which is to be held on the twentieth of this month, should be attended by delegates from every street railway company in the state. This Association was organized at a time when it was necessary for united efforts at Albany to prevent legislation hostile to the street railway interests of the state.

Although happily at the present time there is not so much need of watchfulness in this line, the organization should be kept in a vigorous condition that it may meet the exigencies that may arise. Not only should the Association meet with the hearty support by the small as well as the large lines for the above reasons, but the benefits to be derived from the proceedings will be of great value to the delegates and the interests they represent. Too strong an appeal cannot be made in behalf of the Convention, and it is hoped that the attendance will be larger than at any previous meeting in its history.

Public Parks are coming to be recognized as valuable agencies for the promotion of traffic by the managers of street railway companies in many of our medium sized cities and villages. The example set by a certain line mentioned in another column may serve as a valuable model for others. Of course the fact should be recognized that this matter could be overdone where rival lines are operating in the same territory, but where one company operates most of the lines, a judicious selection of parks, with a judicious equipment and management, may be made valuable adjuncts to increase a company's income. In the selection and laying out of parks for this purpose, it is not always best to select a tract that is level, and best suitable for building purposes; but usually the most wild and uninviting territory may be transformed into an attractive park. Care should also be exercised in providing attractions that will draw only a desirable class of patrons. These being provided, and changes and variations made at intervals, it will be found that the people never tire of patronizing them. Where objectionable features are introduced they drive away respectable people, and frequently attract a patronage that is unpleasant to handle as well as expensive in the way of accidents and repairs rendered necessary from damages wantonly committed by reckless patrons.

The Advent of Power Brakes and other safety devices in the street railway field is the natural sequence to the employment of mechanical power for traction, and doubtless they are destined to play an important part in this service as they already have done in steam railway practice. Safety or continuous brakes are of far greater necessity on heavy electric or cable cars or trains running at high speed than on light horse cars jogging along at only six miles an hour. Hence it is that the hue and cry which follows any accident on cable or electric roads is growing louder and louder, because the general public have come to expect with mechanically propelled cars greater safety with higher speed, as well as cleaner streets and better service. The credit for high speed in steam railway service is given to the air brake, for without it the speed attained could not be so readily controlled, and naturally many are looking to this element first as a reliable means of controlling street cars. Fortunately there is now a machine for utilizing air almost, if not quite, equal to those employed in steam practice, and from which railway managers are expecting a large measure of safety. This device, we understand, has been tested for more than a year, and is now being put in operation on several large cable and electric lines. In the way of fenders we are not making as satisfactory progress as with brakes, although there are many patterns in use. The field in this direction is an inviting one for inventors.

Emergency Cases are bound to occur in the practice of every street railway company, no matter how well the lines are managed, so that how to meet them is an important question. Particulars in this regard will be found in another column. Of course, it is wise policy to employ all possible means to prevent their occurrence, but where they do occur everything that experience teaches should be employed to avoid their recurrence. In some cases, however, the managers guard against a recurrence only when the cost of preventing the trouble does not exceed the damage which the trouble would cause. This is doubtless good policy from the company's standpoint, but the patrons of the line have rights in this respect, and for this reason the company may be called upon to expend in excess of the threatened damage. In this connection we call attention to a former editorial in which we cautioned street railway companies who were reconstructing their lines for mechanical traction not to allow their animals to run down, but to keep them in as good condition to the last day of service as though they were going to continue to operate by animal power. It is gratifying to know that some lines adopted this policy and we find their horses, which are now being replaced by mechanical power, in first class condition and selling rapidly at good prices, while on the other hand several lines having allowed their stock to deteriorate have lost heavily in horses during the recent heated term and have been confronted with a threatened paralysis of the business. These facts are striking commentaries on the rule that all possible emergencies should be carefully guarded against.

“**The Increased Value of Property** along the line of a street railway is the true fund on which to draw to pay for the plant.” So says a local paper in announcing the failure of a certain street car line which failed, as stated, “because it depended alone upon fares for financial support and that properties rent or sell on a basis affected by the convenience of having a horse railroad.” We have frequently stated that the service which a street railway rendered was a sufficient compensation to the municipality for the use of the streets, but this is the first time we remember to have met the suggestion of direct taxation of abutting property for the benefits of an operating company. A street railway may or may not enhance the value of property along its lines. If a road built in a small city that has completed its growth and depends for its patronage upon a few people who will ride only from necessity, we do not see where any benefit is conferred upon the adjacent property. A street railway to be of benefit to local property must create a traffic and induce people to settle in outlying districts, in other words, build up the town, and put the population in easy communication with the business centres. It is then that business as well as residence property is benefited and the street railway reaps its reward in increased patronage. The article further states that, “A street railway is a public function as much as a water or a sewer system.” A little thought will show the fallacy of such a statement. The water system benefits every individual in the community, men, women and children daily. It is operated by a few employes, and the rents are collected at stated intervals by a small clerical force. On the other hand the street railway is of direct service to only a portion of the people and to many of them only at intervals so that they have no interest in its management. Then it requires a large number

of men constantly employed to operate and collect the revenues, who must be carefully watched and governed by experienced managers, a function in which municipalities are proverbially inefficient.

Patent Royalties on street railway appliances are apt to be estimated from a different basis by the inventor and the purchaser. The latter usually considers them an unfortunate tax upon his income, and pays only when compelled to do so, with little thought of the benefit the appliance in question will confer upon him. The inventor, on the other hand, reasons somewhat as follows: “The life of an ordinary, well built car may be estimated at fifteen years. A royalty of \$100 per car would then mean a little less than \$7 per year, or less than two cents per day. Surely a great railway company could pay this insignificant sum per day for my device, for on special occasions the car could carry enough more people in one or two days to pay the entire amount, or would by its use avoid an accident or damage suit that would cost ten times the amount.” The above reasoning is logical and fair, and would, no doubt, ordinarily be admitted by the purchaser, but when it is remembered that upon the same car there may be a large number of patented devices, and that some companies employ a very large number of cars, the amount of royalty demanded would prohibit their use. The same fact is emphasized in the practice of providing a duplicate electrical equipment for open and closed cars. Such lines as employ only a few cars could afford to equip both types of cars with independent motors, or could readily change trucks at the end of the season in case only one set of motors were employed, but where the number of cars run into the hundreds a duplicate equipment is out of the question, for the first cost and the interest on the idle motors would absorb the dividends, or the time consumed in making transfers with ordinary facilities, were only one set employed, would entail too large an expense. Hence, it is difficult to suggest a uniform basis for estimating royalties, as naturally the smaller lines could pay more proportionally than the larger lines with a large number of cars. In any event the disposition on the part of street railway companies to avoid the payment of royalties on valuable appliances is not altogether a commendable one. We have not too many patented appliances; we have not enough; there is still room for improvement in car construction and in safety appliances, and the more liberally inventors are compensated the more earnestly they will apply their genius to devising additional improvements. As a class, inventors deserve more considerate treatment in every way from street railway managers and the public generally.

Shocks From Electric Street Railway Circuits can never cause death or serious accident save under the most unusual circumstances and such as are never presented to passengers. Fatal accidents from the electric railway current are so rare that, for the first time since the electric railway has been in operation, we are called upon in this issue to record one clearly traceable to the railway current. The victim, at Port Huron, Mich., was a lineman, and, as the letter from our correspondent clearly shows, the unfortunate conditions under which he received the current provided a short path for the electricity through the most vital part of the body. On the other hand, the instances are almost numberless of the

full voltage having been received by linemen and others without injury, and there is no instance on record of a passenger on an electric car being seriously injured, still less killed, by the current of an electric railway circuit. But, in the face of all competent testimony, a belief in the great fatality of the electric railway current seems to obtain among a very respectable proportion of the people. Every few months this unwarranted belief finds official expression in the verdict of some coroner's jury, as witness the result of a recent inquest in Rochester, N. Y. The circumstances were such, however, that the case might be cited as an argument in favor of the selection of intelligent men on juries, for it is not difficult to see how this particular jury reached an entirely incorrect verdict. The fact, as subsequently ascertained, was simply this: The unfortunate man was killed by the current from a high potential lighting circuit. The connection was made through a broken fire alarm wire, dangling in the air, which was found to be crossed with the lighting circuit, and at the point of contact the insulation in the latter had been worn away. It so happened, however, that the broken wire crossed the trolley wire, and the jury, learning merely of the latter fact, deemed further investigation needless, and jumped to a conclusion. The case serves to illustrate in a striking way the truth of the general statement with which this paragraph opens, and it indicates that we cannot too frequently reiterate that assertion, for it is true beyond question that the public believe that death lurks in the trolley wire. The belief crops out whenever an electric railway franchise is sought. But the safe and successful operation of electric systems is tending to eradicate this erroneous belief, and the public at the same time are learning that railway companies by good construction are making the possibility of shocks from falling wires more and more remote. Perhaps it is not too much to hope that even coroners' juries may reach correct findings. Then indeed will the companies entering the field congratulate themselves, for one of the chief obstacles to a franchise will be removed. In leaving this subject we may state that while believing that electric railway wires can not cause fatal shock to passengers we are prepared to endorse heartily the following sentiments addressed to the public from a paper which states that its "free advice to its readers is not to trifle with trolley wires, or trolley poles, or any metallic thing connected with an electric road. These things may not kill you if you touch them, and they certainly won't kill you if you don't touch them."

The Rights of Labor are conceded by all fair minded men, but organized labor can have no rights that are not possessed by the individuals composing the organization, and whatever fancied rights they have that cannot be enforced under our laws are not right and must be abandoned unless our laws are changed, and who is there that can suggest laws under which the liberty of the individual and welfare of the state are more carefully guarded than those which prevail in our own country and to which she owes her greatness and from which we trust she is not destined soon to descend? If labor leaders can suggest freer and nobler institutions than those which we now have and reverence, then let them set themselves to the task and not exhaust their superior talents in conducting strikes and violating law. We concede the right of labor to organize, and believe that labor unions properly conducted will work to the advantage of employe

and employer, that employers will be glad to deal with responsible organizations rather than with individuals, but organizations cannot become responsible unless the individuals composing them are faithful to their individual trusts. We take the liberty to suggest to labor leaders a plan of action that will, we think, surely bring increased pay and shorter hours, both desirable results, to that class of workmen who will not spend their increase of time and money in the saloons. There are few industries employing a number of men that could not be made very much more profitable were each individual perfectly reliable and faithful in the discharge of his duties. One has but to watch for a little period the employes of some of our large establishments, and especially the employes in public work, to have the fact emphasized that a good many men are apt to "soldier" unless they are continually under the eye of the foreman. Hence it is apparent that organized labor must be elevated, clarified within, and this is the first work to which the leaders should set themselves. Let them assemble the men engaged in special industries and say to them: Every one of us knows that we could materially increase the output of the material or income of our employer if every individual would pledge himself to do his work upon honor, be saving and work for the general good, as well as inform against those who would not come into this argument that they might be eliminated from the organization. Then we could go to our employer at the end of six months or a year and make the statement that such was the character of all the men in his employ, and that from the fact the income of the business had increased to such a per cent., they considered that had some claim upon a share of this. If the request did not meet with a favorable response at the end of the first period, start in on another in the same way, and then another when an employer worthy of the name would be won to the cause. In any event a strike would not be justified, but the men could withdraw and seek employment with other firms, and such a class of men would have no trouble to secure work. Any leader could then retire from such a work without accusing himself of having been untrue either to the cause of civil liberty or to the cause of property and law, and could reflect with pleasure that he had borne a part in labor reforms that had corrected great abuses and removed just discontent, and that he had never in times of trouble incited his fellows to demand of employers miracles which it was well known could not be performed, nor ever sought the redress of grievances by any other than strictly legal means. Recent events are full of important lessons both to employer and to employes; and he learns only half the lesson they ought to teach who sees in them only a warning against tyranny on the one hand and anarchy on the other. One lesson they teach is that our great industries have no more deadly enemy than the bigoted employer who refuses to adjust them in some measure to the new state of society and the claims of honest labor. Nor do they teach less clearly that the sovereignty of the mob leads by no long path to the sovereignty of the sword. While we recognize in these events the signs of the prophetic "time of trouble," it does not argue that the remedy outlined above should not be undertaken.

A high speed electric railway is proposed between Baltimore and Washington. Among others interested in the plan are D. N. Newbold, T. Edward Hambleton and Stephen Gambrell, all of Baltimore.

Legal.

INJURIES TO PASSENGER—BOARDING MOVING CAR—EVIDENCE. In an action for damages the only evidence to support plaintiff's claim of negligence which occasioned his injuries while attempting to board defendant's horse car, was his own testimony, as follows: "I signaled the driver to stop. He stopped the car. By the time it came to me it had a little speed, but was moving so slowly that it would not be noticed. I placed my left hand on the hand rail and my right foot on the step, when I heard the brake go off; and before I had a firm footing the car moved, pulled me along, and broke my arm. I was dragged a short distance."

Held, that the statement is insufficient to show negligence on the part of the defendant company. That the mere taking off of the brake of a slowly moving horse car would not give it such a jerk as to break a man's arm. It may be that a prudent man would attempt to board a moving car, but it ought to be understood that he does so at his own risk. The mere fact of the conductor being inside at the time of the occurrence does not signify negligence upon the part of the company. He cannot be on the platform at all times. A passenger who attempts to get on board a car, especially if it is in motion and the conductor inside, must be held to a reasonable degree of care. It would seriously inconvenience the traveling public to hold that a car should come to a dead stop until every passenger who gets on is seated. Judgment in non-suit affirmed.

Picard v. Ridge Ave. Pass. Ry. Co., Penna. S. C., Jan. 25, 1892.

ACTION FOR INJURIES—EVIDENCE—RIDING ON PLATFORM—INTOXICATION. Where plaintiff, a passenger riding on the platform of defendant's car, the latter having stopped near plaintiff's destination to let two ladies off, and where, according to plaintiff's testimony, he followed them down the car steps, intending to alight, when the driver suddenly started up the horses, throwing him to the earth and injuring him. Defendant's witnesses testified that plaintiff was "pretty full," and got off the car while it was in motion, which plaintiff denied.

1. *Held*, that the testimony presented a mere question of credibility between said witness and plaintiff, and that the trial court erred in instructing the jury that if plaintiff's intoxication contributed to his injury he could not recover.

2. *Held*, that the court also erred in instructing that, as plaintiff stood on the platform, it was his duty to alight immediately when the car stopped; and that, if the car stopped a reasonable length of time for passengers to alight, and plaintiff, without the knowledge of the driver, delayed alighting beyond that time, he was guilty of contributory negligence and could not recover. Passengers have a right to assume that the car will not be started without ascertaining whether any passenger is alighting.

3. Error also, to instruct that no recovery could be had if "the driver of the car was conducting his business in the usual and ordinary way," in view of the testimony that the horses were started violently and suddenly with a whip. Judgment reversed and remanded.

Britton v. Street Ry. Co. of Grand Rapids, Mich., S. C., February 5, 1892.

ORDINANCE CONSTRUED—ADDITIONAL RIGHTS. Where one section of an ordinance authorizes a street railway company to lay tracks of its own on a certain street, and another provides that it shall be lawful for it to use the tracks of other companies, so far as the council has power to grant the right to their use, and that where the council has no such power, and the company is unable to agree with the other companies for the use of their tracks, then it "shall be lawful" for it to lay its rail inside and outside the said track, the latter section cannot be construed as revoking by implication the right of the said company

to lay tracks of its own, but only as conferring additional rights.

MUNICIPAL AUTHORITY—USE OF ELECTRICITY—SERVITUDE. Where the law (Act 1870, c. 370) confers upon the council of Baltimore full power to authorize the use of electricity for propelling street cars, and since this use does not impose a new servitude upon the streets so as to entitle abutting owners to additional compensation, an injunction will not lie to restrain the said use.

ELEVATED ROAD—WHAT CONSTITUTES—STATUTE. A street railroad built upon vertical iron pillars at an elevation of twenty feet above the street, and extending a distance of three-quarters of a mile is an elevated road, within the meaning of art. 23, sec. 186, of the Code, declaring that no such road shall be constructed except under a special charter, and the fact that the road was elevated only for the purpose of avoiding the tracks of a steam railroad on the surface of the street, and that a descent was made as soon as said tracks were out of the way, will not be sufficient to enable it to escape the operation of the statute. *Kotch et al v. North Ave. Ry. Co. of Baltimore*, Md. S. C., January 28, 1892.

STREET RAILROADS—GRANT OF EXCLUSIVE RIGHT. Suit to enjoin the defendant company from laying tracks on a certain bridge. Relief being refused, the plaintiff appeals.

Held, that an ordinance which grants to a street railroad company the right to use the tracks of another company on a certain street, but which declares that nothing therein shall be construed to grant any right to lay additional tracks on a certain bridge, owned by the city and a part of the said street, is not intended to secure to the company whose tracks are already on the bridge a monopoly of the right of way, but only to avoid incumbering the bridge with unnecessary tracks; and the fact that a temporary bridge is to be erected, while the other is being replaced, and that only those companies that are entitled to occupy the permanent bridge are licensed to lay tracks upon the temporary bridge, does not prevent a similar license from afterwards being given to the other companies.

North Baltimore Pass. Ry. Co. v. Mayor City of Baltimore, Md. S. C., January 28, 1892.

A Schedule Time of Forty Miles Per Hour.

The Hampton & Old Point Railway is the title of an electric railway now in operation between the two points mentioned above, and being extended to Newport News. The road extends a distance of seven and a half miles, passing Fortress Monroe, the National Soldiers' Home and the Hampton Normal School. The track is laid throughout with a sixty-five pound T rail, and a special feature of the road is the fact that the schedule time is to be forty miles an hour. The motors are of the thirty horse power, Edison, single reduction type, wound especially for this speed, and mounted on Brill's No. 13 trucks with sixteen foot cars. The work is being done by J. B. Crankshaw.

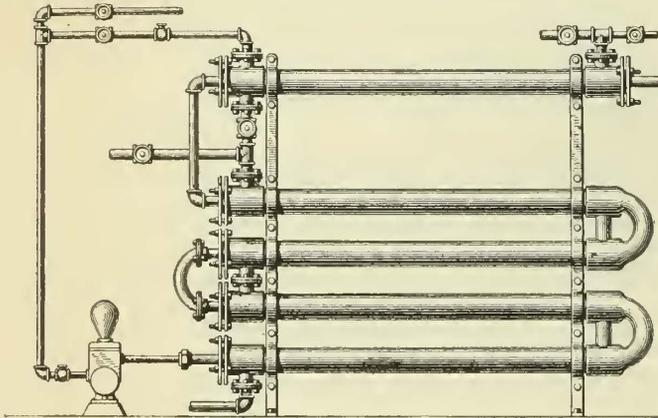
New Equipment at Cleveland.

The plans for the electrical equipment for Woodlawn Avenue & West Side Street Railway have been completed. The contractors are as follows: Cars and trucks: J. G. Brill Co. Motors: Westinghouse Electric & Manufacturing Co. Rails: Johnson Co. Overhead construction: Railway Equipment Co. Engines and boilers: Globe Iron Works. Trolley and feeder wires: McIntosh-Huntington Co., and by them assigned to the Western Electric Co.

THE complete Directory of Street Railways, revised to date, will be found in its usual place. We have found that our readers make such constant use of this directory that upon urgent request, we have decided to continue its publication monthly instead of quarterly, as stated in our July issue.

A Compact Condenser.

A condenser of compact arrangement and designed especially for tug boats, has recently been invented by Elihu Nelson of New York, to be used in connection with the feed water heater illustrated in our last issue. The different sections are made up of what Mr. Nelson calls a double chambered pipe, that is, one pipe is arranged



TUG BOAT CONDENSER.

within another, forming a central circular chamber and outside annular chamber. Either chamber may be used for the induction water, the other carrying the steam which is to be condensed. Ordinarily the two fluids will pass in opposite directions, but this is a matter of detail. It will be seen at once that the space occupied by this new condenser may be made very small, and yet a great deal of surface may be exposed in the successive sections. Another point in favor of this condenser is the reduced weight. The first sections may be made larger than the rest, each succeeding section being graduated to a smaller size from beginning to end, or all the sections may have the same capacity as indicated in the cut.

Improvement in Steam Separators.

With the constant and growing demand among engineers for dry steam in connection with all power plants, the inventive genius of the engineer has kept pace in providing separators of various designs and merit that may be connected into the main steam pipe to the engine for the purpose of separating the water, oil or dirt from the steam, that dry steam free from foreign substance may be delivered to the cylinder.

Among the various appliances for the purpose stated above, the steam separator manufactured by the Stratton Separator Co., 32 Cortlandt Street, New York, has won for itself a high place in the estimation of engineers throughout the country, that could only be obtained by the real and undoubted merit of the apparatus.

The Stratton separator is based on the principle that if a rotative motion is imparted to the steam as it enters the separator, all the liquid particles it may contain, being heavier than the steam, acquire centrifugal force and are projected to the outside of the current.

Practical results have proven this theory to be correct, but in some cases where high pressures of steam are used, it was found that the water gauge on the side of the separator would show full of water, while steam would blow out of the drain pipe at the bottom. While this proves the centrifugal principle of the separator, the force was so great as to hold about the interior walls of the chamber a volume of water whirling so rapidly as to be hollow in the centre, allowing steam to blow out of the drain pipe.

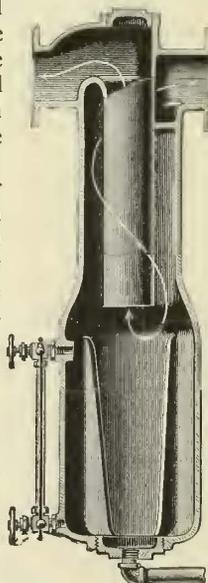


FIG. 1.—STRATTON SEPARATOR.

To meet this slight objection the Stratton company have patented an improvement as shown in the accompanying cuts, and briefly described as being a centrifugal steam separator provided with wings or plates projecting from the interior surface of the well chamber at an acute angle therewith and to the course of steam or water, thus breaking the whirling body of water and allowing it to settle quietly in the bottom of the separator chamber, from whence it can be drained.

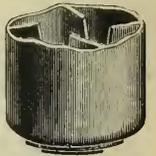


FIG. 2.

Fig. 1 of the above illustrations shows a view of the separator in vertical section, and Fig. 2 a cross section of the water chamber, showing wings or plates placed at an acute angle to the current of the water as described.

Combined Switch and Fuse Box for Railway Lighting Circuits.

In the accompanying view is shown a very neat combination switch and fuse box for use on the lamp circuits of electric street railway cars.

Fig. 1 shows the body of the box with the rotating ratchet switch in the lower compartment, and Fig. 2 the reverse side of the cover with the terminals and thumb screws for the metal fuse.

This box, it is claimed, possesses many advantages over anything heretofore in use for railway lighting service. It

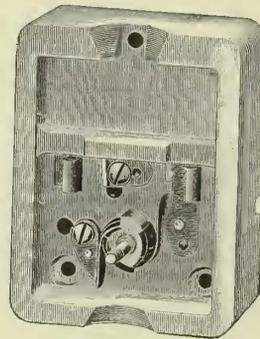


FIG. 1.

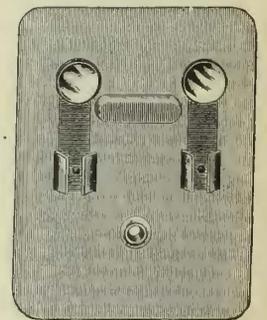


FIG. 2.

is very compact and neat, and as it is made entirely of porcelain it is perfectly incombustible. The switch is of the latest improved type of rotating ratchet switch manufactured by the General Electric Co., and possesses the essential point of good contact and sudden break. The fuse is placed on the inside of the cover, so that in replacing a blown out fuse the fuse terminals are taken completely out of the circuit, and it is utterly impossible to receive a shock in any way. The brass clips on the cover fit over the two contact posts in the box, and serve the double purpose of holding the cover in place and forming part of the circuit.

As will be seen in Fig. 2, the box is divided into two parts, the lower holding the switch and the terminals for the wire, and the upper part consisting of a shallow recess into which the thumb screws on the inside of the cover project. In the back of the box behind this upper recess, is a magnetic blow-out, which breaks the arc formed when the fuse is blown. In general appearance the box is quite ornamental, and with the great superiority over other and older devices for the same purposes it should commend itself strongly to all street railway men.

The Collins Park & Belt Railroad Co., of Atlanta, Ga., is now in successful operation with two 150 H. P. generators, and ten Brill cars, equipped with twenty H. P., single reduction motors, all of which apparatus was furnished by the Short Electric Railway Co., of Cleveland, O. The railway company are operating the two ends of their system, not having as yet been able to complete the line through a part of the city. The road has had unusual success from the start, and both ends are very much more than paying expenses.

New Track Switch.

A track switch, which can be operated from the front platform of a cable or electric car while the car is in motion, is manufactured by the Reliable Manufacturing Co. of Boston, and is shown herewith. The mechanical device is very simple, with nothing to get out of order. The switch plate is about twenty inches square and placed in the centre of the track with one corner extending to the rail. The whole is laid on a heavy wooden frame and can be placed in position very quickly. The pedals in

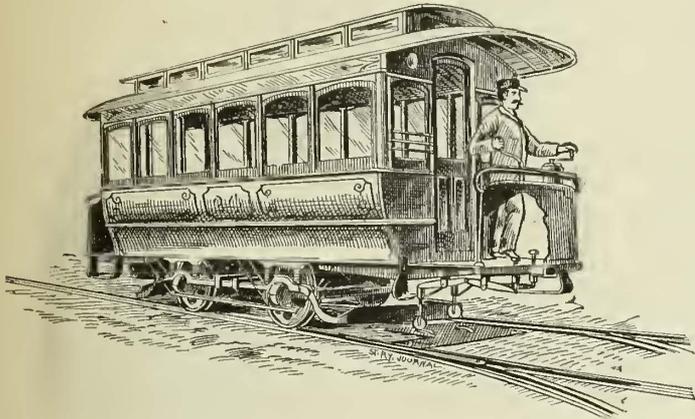


FIG. 1.—ELECTRIC CAR OPERATING TRACK SWITCH.

the plate are about seven inches long, two inches wide and half an inch high, are nearly water tight and with very little care can be kept from freezing in the winter. It is no obstruction to carriages or heavy teams; both can go over them without difficulty or injury to the switch. The plungers to be applied to the car are made in two ways. In one the plunger has a direct motion, going down straight to the pavement. The action is very simple, and the plunger requires little power from the motorman; the other style of plunger is worked by a wire cable over two pulleys, and when the foot is pressed the plunger is moved into position. When released, a spring carries it back into the car.

The switch can be operated in the darkest night as easily as in the day time. If the driver or motorman

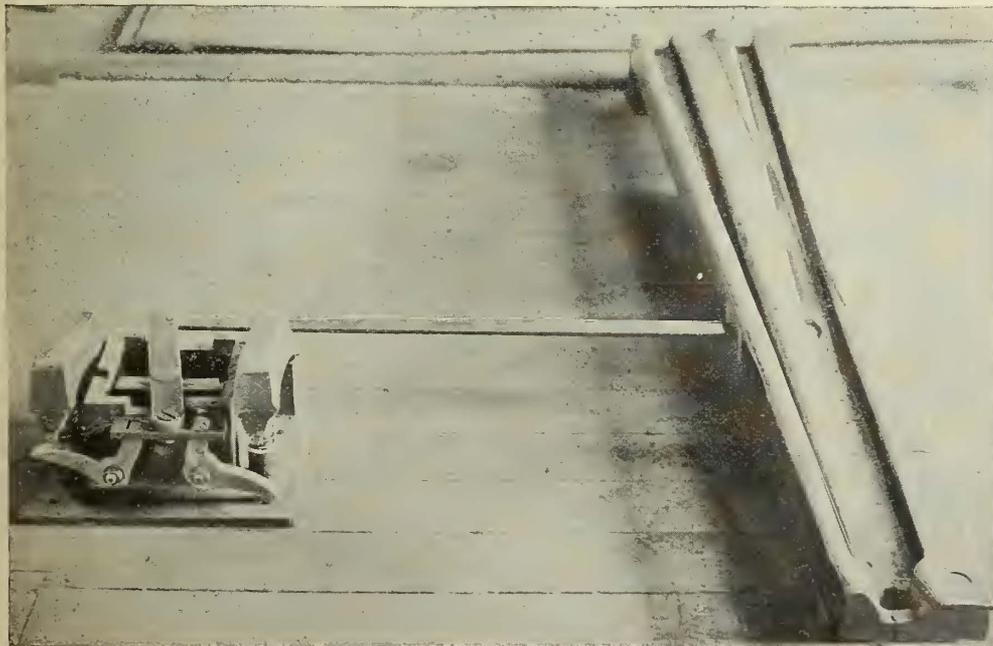


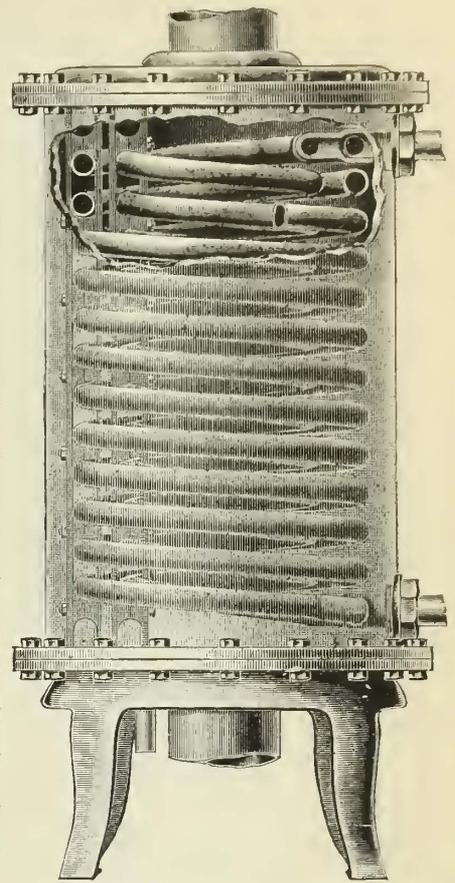
FIG. 2.—DETAILS OF TRACK SWITCH.

wishes a car to go to the right, he places his foot on the right plunger, if to the left, on the left plunger. He can force the plunger down a considerable time before reaching the switch plate if desired, the wheel running on the pavements until the switch pedal is reached.

A New Feed Water Heater.

The American feed water heater, shown in the accompanying illustration, is manufactured by the Whitlock Coil Pipe Co. of Elmwood, Conn., and possesses several very valuable features. The coils are made of the best seamless copper tubing, and are joined together and are also connected to properly designed gun metal fittings by brazing, which makes them virtually jointless. The fitting, which passes through the shell, is tapped for connecting the feed pipes, thereby doing away with all joints inside of the shell.

As the circular coil is perfectly smooth, with no couplings or obstructions of any kind from beginning to end, the friction is very little more, if any, than through the same length of straight pipe, and the trouble caused in straight tube heaters by expansion and contraction is wholly obviated by the use of this spiral coil. The increased area of the shell above that of the exhaust wholly obviates any chance of causing back pressure on the engine; instead it causes a slight vacuum, thereby giving immediate relief to the engine. In fact, it is not necessary to pass all of the exhaust through the heater under circumstances where it is easier to set up the heater without. The exhaust pipe may be tapped by means of a tee placed therein and a branch run from there to the heater, and the vacuum formed by the condensation of the steam when coming in contact with the coil containing the cold water, will draw steam enough from the main exhaust pipe to heat the water above 200 degs. Fah. In setting up a heater in this manner, of course the exhaust hole in the top of the heater should be stopped up, and the heater should always be dripped from the shell as provided for. Dripping the exhaust pipe does not answer the purpose. The coils are thoroughly stayed and tested to 300 lbs. hydraulic pressure before leaving the factory.



NEW FEED WATER HEATER.

This heater is particularly adapted to be used in connection with compound engines as it occupies a small space, increases the vacuum and will deliver the feed water up to the maximum degree. By using the auxiliary heater and utilizing the exhaust from the feed or air pumps, the water is supplied to the boiler at near the boiling point.

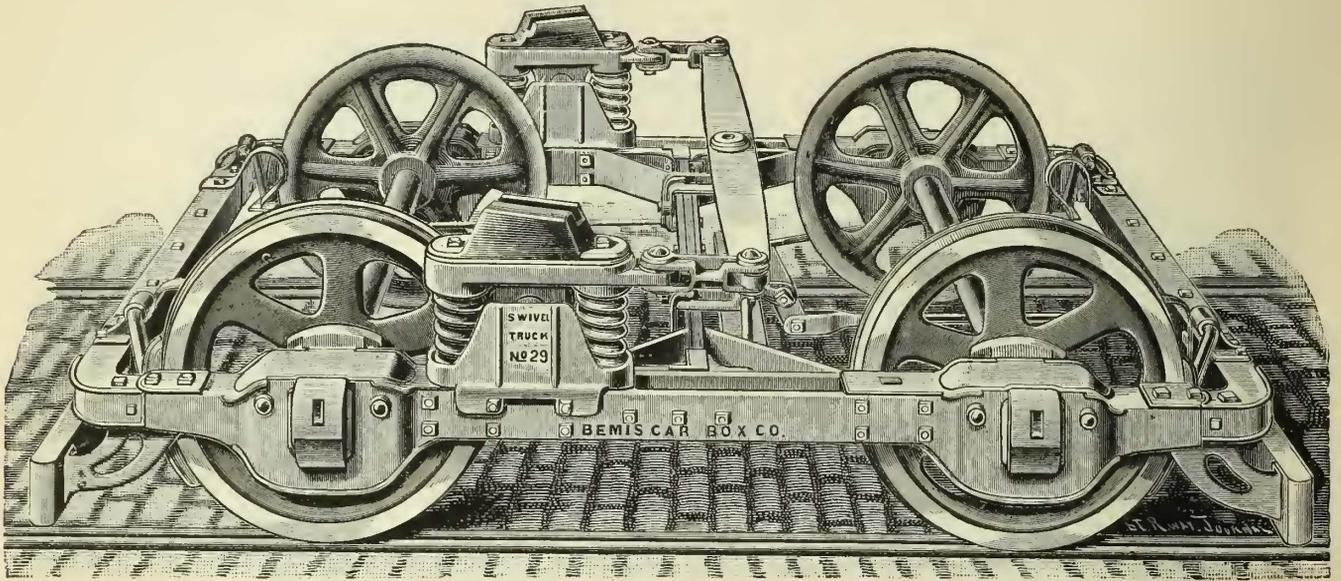
tion with compound engines as it occupies a small space, increases the vacuum and will deliver the feed water up to the maximum degree. By using the auxiliary heater and utilizing the exhaust from the feed or air pumps, the water is supplied to the boiler at near the boiling point.

New Swivel Truck, No. 29.

The accompanying engraving illustrates a new swivel truck, No. 29, for eight wheel cars, designed and built by the Bemis Car Box Co. of Springfield, Mass. The truck

New Triple Expansion Engine.

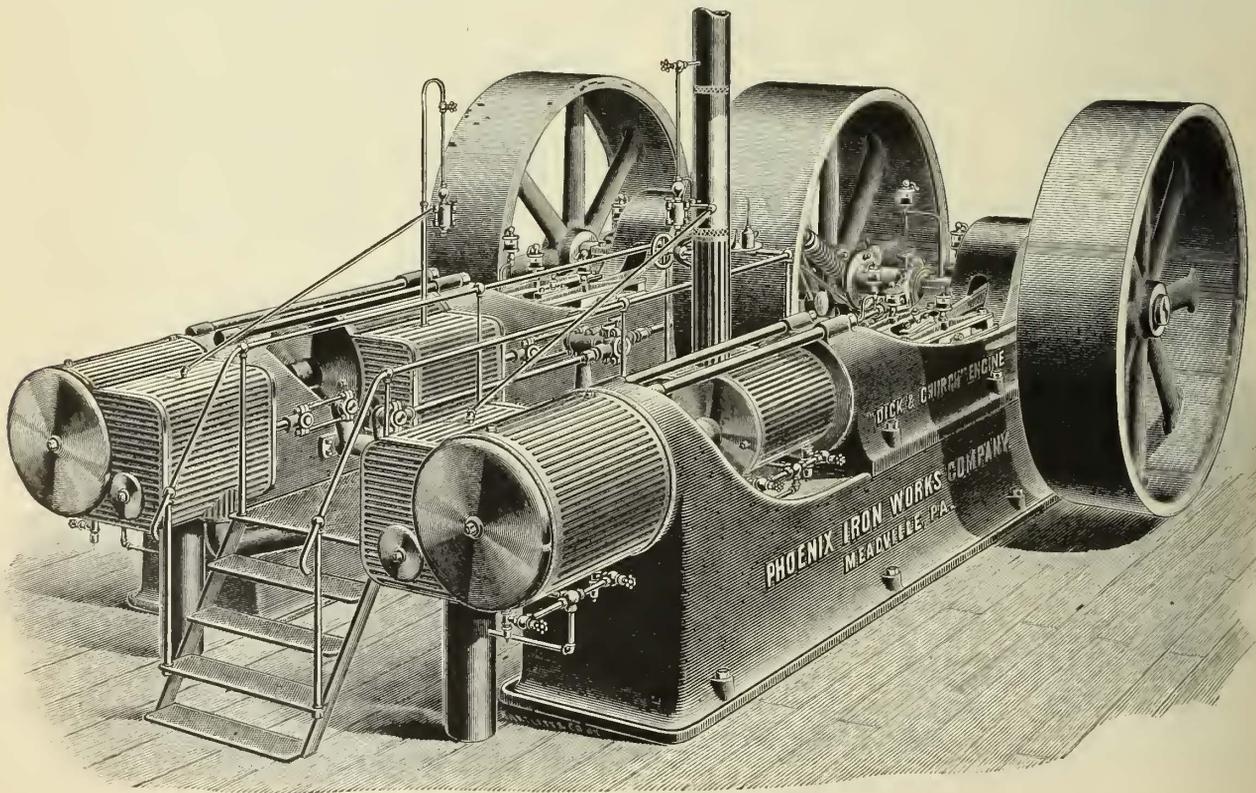
The accompanying engraving shows a view of a 500 H. P., triple expansion engine recently put on the market by the Phoenix Iron Works Co., of Meadville, Pa. This



NEW BEMIS STREET RAILWAY TRUCK.

has a short wheel base and swivels from its centre, but carries a large per cent. of the weight of the car on the motor axles, and while giving increased traction on the motor wheels, has standard sized wheels on both axles. This gives light draught and good braking qualities without increasing the height of the car above the track. Another important feature is the fact that there is no part of the truck over the motor, permitting of easy access to the latter for inspection, dismounting or making repairs.

engine, as will be seen, is very similar in design to the Tandem Compound, manufactured by the same company and described in our October, 1891, issue, except that it is a double engine carrying one high pressure, one intermediate and two low pressure cylinders. The centre wheel is the governor wheel, and, as with the compound engine, the valves to both high and low pressure cylinders are automatically controlled by one governing device. A double governor controlling all four valves is used, actu-



NEW TRIPLE EXPANSION ENGINE.

The well-known Bemis box, which has given such excellent results in the past is, of course, used, and the material and workmanship of the truck are of the best.

THE Passaic (N. J.) Elevated Transit Co. was recently incorporated.

ating the valves of the high and low pressure cylinders on one side, and the intermediate and low pressure cylinders on the other side, and securing, it is claimed, a more equal distribution of loads and temperatures between all cylinders than has thus far been brought out. The crank shafts of the two engines are bolted together mak-

ing, practically, a continuous shaft. The valve gear is all on the inside, but is so arranged that it is easily accessible for adjustment. Belts can be run from any or all of the wheels.

The proportions of this engine throughout are very large to insure durability, and particular care has been taken to make the working parts of the engine accessible for adjustment, and the oiling devices are such that all parts of the engine can be thoroughly lubricated while in motion. The machine is very heavy, of very rigid construction, and is particularly adapted for driving large railway generators. It may be run either as a condensing or non-condensing engine.

Standard Car Heater.

Street railway companies and car builders often find fault with the ordinary type of stove for street cars because, when it is used, it is necessary to cut the car seat. They also object to its location upon the car floor because it interferes with the flushing of the floor, as dirt and water collect in the stove box.



STANDARD CAR HEATER.

With the new stove recently put on the market by the Standard Railway Supply Co. of Chicago, these objections are entirely obviated. It is designed to rest upon the car seat instead of upon the floor, and it occupies only the seating space of one passenger.

The sides of the case are designed to be cut to conform to the shape of the seat, and are so made that they may be used over plain wood, cushioned or upholstered seats. Linings of asbestos and sheet zinc are contained within the case so that passengers sitting next to the heater experience no discomfort because of excessive heat.

The stove presents a handsome appearance. It is substantially constructed of cast iron with nickled top and front plates. It occupies a space fifteen inches high

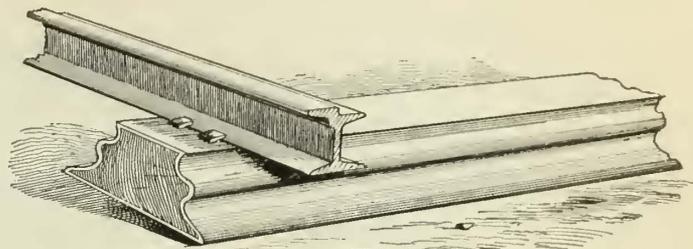
by twelve inches in width, but its capacity is said to be fully as great as heaters of much larger size. As shown in the illustration, the coal box is lowered under the car seat.

The fuel is fed in at the top of the stove, and tests made thus far go to show that in its consumption of coal the heater is extremely economical. The ash box is made sufficiently large to contain all the ashes accumulating in twenty-four hours.

As the engraving shows, the pipe is straight, and extends through the lower deck, an arrangement considered far more sightly than when an elbow is used. The company have already received a considerable number of orders although the stove has been on the market only a short time.

Elastic Metal Railway Tie.

The accompanying engraving shows a type of metal tie recently invented by Charles O. Newton, of Homer, N. Y. It is made of sheet or plate steel, one-fourth to three-eighths of an inch thick, bent into shape, with the



ELASTIC METAL RAILWAY TIE.

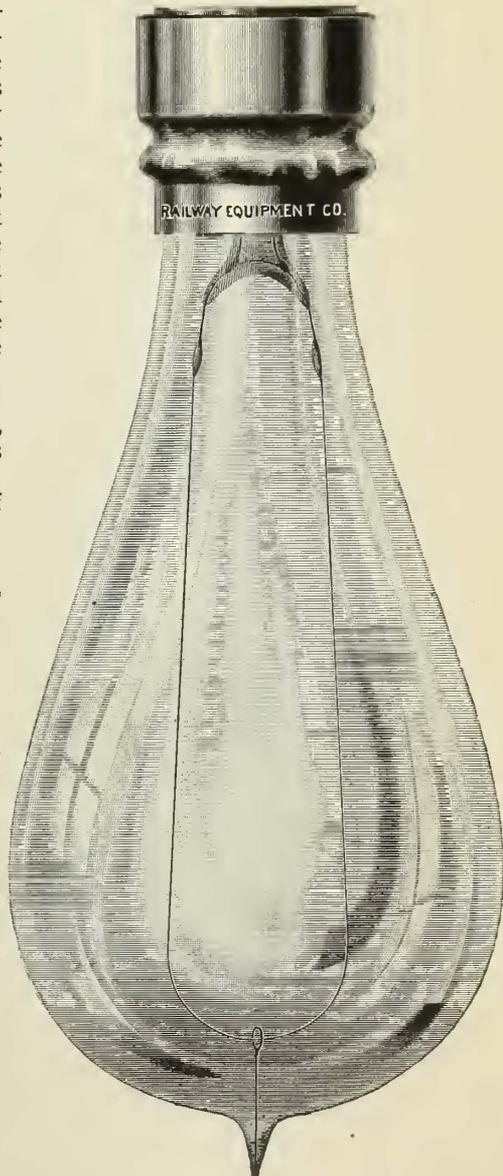
ends coming nearly together on the bottom. It has corrugated or fluted sides, and a wooden plug two and a half feet long fitted to shape and inserted in the ends. On the top of the tie where the rails are fastened are holes through which spikes are driven. If deemed preferable, the rail can be mounted on plates and bolted to the tie in place of employing spikes.

The advantages claimed by the inventor for the device are durability and elasticity. The latter quality is secured both by the shape of the tie and the wooden plugs which act not only to hold the tie in shape, but also serve as a cushion. The form of the tie enables it to be easily tamped in place, while, of course, its life is much longer than if made of wood.

New Anchored Filament Lamp.

The service required of an incandescent lamp on electric cars is necessarily very severe, and ordinarily conducive to short life through a breakage of the lamp filament.

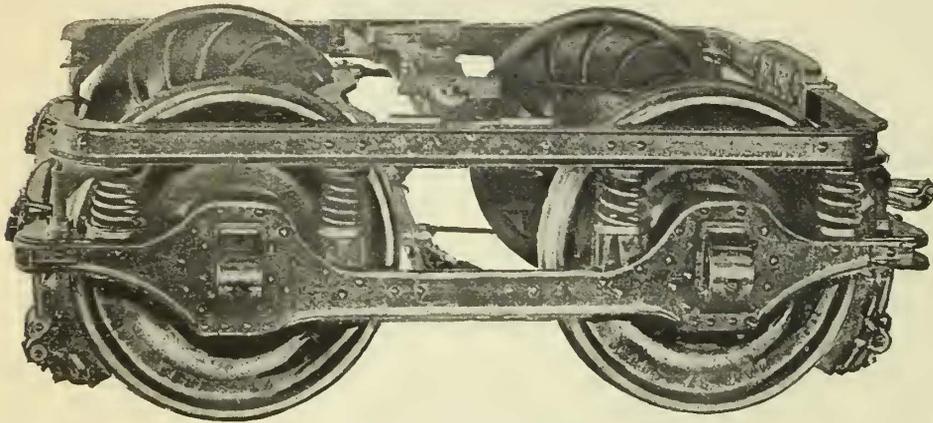
The Railway Equipment Co., of Chicago, noting the need of an anchored filament lamp, have lately placed one on the market, which, they claim, will meet the requirements. Severe tests of this lamp have been made during the last six months, and the company state they are prepared to guarantee it for life, efficiency and reliability of candle power. The lamp is called the Mansfield lamp.



ANCHORED FILAMENT LAMP.

Elevated Railway Truck.

The type of truck adopted on the elevated railway of the Interstate Consolidated Railway Co., of Kansas City, Mo., is shown herewith. The motive power on this line is being changed from steam to electricity, and the truck is the heaviest ever built for an electric railway.



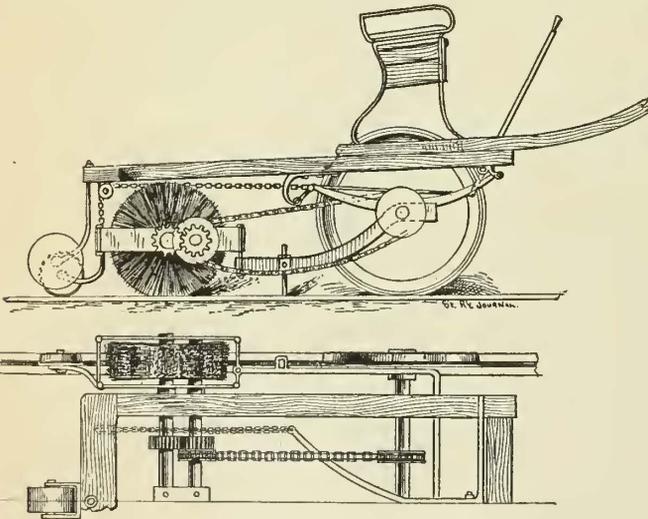
ELEVATED RAILWAY TRUCK.

The weight of the truck complete is 6,000 lbs., and the wheel base is six feet six inches. The wheels are thirty-six inches in diameter and weigh 600 lbs. each. The car bodies are thirty-five feet in length, and the motive power will be furnished by Westinghouse thirty horse power single reduction motors. The manufacturers of the truck are the McGuire Manufacturing Co., who have recently placed seventy trucks similar in design, but lighter in weight, on the San Francisco & San Mateo Railway in San Francisco. These trucks have given good satisfaction.

Track Cleaner at Lille, France.

By C. R. KING.

In the accompanying drawing is shown a simple form of track cleaner employed at Lille, France, that has probably been in use since the earliest days of street railways in that city. The operation of the sweeper is very simple



ELEVATION AND PLAN OF TRACK CLEANER AT LILLE, FRANCE.

and apparently effectual in a city like Lille, where sand and gravel are never thrown on the track in greasy weather.

The sweeper frame is of iron, and is mounted on two forward and two small rear wheels. Each brush is about twenty inches in diameter by five inches wide and is mounted on a pinion shaft which has bearings at either side of each brush, and is driven by an intermediate shaft carrying two fixed pinions of the same diameter as those on the brush shaft. The intermediate shaft is driven by chain gearing from two larger pulleys keyed on the main

axle. The object of the intermediate shaft is to make the brushes sweep forward. The driver's seat is placed over the main driving axle, thereby increasing the adhesion of the driving wheels on the rails. The seat is bolted to an upper wooden frame carried on plate springs sleeved on the axle. To relieve the shafts of strain, there is an iron standard pivoted in the middle of the rear of this frame and fitted at its lower end with a thick wooden block wheel or roller. The iron frame can be lifted so that the brushes are two or three inches clear of the ground, by a single pull on a lever at the driver's hand. This lever is worked beneath, and each brush is connected with chains passing over the grooved runners placed at either corner of the wooden frame down to the iron frame to which they are hooked. As the Lille lines are largely single track, the flanges of the tires of the sweeper wheels are made very shallow to facilitate derailment. Once off the rails, the weight of the sweeper is carried on the two front wheels and the wooden trailing wheel. On the

iron frame directly behind the front wheels are two steel spuds or scrapers for cleaning the rail groove in advance of the brushes. The points which require the particular attention of the driver are, of course, the switches and "closed rails," that is to say, the rails of the double or jointless type which were formerly employed extensively at Lille, and which have the drawback of sometimes closing like a pair of scissors under the weight of the general street traffic. To pass such places, the flanges of the car tires manage to plow their way, but the scraper of this machine cannot. Such rails are, however, being rapidly replaced by the double or twin rail of the Marsillon's system, or by the grooved Broca rail.

The brush frame can be raised by a lever near the seat of the operator, and the sweeper can be turned from the track readily as the flanges on the wheels are shallow.

Correspondence.

Communications on all subjects of interest to street railway managers are solicited. Names of correspondents may be withheld from publication if desired, but must be known to the editors. The correspondent alone is responsible for his statements and opinions, not the editors.

Death From a Trolley Wire.

PORT HURON ELECTRIC RAILWAY CO.

PORT HURON, MICH., August 16, 1892.

EDITORS STREET RAILWAY JOURNAL:

In reference to your letter of recent date concerning the death of Newton Talbot we would say: Newton Talbot was one of a gang of linemen at work putting up the overhead construction for the reconstruction of our road. The gang was straightening a pair of iron poles preparatory to putting on the cross wire that will support the trolley wires for a double track. Talbot was on top of the carry and happened to be astride of our live trolley wire. He told the driver to go ahead to enable a street car to pass, and failing to get from astride of the trolley wire, he grasped the wire the men of the gang were using in straightening up the poles, or rather threw his left arm over it, forming a circuit through his body. Before the unfortunate man could be released the current had done its work, as he expired very soon after being taken down.

We tested our current twice during the same day and found that it was running at 500 volts, and a little under at times. There was no *post mortem* examination made, the man to all appearance being strong and healthy. The current, you will notice, passed directly through the left side, and may thus have caused a fatality that under other circumstances would not have happened.

Yours truly, F. J. DIXON, Secretary.

LANCASTER STREET RAILROAD CO.

LANCASTER, O., August 20, 1892.

EDITORS STREET RAILWAY JOURNAL :

On June 1, the roadbed of the Lancaster Street Railroad was completed, and the line has at present three and three-quarters miles of track. Of this two miles, including turnouts, are laid with fifty and a half pound girder rails and curves with ninety pound grooved girder rails all mounted on chairs, and the streets are paved with vitrified brick. The remaining one and three-quarters miles of track are laid with from thirty-five to fifty pound flat rails on stringers. All the track, except that using stringer rails, is bonded ready for electric traction. The local electric light plant already has the steam plant and will install the power house equipment and furnish power for four cars. All that is required to convert the line into an electric road is the overhead construction and four motor cars.

The road at present with horse power has paid all running expenses and repairs, and if once equipped as an electric line would be a good investment. The city of Lancaster has plenty of natural gas. Columbus is supplied from the Lancaster gas field, and Zanesville will soon receive natural gas from here through a pipe forty miles in length, so that fuel is cheap.

The undersigned will be glad to correspond with parties seeking a safe and profitable investment by the purchase of the line outright or of sufficient stock to complete the electrical equipment. A. BAUMAN, Manager.

How to Meet Emergency Cases.

In order to give our readers the benefit of the experience of others, we recently addressed a letter to a number of street railway superintendents asking them to give in detail the methods employed by them to prevent or raise a blockade, should one occur, and how they meet the many exigencies that arise in street railway practice. The following are a few of the replies received which will be found interesting. There are doubtless others who can give valuable suggestions in this line, and we shall be pleased to hear from them.

CHICAGO CITY RAILWAY CO.

CHICAGO, ILL.

GENTLEMEN :—We operate 150 miles of road, thirty-six miles of which are cable, and the balance are horse lines.

Most of our blockades and delays are caused by the breaking down of wagons in turning out of tracks, principally coal wagons and heavy loaded trucks. We have wrecking wagons located at different points in the city from which such blockades can be reached quickly. These wagons are drawn by a team of fast horses as are the fire department wagons, and are always ready to start on a telephone call.

The driver and one man are sufficient to remove the heaviest wagon from the track. The jack screw raises the wagon, so that our extra wheel, which fits any wagon or carriage, can be placed on the axle, and the obstruction is ready for moving. For this class of breakdowns the extra wheel and jack screw are the only tools required. Where the wheel cannot be used, a "skid" takes its place. These wrecking wagons also carry tools for use in all cases of damage to grips and cables, such as cutting out grip plates, etc., etc.

In case of breaking of cable, failure of power, or stopping of cable from any cause, horses and men are taken from stables at once and used until the cable is ready to resume work. A wagon loaded with whiffletrees for such an emergency always stands ready waiting for a team, and I am pleased to say that its service has not been required but once during past year. We endeavor to make blockades by civil or military parades as short as possible, by anticipating the line of march and having tow men and horses ready for switching back when possible.

In case of epidemic among horses, such as glanders,

farcy, etc., we destroy those seriously affected, isolate those liable to be affected by contagion, and apply the usual remedies and disinfectants. Since the "Epizootic", which stopped us ten days, we have not been troubled with any delay from this cause.

For city use I consider a wrecking wagon with a good team and driver, the most essential outfit required. The driver should be a man not afraid to make the necessary pace with his team, and at same time avoid all injury to persons and property. His mate should be an active man accustomed to handling tools, a repairer of car trucks preferred. Others can be added from depot men if required.

With the exception of jack screw and wagon wheel to fit any vehicle, the balance of tools should be selected according to the requirements.

M. K. BOWEN, Superintendent.

THE CLEVELAND CITY CABLE RAILWAY CO.

CLEVELAND, O.

GENTLEMEN :—In reply to yours of the 14th in regard to emergencies arising on our road, we would say we have never had a strike on our road since we commenced running the cable, nor have we had any failure for want of power. In regard to blockades caused by fire, we simply wait until the fire is over and the hose taken off the street. In regard to processions, civil or military, we have had but little trouble. In passing through crowds we put a man on the front of each grip car, run slowly and have him do the best he can to get the crowd out of the way. In this way we generally keep our cars moving, sometimes quite slowly.

In regard to cables breaking, our system is, first to notify the roadmaster as soon as possible, and have him and his men run along the street and try to find the place where the cable is broken. In the meantime we order teams sent from our horse car line for pulling the cable together. Our express wagon is ordered from the barn to the power house as quickly as possible, and the splicers' tools and all the implements necessary are placed in that. In the meantime, while waiting for the horse and wagon to reach the spot, our splicer and his men are getting the tension carriage in shape so that it can be drawn up close to the drums, and in all cases we try to save as much time as possible in getting our rope together, spliced and started up.

M. S. ROBISON, Manager.

THE DENVER TRAMWAY CO.

DENVER, COLO.

GENTLEMEN :—In regard to blockades on our roads, we have a wrecking wagon equipped with all necessary tools, which we send out as occasion requires. There is a man constantly on watch, and we have a very complete signal and telephone system.

We find the wrecking wagon an almost indispensable adjunct to our business.

C. K. DURBIN,
General Superintendent.

HOUSTON CITY STREET RAILWAY CO.

HOUSTON, TEX.

GENTLEMEN :—The plan of our railway system prevents in most instances a total suspension of traffic. We operate a belt system, and it is rarely that both streets are obstructed, so that partial service by transfer can generally be given. The greatest delays come from fires and civil parades, through an indisposition shown on the part of the fire department and city authorities to give the necessary co-operation.

Duplicate station equipment is provided to prevent failure of power, and the overhead construction is divided in sections so that only one section is stopped by a short circuit. A variety of tools to make minor repairs and to replace derailed cars on track are kept at the office which is centrally located. We have not found obstructions frequent enough to have a special emergency force, but issue a general instruction book to employes, which is intended to cover most cases. It is not perfect as it has

not been revised under the light of experience with electric power, and special training to fit local conditions is always necessary, so that every case cannot be covered by a book of general instructions.

F. MUNDES, Superintendent.

NAUMKEAG STREET RAILWAY CO.

SALEM, MASS.

GENTLEMEN:—So far as the overhead lines are concerned we have two regular linemen who do nothing but attend to this part of the equipment. These men are hired with the understanding that they are to report any time in the twenty-four hours and any day in the week if called upon out of regular hours. As these men are not employed on any other part of the work, they are always ready at a moment's notice to respond to a call for accident. The line foreman is never allowed to leave the city without notifying the company, so that some one can be provided in his place; this rule holds good in and out of regular hours. We have also one of Davis & Son's latest improved tower wagons, with a few attachments of my own upon it, which enables us to repair any trouble in the shortest possible time.

To give an instance of their work, we had a case a few weeks ago when the trolley wire separated at a sectional insulator and fell to the ground. Although it was during the night, the linemen were on the spot in eighteen minutes after the accident occurred, and inside of forty minutes all repairs were made. The linemen live close to the car barn, and at night are called by the man in charge of the barn.

During the regular hours the line foreman calls at the receiving office of the company at frequent intervals and keeps the office informed of his whereabouts at all times. Our road not being large enough to warrant keeping an emergency force of men stationed at one place continually, we have adopted the plan outlined above and find it very satisfactory.

We have never had any serious shutdown from fire or from the elements. In case of a heavy thunder storm we have a standing order to shut down until the heaviest part passes, as we find it cheaper to lose an hour's business and then be able to proceed as before, than to be obliged to lose several hours by the station being damaged and the street blockaded by disabled cars. In such cases the trolley poles are tied down several feet from the line.

In regard to tools and appliances, we believe that a suitable tower wagon, built light but strong, and equipped with all necessary line tools should be kept ready at all times to respond to a call. On small roads the same wagon can be used in every day work, provided some similar plan to ours is adopted.

So far as the cars and station are concerned, we have a chief inspector who has full charge of both, and whose duty it is to ascertain and immediately remove the cause of any trouble to either. This man has no other duties than to see that all cars are fully examined several times a day, and that all the electrical appliances at the station are in good working condition. In this way much trouble is prevented by taking small troubles in season and making repairs before larger ones happen. Such a man is of great service to a road of any size.

In conclusion, let me say that I believe in hiring men for a specific purpose and not for all kinds of work. If I have a mechanical job to be done, I hire a mechanic, and if a line job a lineman, and if an armature or field job, an experienced winder; I do not believe in a "jack-of-all-trades" man.

JOHN H. BICKFORD,
Electrical Superintendent.

SEATTLE CONSOLIDATED STREET RAILWAY CO.

SEATTLE, WASH.

GENTLEMEN:—In reply to your favor of the 14th inst., we have been singularly free from blockades since we started as an electric railway, viz., April 7, 1889.

We keep a wrecking car with the necessary tools and appliances in case of accident, either to cars, overhead

construction or any other emergency, with the following tools, etc.: One hydraulic jack; two screw jacks; one pair wrecking frogs; two large plates of iron, 4 ins. X 4 ft.; two pieces of flat rail, each ten feet long; block and tackle; two long hook chains; two steel bars and a large quantity of blocks, besides the usual smaller tools.

We have never shut down the road for more than thirty-five minutes from any cause whatever, except on one occasion. This was early in the morning of December 25, 1890, when, in an exceedingly heavy gale of wind, we had our smokestack blown down, and several fir trees fell across our boulevard bridge (two and a quarter miles in length) which caused a shut-down of five hours. The trees were considerably over four feet in diameter, and drove the piles down several feet with the weight of their fall. In this case we had to transfer for two days. This accident could not occur again, as we have had all trees cut down in the vicinity of our tracks. This was the worst wind storm in the memory of the oldest resident, and caused much damage besides that mentioned.

A. DUNN, Auditor.

UTICA BELT LINE STREET RAILWAY CO.

UTICA, N. Y.

GENTLEMEN:—In order to explain intelligently our methods of raising blockades, etc., it will be necessary to first describe the system by which our gangs are divided and governed.

There is, first, an assistant superintendent who has entire charge of motormen, conductors and transportation. It is his duty in all cases of obstruction to traffic, such as fires, wires down or derailed cars, by which travel will be delayed for any interval, to go immediately to the place of trouble; and should the obstruction occur on a single track line, he sends orders to the nearest turnouts for the cars to meet at the point obstructed and the passengers to be transferred from car to car.

If a car is delayed in returning to the car house by the accident, the starter at that point starts an extra crew with a car on the time of the car overdue, the extra crew changing with the regular and bringing their car to the house when the two meet. By this method the cars are on time when the blockade is raised.

If the trouble occurs on a double track, a man is placed at the nearest crossover from the point obstructed, and a given number of cars are allowed to pass, first down one track and then down the other, returning by the same track to the crossover. The transfer of passengers occurs the same as on a single track, the double tracks only serving to facilitate matters.

Second. There is a foreman of a gang on car repairs, who, in case of a derailed or disabled car, will have an extra car run out with his men and necessary tools, and get the car in shape to return to the car house. If convenient the disabled car is derailed entirely, so that it offers no obstruction to travel, or is side tracked at the nearest switch, and the repairs made at such times as not to interfere with regular travel.

Third. There is a foreman of linemen who lives in close proximity to the car house, and is subject to a "call out" at all hours. A man from the line gang is also on duty at all times. Should word be received of trouble on the line, the line gang with an emergency wagon is ready to start for the break with the utmost dispatch, and make the necessary repairs.

Fourth. There is a small track gang kept constantly employed on adjustment and light repairs of curves, switches and low joints. These men have a horse and wagon always with them, and they can be quickly called in case of spread rails, washouts, or other trouble with the track, and are also called in case of a derailed car.

All foremen of gangs make a report each morning at the office where they will work during the day, so that in case of trouble they can be quickly called.

In case of "heart failure" at the power house, when the power has again returned each conductor has instructions to allow the car immediately preceding one minute's start before giving the bell to start his own car, and the starter sends out extra cars to meet the regulars

and get them again on schedule time. On the single track when, for instance, cars are running on half hour time, and two cars meet at a given switch, the inward bound car will be on the outward bound car's time; the crews merely transfer cars.

I would suggest that all motormen serve at least one week on motor repairs in the shop before running on the cars. All motormen should be equipped with a neat and compact canvas or leather bag, containing a twelve inch monkey wrench, a six inch screw driver, a pair of side cutting pliers and six or eight feet of insulated No. 6 wire, for a ground wire. These tools are all that are necessary for any ordinary repairs to lamp circuits, hot boxes or to cut out a motor. Any repairs that would require any length of time should never be undertaken on the street by the motormen, but the car should be pushed home.

The conductor should at all times telephone to the starter at the car house, at the first place to which he has access, any disablement of his car.

A pair of rerailing frogs and jacks should be kept in a convenient place in the shop at all times.

WM. W. COLE, Superintendent.

UNION RAILWAY CO.

CHESTER, PA.

GENTLEMEN:—I have not time at present to reply fully to yours of the 13th, but would make a suggestion that street railway companies should endeavor to get all fire companies to carry two sets of jumpers to protect their hose in case of fire. In my opinion it would save a great deal of time and unnecessary delay to the traveling public.

JOHN MACFAYDEN,
Superintendent.

A Stranger's Impression of Our Street Railway Systems.

Mr. George Flett, managing director of the firm of Messrs. Dick, Kerr & Co., engineers and contractors, London, Eng., having recently made a tour of our principal cities gives us his impressions regarding our street railways, in substance as follows: He was exceedingly surprised and gratified to see the crowded three and five car trains, following each other at short intervals on the Chicago cable lines, and the same thing on electric lines in other localities, and says he can now understand how that electricity is a success in this country while it has not thus far proved a success in the old country.

He criticizes our method of track construction and thinks we will have to improve our methods before our tracks will compare with those of English construction. But he infers that we will in time make an equally substantial roadbed, but that we are now going on the principle of putting down a road that will pay in the first instance, with a view of improving it later on. He thinks it may be a sensible course to pursue, but that it is a policy that the English people cannot be trained to adopt. He further says that we will not regret the adoption of the girder rail that is now being extensively used, and states that it has been universally adopted on the other side and in the colonies, and where laid on a proper roadbed and with heavy fishplates very satisfactory results have been obtained. The rail, however, differs somewhat from our type of girder rail as only the grooved girder rail is allowed, and they are usually rolled with a very wide base.

Again, he is surprised at the enormous strides that electric traction has made in all parts of this country, and especially in cities of the size of Toronto where they are constructing a system that will embrace seventy miles of track, for in cities of the old country, with no larger population, twenty-five or thirty miles of street railway would suffice. Mr. Flett is not only surprised at the magnitude of the business, but seems to think that the concessions granted to the street railway companies by the municipal authorities are much more liberal than are usually allowed in his country, and were the same concessions granted to them, he thinks it would cheapen considerably the cost of construction in the first instance and would lessen a great

deal of the irritation which now usually attends street railway construction.

Mr. Flett secured an order for 10,000 tons of grooved girder rail from the Toronto syndicate, and after this is put in service we will have an opportunity of studying the relative merits of this construction as compared with the American type of rail.

Street Railway News.

General.

Allentown, Pa.—The Briggs Carriage Co., of Amesbury, Mass., have shipped ten open cars to the Allentown & Bethlehem Rapid Transit Railroad. They have several closed cars to build for the company.

Asheville, N. C.—The Asheville Street Railway Co. carried 23,000 passengers during the four days of the firemen's tournament.

The Asheville Street Railway Co. and the Asheville Light & Power Co., two corporations intimately connected, have bought the Reems-Creek Falls and water power, six miles north of the city, and will bring their power and light by cable from that point instead of running their dynamos by steam engines here. It is estimated the saving in coal alone will be nearly \$12,000 yearly.

Buffalo, N. Y.—The contract for the construction of the Buffalo, North Main Street & Tonawanda Electric Railroad has been let to the Field Engineering Co. of New York.

Chester, Pa.—The contract for ten twenty-five horse power motors for the Chester & Media Electric Railroad has been awarded to the Westinghouse Electric & Manufacturing Co. The motors will be attached to cars thirty-one feet in length.

Cleveland, O.—The Woodlawn Avenue & West Side Street Railroad Co. recently purchased three acres of land on which the car houses and shops will be erected when the road is equipped with electricity.

Dubuque, Ia.—It is reported that the bondholders who recently bought the Eighth Street motor line for \$25,000 will offer it for sale at auction. In all probability a company will be formed here to operate it.

Durham, N. C.—The Durham street railway has suspended operations for the reason that it did not pay expenses.

Easton, Pa.—The stockholders of the Centre Square & Delaware Bridge Passenger Railway Co. recently voted to merge with the Easton, South Easton & West End Passenger Railway Co. under the title of the Easton Transit Co. This completes the merging of the horse car lines in Easton. The officers of the new company are: President, Warren A. Wilbur; secretary and treasurer, A. D. Chidsey.

The Easton Transit Co. have adopted the Westinghouse system, and have ordered ten closed cars of the Westinghouse Manufacturing Co., of Pittsburgh. Each car is to be equipped with two twenty horse power motors, the cars to be delivered by November 1. Next spring the Westinghouse company will furnish the road with ten or twelve open cars of the same equipment. Pepper & Register, of Philadelphia, have secured the contract for the construction of the road.

Fort Wayne, Ind.—The contract for the power house for the new electric railway plant of the Fort Wayne & Belle Isle Railway has been let. It is to be finished by October 1. A Chapoton, Jr., will do the mason work, Golden & Teakle the carpenter work, and the Wrought Iron Bridge Co. of Canton, O., the roof.

Gainesville, Tex.—The street car line was sold, August 3, for \$855, to satisfy judgment in favor of the Merchants' National Bank of Fort Worth.

Galveston, Tex.—The Galveston City Railway has been sued in the United States Circuit Court here by the Detroit Electrical Works. On March 12, 1891, the Galveston City Railway Co. contracted with the Detroit Electrical Works for a full car equipment. The electrical company claim that they have complied with all the requirements of the contract, while the railway company allege that the plant and equipment put in by the electrical works did not meet the requirements of the contract.

Honeoye Falls, N. Y.—The projectors of the Lima & Honeoye Falls Motor Railway have begun operations.

Halifax, N. S.—The Nova Scotia Power Co. propose constructing an electric street railway to extend from the deepwater terminus of the Intercolonial railway along Water Street to the South End.

The Halifax Carriage Co. started business here about two months ago with \$15,000 outfit. During the first month the company lost over \$1,500 on running expenses, and the directors then discontinued the experiment.

Independence, Mo.—The tracks of the Citizens' Street Railway Co. were taken up by order of a resolution adopted by the City Council declaring the franchise void. The cause alleged was poor service and non-compliance with the franchise.

Johnstown, N. Y.—Frank Hart of Amsterdam has been awarded the contract to build the power house for the Cayadutta Electric Railway Co.

Kansas City, Mo.—The Eighth Street line from the Union Depot to Delaware Street has been equipped as an electric road by the Consolidated company.

THE transfer has been completed of the Interstate Consolidated Rapid Transit Railway to the Kansas City Elevated Railway Co.

AN ordinance has been passed by the City Council declaring forfeited \$10,000 deposited by the Union Cable Co. on May 10, 1892, as a guarantee to complete their road, in accordance with their franchise, before August 1, 1892. The amount was placed to the credit of the City Hall fund.

Lansing, Mich.—As a result of the suit which has been pending in the United States Circuit Court, between the Continental Trust Co. and the Lansing Street Railway, Judge Swan has ordered the foreclosure of the mortgage which the trust company hold, and the sale of the line, including the franchise and equipments. It is said, however, that this new phase of affairs will not affect the proposed extensions of the lines nor the operations of the road. If the trust company bid in the road the improvements which are being carried out will be completed.

Lynchburg, Va.—The street railway companies are to be consolidated.

Memphis, Tenn.—The Memphis & Raleigh Springs Railway is complete and in full operation.

Montreal, Can.—Work on the electric street railway is progressing rapidly. The directors lately granted a 25 per cent. increase of wages to the conductors and drivers. It was also agreed to limit the working hours of the men to ten per day.

New York, N. Y.—The Belt Line railroad is likely soon to pass into the control of Metropolitan Traction Co., owners of the Broadway & Seventh Avenue, the Sixth Avenue and a number of other surface roads. The official name of the Belt Line road was the Central Park, North & East River Railroad. Another road which the Metropolitan Traction Co. are understood to be negotiating for is the Forty-second Street, Manhattanville & St. Nicholas Avenue. Negotiations were in progress some time ago for the sale or lease of the Eighth Avenue Road to the Metropolitan Traction Co., but they were interrupted.

North Vernon, Ind.—The North Vernon & Vernon Street Railway was put in operation August 9.

Ottawa, Ont.—The endeavor to get the old street car line converted into electricity has resulted in a proposition from the company to the Corporation to allow both lines to amalgamate under a thirty year charter, in place of the twenty year charter now owned by the electric line, and to give a twenty year charter to the Passenger Railway Co., with power to go back to their perpetual horse car charter at the end of that time. By this proposal both roads would be controlled by the Corporation.

THE electrical machinery is being placed in the Ottawa Electric Street Railway Co.'s new power station. The chief novelty of the station is that it will be the first building in America heated by electricity. The method is by water heated by electrical apparatus patented by Mr. Ahern, the general manager. The 400 H. P. generator, weighing nearly 33,000 lbs., is made by the Westinghouse Electric & Manufacturing Co., of Pittsburgh, Pa.

Paducah, Ky.—The Sinker-Davis company have shipped a high speed, 150 H. P., engine and boilers to run the electric plant which the Paducah Street Railway Co. are putting in.

Pawtucket, R. I.—A bill of equity has been filed in the Supreme Court by the New York, New Haven & Hartford Railroad Co., against the Interstate Railway Co., and also a petition for an injunction enjoining them to take up their tracks and the plate at the point where their roads cross the tracks of the railroad company on Broadway.

Peoria, Ill.—Eighteen conductors on the Central Electric line were discharged recently as a result of the discovery of wholesale robbery of the company. The plan of operation was to secure at a low figure, from the janitor, tickets which had been returned to the office, sell them over again and pocket the proceeds. The sum thus obtained is not known, but will amount to several thousand dollars.

Philadelphia, Pa.—John A. Rigg, who for eighteen years has been manager of the City passenger Railway of Reading, has assumed general management of the People's Passenger Railway Co. His brother, Samuel E. Rigg, will succeed to the superintendency of the City Passenger Railway of Reading.

Pittsburgh, Pa.—The arrangements for the consolidation of the Pittsburgh, Allegheny & Manchester and the Pleasant Valley street car lines, have been practically completed. Negotiations for a consolidation have been in progress for several months.

Pittsfield, Mass.—The directors of the old Pittsfield Street Railway Co. have authorized the treasurer to apply to the Supreme Court for the dissolution of the corporation. The franchise and road were sold last year to the Pittsfield Electric Street Railway Co.

Portland, Ore.—The Metropolitan and Multnomah companies recently caused the arrest of forty conductors for stealing. G. B. Markle, president of both companies, says that the company have been losing on an average of \$4,600 a month.

Racine, Wis.—The City Council a year ago passed an ordinance granting to the Belle City Street Railway Co. the privilege of rebuilding fifteen miles of track and installing an electric system. The company have laid T rails and the Council have adopted resolutions notifying the company that there is serious opposition to their use as they interfere with traffic.

Rock Island, Ill.—The street railway syndicate has inaugurated a system of making a monthly award of prizes to the conductors and motormen presenting the neatest appearance personally, and who keep their cars in best order.

Rockland, Me.—The Rockland, Thomaston & Camden Electric Street Railway is finished and in full running. The road is very popular and the cars are crowded all the time. 30,000 passengers were carried the first week of operation.

Salem, Mass.—The great street railway deal, about which so much has been said and written lately, has been consummated. The syndicate is composed of Philadelphia capitalists, at the head of which is the banking house of E. W. Clark & Co.; they have secured the control of the Lynn & Boston, the Belt Line, the Naumkeag Street Railway and the Essex railway, and will operate a continuous electric system from Boston. The road will be known as the North Shore Traction Co. The property secured by the combination embraces fully 120 miles of track, about one-half of which is equipped with electricity.

St. Paul, Minn.—A fall of almost eight inches of rain during July 26 and 27 caused a suspension of the service on the electric railway lines. Rain collected on the roof of the Hill Street power station more rapidly than the pipes could drain it away. The roof finally collapsed, and rested on the machinery. The company had an enormous amount of repair work to do after the rain had ceased. The Concord Street line was three feet under sand. The interurban line was kept in operation by current from Minneapolis. The street car company sustained considerable damage in Minneapolis, though it was by no means as serious as in St. Paul.

San Diego, Cal.—The San Diego Electric Railway Co. have ten miles of electric road under construction and expect to be in operation about October of this year.

San Francisco, Cal.—The Geary Street, Park & Ocean Railroad Co. have almost completed the reconstruction of their cable line, nine miles in length, and have changed the gauge to four feet eight and a half inches and will add ten cars.

THE City Railway Co. have a three mile cable line under construction.

Springfield, Mass.—A new car for the street railway company arrived recently from the factory of J. M. Jones's Sons, West Troy, N. Y.

Springfield, O.—W. B. Kinley, of Champaign, Ill., and S. L. Nelson, of Defiance, O., own and are now operating the Springfield Street Railway. The price paid for the system is over \$500,000. Messrs. McKinley and Nelson are practical electric road men and will equip their new purchase with the best machinery obtainable.

Uniontown, Pa.—The Union Street Railway Co. are building from three to four miles of electric road.

Urbana, Ill.—B. F. Harris, Jr., has purchased the street railway system of Champaign & Urbana and the electric lighting and power plants connected with it, assuming management thereof. New and improved machinery will be added to the plant.

Velasco, Tex.—Messrs. Perry and Guy M. Bryan and others have begun construction on the street car line from Velasco to Bryan Heights, an elevation in the prairie three miles distant.

Victoria, B. C.—The Electric Lighting & Tramway Co. lately suffered a loss by fire of \$80,000, of which only \$45,000 was insured.

Victoria, Tex.—The Victoria Street Railway stopped their cars recently. Lack of patronage is the cause. It is expected that the suspension will be only temporary.

Wilkesbarre, Pa.—J. H. Gibson has been appointed general superintendent of the Traction company's lines.

Woburn, Mass.—Dr. George P. Bartlett, a physician and surgeon of this place, has invented a fender for electric street railway cars, which was successfully tested on the East Middlesex Street Railway lately. Dummies of a man and boy were placed on the tracks and roadbed in different positions, and the car run against them at various rates of speed. They were pushed off the tracks most effectively. In no instance was a dummy carried over twenty-two feet, and in most cases a much shorter distance before, being thrown aside. Stones were also placed upon the tracks and between them, and the fender worked equally well with these.

Yarmouth, N. S.—The Yarmouth Electric Street Railway was opened last month.

York, Neb.—The franchise of the street railway company was declared forfeited for the reason that their company had failed to comply with the provisions of the franchise in constructing and operating street railway lines, and owing to the fact that the materials composing the road were sold under attachment proceedings.

Extensions and Improvements.

Akron, O.—John F. Seiberling has received an ordinance to build and maintain a street railroad on North Hill.

Alameda, Cal.—The Alameda street railway line with its franchises has been sold to a company which will at once rebuild it as an electric line. It is likely that other franchises in the town will be applied for, and a complete system built that will supply all demands of travel. The officers of the company which purchased the road are: W. H. Bailey, president; F. H. Meyers, vice-president; W. M. Rank, treasurer.

Albany, Ga.—The Artesian City Railway Co. will extend their line for a quarter of a mile and will add two cars this year.

Allentown, Pa.—The Allentown & Bethlehem Railway Co. are extending their line this year.

Ashland, Wis.—The Ashland Lighting & Street Railway Co. have let the contract for changing the present horse car system into an electric line to the Thomson-Houston Electric Co. of St. Paul, Minn.; all work to be completed within four months.

Attleboro, Mass.—The Attleboro, North Attleboro & Wrentham Street Railway Co. have applied for a location from Park Street crossing to the town line of Seekonk.

Beaumont, Tex.—The Beaumont Street Railway Co. will make a slight extension this year.

Boone, Ia.—Engineer C. H. Hart, who is the projector of the scheme to electrically equip the Oskaloosa line, proposes to buy the present street car line, make some four miles of extensions and operate it by electricity.

Bowling Green, Ky.—The Park City Railway Co. have in contemplation some important improvements.

Bridgeport, Conn.—The East End Railway Co. have decided to discard horses for electricity.

Cairo, Ill.—E. W. Halliday, C. O. Patier and others of Cairo have purchased the interest of the St. Louis stock and bond holders, also Capt. W. P. Halliday's interest, and thus secured control of the road. They will proceed at once to extend the road and improve it.

Carthage, Mo.—J. Guinney, proprietor of the Carthage street railway, and other wealthy gentlemen of this city are interested in a scheme to run a belt line round Carthage, thence to Cartersville to connect with the electric line which is being built from Joplin to the Troup mines.

Chicago, Ill.—The Chicago City Railway Co. are building and are to build a number of miles of street railway tracks on the South Side. Permits have been issued to build two loops to use in World's Fair transportation.

Cincinnati, O.—John Kilgour, of the Consolidated company, has asked Council to be allowed to relay the tracks on Eighth Street, from Central Avenue to the foot of Price Hill incline, with heavier rails, as the Consolidated want to operate the line with electricity at an early date, if permission is granted. He also wants permission to change the motive power of the Storrs and Sedamsville route to electricity.

Cleveland, O.—The East Cleveland Railroad Co. and the Sheriff Street Market & Storage Co. are working to get the right of way on Huron Street from Prospect Street to the market house for carrying farm products from the district east of Lake View to the market. The company's charter gives them the right to carry freight as well as passengers.

APPLICATION has been made to the Council to grant the Cleveland City Cable Railway Co. the right to equip and maintain an electric street railway on St. Clair Street from Water Street to the city limits.

Columbus, Miss.—The Columbus Street Railway & Power Co. have received an extension of their franchise.

Columbus, O.—The Columbus Consolidated Street Railway Co. have received a franchise on Kelton Avenue from Main Street to Livingston Avenue, for a single track railway.

AN ordinance has passed the City Council granting the Columbus Street Railway Co. right to extend their tracks on Goodale Street.

Corpus Christi, Tex.—The street railway system is to be extended.

Corvallis, Ore.—The Corvallis Street Railway will extend their horse lines two miles this year.

Covington, Ky.—The running of an electric street railway to Fort Thomas by way of Bellevue is being considered by the South Covington & Cincinnati directors.

Dalton, Mass.—There is a project on foot to extend the Pittsfield electric road to this place.

Decatur, Ill.—The street railway company have received a twenty year franchise to make further improvements.

Denver, Colo.—It was lately stated that the City Cable Railway Co. would abandon their Platte Street horse car line, and in this event the Tramway company will extend their Agate Avenue line over the horse car line and down Fifteenth Street to Lawrence. It is also said that the company will run electric cars through from Lawrence to both Elitch's and Manhattan.

Easton, Pa.—Permission has been granted to the Easton, South Easton & West End Passenger Railway Co. to operate their roads and proposed extensions by electrical power.

El Paso, Tex.—The El Paso Street Railroad Co. and the Santa Fe Street Railroad Co. have been granted the right to change their lines now in actual operation from horse power to electric.

Elizabeth, N. J.—Council lately received a petition from the Elizabeth Street Railway Co. for consent to use electricity for motive power instead of horses.

Flatbush, N. Y.—Application has been made to the Board of Improvement for a franchise to build a surface railroad on Nostrand Avenue from the city line to Vernon Avenue and from thence to Flatbush Avenue, by J. C. Cameron, representing the Brooklyn City Railroad Co.

Fond du Lac, Wis.—On August 9 a deal was closed whereby the Fond du Lac street railway passes into the hands of W. G. DeCille, St. Paul, Western agent of the Westinghouse Electric Co. The line will be equipped for operation by electricity, and an incandescent electric light plant will be put in.

Fort Wayne, Ind.—The Centlivre line is being extended to the race track.

Frewsburg, N. Y.—Frewsburg people want the Jamestown electric road extended to their town.

Glens Falls, N. Y.—The Glens Falls, Sandy Hill & Fort Edward Electric Railway Co. have commenced extending the road from East Street to a point in front of the post office.

Glenshaw, Pa.—The Manchester Electric Street Railway Co. having obtained the rights of way in Sharpsburg, Etna and Millvale, the people of Glenshaw have requested the company to put down a branch line from Etna to Glenshaw.

Harrisburg, Pa.—Right of way has been granted to the Citizens' Passenger Railway Co. to lay tracks on Fourth to Maclay Street, providing the company will not lay tracks on Fifth Street as granted by a previous ordinance.

THE East Harrisburg Passenger Railway Co. have asked the Council for rights to occupy certain streets.

Johnson City, Tenn.—The Johnson City & Carnegie Street Railway Co. have built a half mile of road during the present season.

Joplin, Mo.—A deal is on foot looking to the consolidation of the street railways of Joplin, Webb City and Cartersville, and the building of an electric line between Joplin and Webb City. The necessary capital is said to be pledged.

Kansas City, Mo.—Negotiations are under consideration for the consolidation of the Northeast electric street railway line and the Tenth Street cable line, known as the People's Cable Railway Co., and the construction of a connecting line between the two on Lydia Avenue from Independence Avenue to Tenth Street. If successful the cable line will be converted into an electric line, the power to be obtained from the Tenth Street plant. The two downtown terminals will be continued. The Burge Park and Brooklyn terminals will also be continued.

THE Metropolitan Street Railway Co. have been granted a franchise to extend their line to the west end of Argentine.

A MAJORITY of property owners on Wyandotte Avenue, from Second Street south, have signed a petition for an electric line.

Key West, Fla.—It is said that the Key West Street Car Co. have sold out to a Northern company, who will relay the track and employ electricity.

Lancaster, Pa.—The West End Street Railway Co. are going to extend their lines from South Queen to Prince Street, on Conestoga, thus forming a belt line by erecting a line on South Prince Street to West King.

Laredo, Tex.—The Laredo Electric Street Railway Co. contemplate the extension of their road and the addition of six cars.

Lincoln, R. I.—The Pawtucket Street Railway Co. have asked the Town Council for rights to lay tracks in High Street.

Lynn, Mass.—The Thomson-Houston Electric Co. have been granted a hearing for September 6, on their petition to extend electric car tracks over Western Avenue from Federal to Fairchild Street.

Macon, Ga.—The Macon Consolidated Street Railroad Co. have been authorized to make various extensions.

Melrose, Mass.—The selectmen have granted the petition of the East Middlesex Railroad Co. to locate tracks from the junction of Main and Green Streets, Highlands to Wakefield line and from Howard Street easterly to Saugus line, and to maintain electric power over said tracks.

Methuen, Mass.—The Lowell, Lawrence & Haverhill Street Railway Co. have been granted a location in Methuen by the Selectmen.

Milwaukee, Wis.—The Milwaukee & Wauwatosa electric line is being extended.

A MOVEMENT is on foot by the Cudahy Bros. and other parties interested at Cudahy, St. Francis and along the route, to induce the Milwaukee Street Railway Co. to extend their line to Cudahy early next spring.

Mobile, Ala.—The Mobile Electric Railway Co. have asked authority to build a street railway, to be operated by electricity, on Jackson and other streets.

New Orleans, La.—It is reported that R. T. McDonald, general manager of the Fort Wayne Electric Works, has purchased and consolidated the street car lines and will operate them with electricity.

OFFICIALS of the Crescent City company state that an electric line, fully equipped, will be in operation in six months, the power to be supplied by the Louisiana Electric Light Co.

New York, N. Y.—John F. Foster, president of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad Co. has registered plans for the erection of a four-story brick depot and car stables, 125 x 182 ft., on the north side of Manhattan Street, and the south side of 113th Street.

Newburgh, N. Y.—The Newburgh Street Railway Co., will equip their line for electricity, provided they can get permission for further use of the streets.

Newport, Ky.—Colonel Shipherd and other members of the new street car syndicate have agreed to extend the electric car system out the Alexandria pike to the Evergreen Cemetery.

Niagara Falls, N. Y.—The Niagara Falls & Suspension Bridge Railway Co. have applied for a franchise on Ontario Avenue from Lewiston Avenue to Spring Avenue.

Oakland, Cal.—The Town Trustees have granted a franchise to the Oakland Consolidated Street Railway Co., giving them permission to construct their northern loop.

THE Oakland, San Leandro & Haywards Electric Railway Co. have been granted a franchise to maintain an electric road from Clay and Thirteenth Streets, down Clay to Eighth and thence to Franklin. This company has made an agreement with the Oakland Consolidated to run cars from East Oakland over Twelfth Street to Oak, to Thirteenth, and thence to Clay. The loop will be made by running up Franklin Street to Thirteenth.

Paterson, N. J.—The ordinance granting the right of way through Clay and other streets to the People's Park Railway Co. has been passed.

Petersburg, Va.—The street railway is to be extended this year.

Providence, R. I.—The Union railroad have asked the City Council of Providence for electric trolley rights on the Elmwood route.

Rockford, Ill.—Two miles of electric road and five cars will be added by the Rockford City Railway Co.

San Antonio, Tex.—The San Antonio Street Railway Co. advise us that they contemplate building a pavilion or summer theatre at the end of one of their lines, and that they desire to open correspondence with architects with a view to secure plans.

Saugus, Mass.—The Lynn & Boston Railroad Co. have asked for a location for their tracks from Saugus Centre to Melrose Highlands. It is understood to be for an electric system.

Seattle, Wash.—The Rainier Power & Railway Co. expect to complete seven miles of electric road before long.

Sioux City, Ia.—Rights to make several extensions have been conceded by the City Council to the cable railway company.

Stoneham, Mass.—The Wakefield & Stoneham Street Railway Co. have asked for a location for their tracks.

St. Paul, Minn.—President Lowry has proposed to the City Council to extend his lines to Como Park and Lake Phelan, on certain considerations.

Terre Haute, Ind.—The Terre Haute Street Railway Co. have filed a petition with the County Commissioners, asking to be granted the same franchise as was given to the Suburban Street Railway Co. They ask the right of way for a period of thirty years.

Trinidad, Colo.—The transfer of the Trinidad street railway to an Eastern syndicate has taken place. The present horse car lines will be taken up and an electric line of five miles laid.

Uniontown, Pa.—The Uniontown Street Railway Co. are extending their line three miles south to the Redstone Coke Co.'s works. The company also talk of extending to Oliver Bros. new plant, two miles north.

West Chester, Pa.—It has been decided to extend the line of the West Chester Street Railway Co. from Lenape to Birmingham Park. A new roadbed will be built separate from the railroad track.

Wilkesbarre, Pa.—The Wilkesbarre & Suburban Street Railway Co. by an amended ordinance have received permission to operate new lines over certain streets.

Yonkers, N. Y.—The Yonkers Railway Co. have petitioned the city to allow them to extend their line along Palisade, Ashburton and Park Avenues.

New Roads.

Abington, Mass.—The Abington & Rockland Electric Railroad Co. have accepted all the franchises granted by the towns along the proposed line, and contracts for the construction of the road will be made as soon as possible, and a call has been made to stockholders for the first 10 per cent. on their stock.

Atlanta, Ga.—A franchise has been granted to James Mell, W. J. Zachrey and A. S. Seals to build an electric street railroad on Loyd, Ivy, Gilmer, Fort, Erwin and Turnpike Streets to the city limits. Under the grant the road must be completed within one year's time.

A CHARTER has been granted to the Associated Loan & Investment Co., with a capital stock of \$100,000. Some of the charter members of the company are: T. S. Boyd, D. G. Wylie, A. W. Hill and M. Harralson. The principal office of the company will be in Atlanta, and they have the right to construct railroads, canals, tramways and street railroads, to be operated by any authorized corporation, with steam or electricity.

THE proposed new dummy line between this city and Decatur is to be built at once, the permission requiring it to be in operation within one year under penalty of forfeiture of the franchise.

Aurora, Ill.—The Aurora & Chicago Interurban Railway Co. were given a franchise lately to build and operate their lines in Aurora. The company expect to build an elevated electric road between the cities to cover the distance in less than half an hour. The projectors hope to have the line completed by December, 1893.

Baraboo, Wis.—A movement is on foot to build an electric road from Devil's Lake to the Dells, via Baraboo. A scheme of this kind was contemplated some time ago, but it fell through.

Bartow, Fla.—R. W. Price of Dayton, Ala., has entered into obligations to have the new street railway in operation by June 25, 1893. It will run from the South Florida to the Florida Southern depots by way of the public square, and is to use either horse, steam or electric power.

Bedford, Pa.—A charter has been issued to the Bedford Electric Railway Co. with a capital stock of \$15,000. The proposed road will be about two and a half miles in length, running from the Pennsylvania Railroad depot to the springs, and will run through the principal streets of Bedford. Three of the directors are: John B. Robinson, Media; James B. Oliver, Pittsburgh, and John Neeb, Pittsburgh.

Bridgeton, N. J.—A party of capitalists have formed a company, with ex-Senator Cattell, of Camden, at its head, to put in a line of horse cars.

Buffalo, N. Y.—Contracts have been let by the Buffalo, Kenmore & Tonawanda Electric Railroad for the construction of that long-contemplated line. The Field Engineering Co., of New York, will do the work. The officers of the road are: D. F. Callahan, president; William F. Strasmer, secretary; John L. Donovan, treasurer; George H. Frost, attorney.

Chattanooga, Tenn.—The Chattanooga, Mission Ridge & Alton Park Railway Co. have been incorporated by F. J. Bennet, C. E. James and others.

Chicago, Ill.—Residents of Oaklawn are organizing a company to build an electric road to Western Avenue. D. R. Niver and Geo. W. Warr are amongst those actively interested.

THE Evanston City Railway Co. have been organized at Evanston, a suburb of Chicago. The capital stock is \$150,000, and the incorporators are: Henry Delany, Richard A. Paddock and J. P. Cody.

THE Chicago Carrette Co. have been incorporated, capital stock, \$100,000; incorporators: Thomas Salor, John Pender and James J. O'Connor.

THE Calumet Electric Railway Co. have recently been given the right to operate an overhead trolley line on 75th Street. The Council has amended the franchise so that the company may be compelled to use an underground system at the discretion of the authorities.

Chillicothe, O.—The Chillicothe Electric Street Railway & Light Co. have asked for the right of way and necessary franchise and privileges for operating an electric street car line, and arc and incandescent lights in the city.

Chippewa Falls, Wis.—C. W. Riely and F. J. Jersey, of St. Paul, are in the city, trying to secure a franchise from the Common Council to put in an electric street car line.

Cincinnati, O.—The citizens of Linwood and Red Bank, after having asked the Consolidated company to give them rapid transit, have raised a bonus of \$10,000 which they have offered to the Cleveland company, now operating in the city, to build a line.

Cleveland, O.—A. Whitebeck and associates are making efforts for a cross-town street railway franchise. The proposed road is to run from Woodland Hills Avenue to the lake by the way of Doan Street.

Columbia, Pa.—Surveying has been begun for the proposed Columbia & Marietta Electric Railway.

Columbus, O.—Two new corporations, the Leonard Avenue and the Westerville street railway companies have received twenty-five year franchises to construct lines.

Easton, Pa.—The Easton & South Easton Railway Co., in which J. Davis Brodhead and W. A. Wilbur, of South Bethlehem, are interested, have been chartered; capital \$1,000,000.

East St. Louis, Ill.—W. E. Gunn has asked the City Council for a right of way for a street car track from a point on Broadway and Eighth Street along Walnut and Fisk Avenues and on out through Denverside. The road will be propelled by cable.

Eddystone, Pa.—The Darby & Chester Electric Railway Co. have applied for permission to erect and operate a system of electric cars through the borough.

Erie, Pa.—The indications are that the project to build a line from here to Wesleyville and thence to Four Mile Creek is about to be revived by the Erie Transit Co.

Flint, Mich.—The Common Council has granted a franchise for the construction and maintenance of a system of street railway in this city to David Joy and Chas. A. Stockton, of Findlay, O.

Fort Wayne, Ind.—The Fort Wayne Electric Railway Co. have filed articles of association. The capital stock is \$1,000,000.

Galion, O.—A company is being organized to construct an electric line between this place and Crestline.

Grand Forks, N. Dak.—The street railway ordinance has been passed by the Grand Forks City Council, and \$5,000 bonds have been given by the company, and one mile is to be completed within sixty days.

Greenville, S. C.—The Street Railway Co. of the City of Greenville have been authorized by ordinance to build an electric railway and operate the same for a period of thirty-seven years.

Hoboken, N. J.—The Palisade Rapid Transit Association of West Hoboken are pushing the project of an elevated road to North Hudson.

Holidaysburg, Pa.—It is understood that the directory of the Hollidaysburg Electric Light & Power Co. are considering the advisability of running an electric car line between this place and Duncansville.

Homestead, Pa.—Civil Engineer J. H. McRoberts has just completed a survey of the route of the proposed street car line from the South Side, Pittsburgh, to Homestead. The project is being engineered by Dr. J. M. Duff of Carson Street, Pittsburgh, and a number of well known capitalists.

Houston, Tex.—The Houston Heights Street Railroad Co. of Houston, with a capital stock of \$100,000, have been incorporated by D. D. Cooley, H. F. McGregor and G. B. Hengen.

Hyde Park, Mass.—The selectmen have granted to the Suburban Street Railway Co. the right of way through the town. This is the same company that was granted a franchise at Dedham. The road will be at once built from Dedham to Mattapan, through Hyde Park, and if favorable action is taken in Boston, a line will be built on Hyde Park Avenue to Forest Hills.

Indianapolis, Ind.—The taking of subscriptions to secure an electric street car line to Brightwood is being successfully pushed. On the committee are: Captain D. D. Negley, Jacob Caskey and Aaron Clem.

Jamestown, N. Y.—President A. N. Broadhead, of the Jamestown Electric Street Railway Co., is organizing a company to build an electric road along the northern shore of Chautauqua Lake from this city to Mayville. Fast double decked cars will be run, and freight hauled by 250 H. P. motors. The road is to be completed by next spring.

Kansas City, Mo.—B. T. Whipple and others have applied to the City Council of the suburb of Westport for a franchise to construct an electric railway on Summit Street from Thirty-first Street to Westport Avenue. The line will connect with the Kansas City Cable Railway Co.'s line.

Lawrence, Kan.—Lawrence people want \$10,000 from the state to build an electric street car line to the university.

Leavenworth, Kan.—The Leavenworth Electric Transit Co., capital stock \$500,000, have filed articles of incorporation. The company are incorporated for the purpose of building an electric road from Leavenworth to the Soldiers' Home. The directors are C. F. Brotherton and L. M. Erb of Kansas City, and S. M. Neely, C. S. Hartrough and William C. Hook of Leavenworth.

McKeesport, Pa.—Application has been made for a charter for an electric street railway between McKeesport and Wilmerding. The name of the corporation is the "McKeesport & Wilmerding Railway Co." The officers are: A. W. Smith, president; B. W. Karskadon, vice-president; John C. Devenny, secretary; Dr. C. B. Stucslager, treasurer. The capital stock will be \$200,000.

Manchester, N. H.—The American Elevated Railway Construction Co. of Manchester, capital stock \$1,000, have filed articles of incorporation, to construct elevated railways in all parts of the country. The incorporators are: A. J. Hodden and C. S. Daniels of Boston, E. Farrand of New York City, and F. C. Twombly and John Gay of Manchester.

Marquette, Mich.—Right of way has been secured for a motor line between this city and Nagaunee, thirteen miles distant. The right of way is in the name of M. E. Ascire of this city. The road will use either electric power or the new Healy steam motor.

Marshallton, Pa.—A well founded rumor is afloat that a Wilmington man has offered to put \$20,000 in an electric road from Marshallton to West Chester, the route to be through Glen Hall.

Melrose, Mass.—It is stated to be the intention of a number of gentlemen to organize a company with \$50,000 capital to unite with the East Middlesex company and run from Melrose to Wakefield, and thus save the necessity of paying two fares.

Milford, Neb.—Some of the enterprising business men of Milford have been in correspondence with Eastern capitalists with a view to organizing and building an electric railway from Lincoln to Milford. A company will be organized for that purpose as soon as possible.

Milwaukee, Wis.—F. T. Day, William Sanderson and Charles L. Clason have incorporated the Milwaukee & Layton Park Street Railway Co. The capital stock is \$10,000. The company will build a street railway from Layton Park to the vicinity of Forest Home to connect with the line of the Milwaukee Street Railway Co.

Muncie, Ind.—The Citizens' Street Railway Co., capital stock \$250,000, has been organized in this city and articles of incorporation filed. Three of the directors of the new company are: Oliver S. Kelley, of Springfield, O.; J. Smith Talley of Terre Haute, and George F. McCulloch, of Muncie. At a special meeting of the City Council a franchise was granted the company to operate an electric line.

ARTICLES of incorporation have been filed by the Muncie Belt Railway Co., with a capital stock of \$50,000. The road will be nine miles long and will completely girdle Muncie.

Nanticoke, Pa.—A charter was issued lately to the Nanticoke & Newport Railway Co.; capital \$50,000; to build a line eight miles long which will put into communication with each other a number of small towns and hamlets. The directors are: Thomas D. Shea, John Smoulter, jr., Nanticoke; John B. Reynolds, C. H. Reynolds, Kings-ton; John T. Lenahan, Wilkesbarre.

New York, N. Y.—The New York, Mapleton & Van Pelt Manor Railway Co. have filed articles of incorporation. The road is to be operated by electricity, horse power or cable, from Brooklyn, through Flatbush and New Utrecht, a distance of about five miles. The capital stock is \$50,000, and the directors are: Andrew D. Baird of Brooklyn; J. A. Townsend of Bay Ridge; M. McCormack of Mapleton, L. I., and others.

Niles, O.—The officers of the Mineral Ridge & Niles Electric Street Railway Co. have presented a petition to the City Council asking the right of way to construct a line on Vienna and Robbins Avenues to the city limits.

Norwalk, Conn.—Senator E. J. Hill is president of the Norwalk Tramway Co. who propose to build an electric road from Norwalk to South Norwalk and Darien Point, to be running by November 1. The capital stock of \$50,000 is now all subscribed.

Norwalk, O.—This place will soon be connected by electric street railroad with Milan, Huron and Sandusky, the proposed electric line to be constructed and operated by the Sandusky, Milan & Huron Electric Railroad Co.

Oakland, Cal.—It is said that articles of incorporation will be filed shortly of a company to operate the electric roads in Oakland covered by the Meetz franchise, which have been acquired by a number of capitalists interested in the California Improvement Co., among whom are the following: Col. F. H. Meyers, E. S. Denison, W. M. Rank, W. H. Chickering and W. H. Bailey. It is understood that considerable money is to be expended in improving the service.

Oklahoma City, Ok.—The City Council of Oklahoma City has passed an ordinance granting a franchise to A. N. Spencer and his associates to build a street railway line.

Paterson, N. J.—James A. Morrisse, real estate dealer of this city, is the organizer of the Paterson & Little Falls Electric Railway Co. Thomas M. Ryle and John R. Lee are two others of the incorporators.

Peoria, Ill.—An incorporation license has been issued to Martin Kingman and others, who propose to connect Prospect Heights with the city by means of rapid transit. The capital stock is \$100,000.

Philadelphia, Pa.—A charter has been issued to the Philadelphia & Bryn Mawr Passenger Railway Co., capital, \$50,000. The road will be operated by electricity and will be seven miles in length. The directors are Samuel F. Gillies, Geo. W. Seltzer, James Jordan, Adolph Hermann, Chas. F. Trego, Philadelphia.

ANOTHER company is the Elmwood & Fairmount Park Passenger Railway Co., capital, \$58,000. The road will be operated by electricity and will be about seven miles long. It will begin at the starting point of the Philadelphia & Bryn Mawr Railway.

A THIRD incorporation is the Fairmount Park & Haddington Passenger Railway Co., of Philadelphia; capital, \$50,000.

A CHARTER has been granted to the Philadelphia, Cheltenham & Jenkintown Passenger Railway Co. with a capital of \$60,000. John H. Fow is president, and the company will proceed immediately to build an electric road along the old York road from Jenkintown to its intersection with Erie Avenue, in this city. It will then cut across to Fifteenth Street and by an elevated structure run down Fifteenth Street to Indiana Avenue, where connection will be made with the lines of the Traction company.

Pittsburgh, Pa.—The directors of the new Kensington Street Railway Co. have decided to commence construction at once. Electricity will be the motive power. It runs from Parnassus to the Chambers Glass Works and Valley Camp. The line is five miles long and is expected to be in operation this winter.

Pomeroy, Wash.—The Judkins Tramway Co. has been formed, with a capital of \$6,800.

Pontiac, Mich.—Orchard Lake is to have an electric road from Pontiac. John D. Norton is president of the company.

Portland, Ore.—The Portland Consolidated Street Railway Co., of Portland, capital, \$1,000,000, have filed articles of incorporation.

Portsmouth, O.—The franchise for the electric line here has been granted and construction will be commenced immediately.

Radford, Va.—It is said a syndicate has purchased the street car franchise and will proceed at once to furnish an electric railway.

Reading, Pa.—There is a project here to run an electric line from the city to Ringing Rocks.

Reno, Nev.—Articles of incorporation of the Reno Electric Railway & Land Co. were filed recently. They will build and operate electric railroads and street railways and purchase land in Nevada and California. The incorporators are F. G. Newlands, William Thompson, C. T. Bender, T. K. Stewart and M. D. Foley. The capital stock is \$200,000.

Reynoldsville, Pa.—An electric street railway is to be built from West Reynoldsville to Rathmel.

Rochester, Ind.—A franchise has been granted for the construction of a street railway along the streets of Rochester. Col. John L. Wood and Capt. Henry L. Heath control the franchise. Under the conditions of the franchise the line must be completed by June 1, 1893.

Sacramento, Cal.—W. A. Jacobs and A. D. Thompson presented a petition to the Board of City Trustees for a franchise for fifty years to construct and operate a street railway.

Salem, Ore.—Articles of incorporation of the Capital City Railway Co. were filed recently by M. L. Chamberlain, Thomas Holman, O. E. Krause, H. V. Matthews, David Simpson and T. H. Barnes. The amount of the capital stock is fixed at \$100,000. The object is to build, own and maintain a street railway in this city.

Salina, Kan.—The charter of the Consolidated Street Railway & Light Co. of Salina has been filed. The capital stock is placed at \$100,000.

San Francisco, Cal.—The San Francisco Contract & Equipment Co. have been incorporated; capital stock \$100,000. Directors, William Montgomery, T. D. Hoskins, Witscher Jones, A. E. Shuttuck, E. F. Staples. The object of the company is to build, equip, lease and operate street railroads in this city.

MARC W. CONNOR, John O'Byrne, E. Avery McCarthy, Raymond A. Perry, William A. H. Connor, Charles McCarthy and D. H. Austin have applied to the Board of Supervisors for a franchise for a short railway over certain streets. Several branch lines are also designated. The petitioners agree to commence work in ninety days and complete it within twelve months. They will also pay the city 2 per cent. of the gross receipts.

Sandusky, O.—The Sandusky, Milan & Huron Electric Railway Co. have filed articles of incorporation, and the capital stock will be \$100,000.

St. Louis, Mo.—The St. Louis, Collinsville & Eastern Electric Railway Co. have been incorporated, with a capital \$500,000.

THE St. Louis County Court lately granted the Clayton & Forest Park Railway Co. a franchise to construct and operate an electric railway from the Skinker road to Clayton. The company recently procured a franchise in the city to construct and operate a line from Union Avenue to the Skinker road at the city limits. Messrs. Thomas K. Skinker, John C. Lanphier and B. F. Thomas are the leading members of the company.

A MASS meeting of the most prominent and wealthy citizens of Kirkwood was lately held to take some definite action upon the proposal made by Drake & Orton to build, equip and operate an electric road to St. Louis, provided the property owners along the proposed line raise a bonus of \$150,000. The meeting was presided over by Mayor T. D. Kimball and Prof. J. S. Collins acted as secretary. The effort was successful and the company promise to commence the construction before November 1, 1892, and complete it before December 31, 1893.

Stoneham, Mass.—A petition has been presented to the Stoneham Selectmen by the directors of the Boston, Malden & Stoneham Street Railway Co., asking permission to locate tracks, wires and poles for an electric railway in Stoneham. The petition is signed by Jonathon Munyan, George F. Butterfield, E. P. Shaw and Albert C. Pond. The capital stock is to be \$100,000. Jonathan Munyan of Worcester, E. P. Shaw of Newburyport and L. W. Gilman of Malden are interested.

Strathroy, Ont.—This town is advocating the construction of an electric tram line along the Mount Brydges road to connect with the Canadian Pacific.

Toledo, O.—A new corporation is the Toledo Riverside Railway Co., capital stock, \$5,000.

THERE is talk of building a car line, either electric or steam, to Catawba Island, starting from the city and extending to the Catawba Point, and from thence carrying passengers by boat to the surrounding islands, Middle Bass, Put-in-Bay, etc.

Trinidad, Colo.—For some time past New York and Hartford capitalists, represented by Will I. O'Donnell, have had under consideration the erection of an electric street railway in Trinidad. The prospects are good that it will soon be built.

Ukiah, Colo.—J. W. Hartzell, superintendent of the new water company that has been organized by San Francisco and Santa Rosa capitalists for Ukiah, represents a syndicate with \$15,000,000 capital who are prospecting the route to Blue Lakes with a view of building a motor road to that place.

Vicksburg, Miss.—Some citizens have applied for a charter under the style of the Hill City Street Railroad & Electric Co., with a capital stock of \$100,000. Among the incorporators are: Geo. P. H. Rector, Frederic Speed, H. C. McCabe and Marye Dabney.

THE City Council has been petitioned to grant a franchise for a street railroad to be operated by electricity or otherwise. The petitioners are: R. C. McFarland, J. P. Roach and J. B. Mattingly, of Vicksburg, and E. F. Fuller, of New York.

Whatcom, Wash.—A franchise has been granted for an electric line to Lynden.

Whitehall, Ill.—The road mentioned last month will be built by the Roodhouse & Whitehall Consolidated Street Railway Co. (electric), with a capital stock of \$100,000. The incorporators are: John Roodhouse, John W. Roodhouse and Charles T. Bates.

Willoughby, O.—The Lake County Street Railroad Co. have been chartered, with a capital stock of \$20,000.

Worthington, O.—Another meeting in the interest of the proposed electric line from Clintonville to Worthington was held here lately. Reports of a very encouraging nature were made, and the stock subscriptions were increased to about \$20,000. Worthington people say the project is now on a foundation that insures the construction of the road.

Personal.

Mr. Robert M. Huston, formerly Eastern manager of the Heine Safety Boiler Co., has severed his connection with that company.

Mr. G. F. Steele, of the department of long distance transmission of power, General Electric Co., Boston, called at our office in the *World Building* last month.

Mr. L. Pfingst who for a long time has been master mechanic of the West End Street Railway Co., of Boston, has resigned that position, to take effect on the first of this month.

Mr. J. R. Chapman has been appointed general manager of the South Chicago City Railway Co. and will have charge of the construction and operating of the company's property.

Mr. John MacCormack, M. E., has been appointed agent and sole representative in the East, with headquarters at 45 Broadway, New York, of the Heine Safety Boiler Co., of St. Louis.

Mr. J. W. Peugh, secretary to the Robinson Machine Co., Bellwood, Pa., was in this city during August, and called at our office. Mr. Peugh stated that the demand for the Robinson all-steel truck is increasing daily.

Mr. Charles Flesch, the representative in Australia of the interests of the General Electric Co., made us a visit last month. Mr. Flesch has been in this country studying the recent developments of electric traction, and will sail for Australia from San Francisco about the end of September.

Mr. John W. Fowler, president of the Lewis & Fowler Manufacturing Co., has entirely recovered from the injuries which he received a few months ago by being thrown from his carriage. He is now attending regularly to business again, and seems busier than ever after his period of enforced idleness.

Mr. P. A. B. Widener, the street railway magnate of Philadelphia, is anxious that a series of grand social entertainments be given during the dedicatory ceremonies of the World's Fair next October. Mr. Widener is so certain of the success of his idea that he has offered to guarantee the expense of a number of receptions.

Mr. S. B. Cottrell, engineer of the Liverpool elevated railway has been spending some time in this country inspecting our system of electric traction. He has visited Chicago, St. Paul, Buffalo, Rochester and other cities, and sailed for home August 13. We had a pleasant call from Mr. Cottrell who states that the Liverpool elevated lines, six miles in extent, now nearing completion, will be equipped for electric traction. Gearless motors of home manufacture will be employed.

Mr. G. S. Duncan, of the Tramway Trust of Melbourne, Australia, whose coming to this country for the purpose of studying our transit facilities, was noted in the June issue of the JOURNAL, has completed a tour of the principal cities of this country, and sailed for England on August 13. Mr. Duncan is enthusiastic over the cordial treatment accorded him by all our street railway people and others whom he has met in a business way. He states that he has gained all the particulars relating to electric and cable traction that he has asked for, and that he is favorably disappointed with the success that is attending the operation of electric lines. Seven years ago, Mr. Duncan visited this country to inspect our cable railways, and returned to build a cable system in Melbourne costing \$11,000,000. He states that the present outlook for electric traction is much brighter than that for cable seven years ago, and he looks for its speedy adoption in many foreign cities.

New Publications.

Useful Information and Data for Travelers, Railway Men and Mechanics.

A small pamphlet of seventy pages containing this title has been published by Danks & Co., Chicago, giving a number of convenient tables and rules. The compiler, Mr. T. J. Nichol, is a civil and consulting engineer in Chicago.

Report of the Ninth Annual Meeting of the Street Railway Association of the State of New York.

The official report of the last annual meeting of the New York State Street Railway Association at the Hotel Metropole, New York City, September 15, has been received from the secretary. The pamphlet, which has in all seventy-six pages, contains, of course, the paper read by Mr. Beckley before the Association, which will well bear re-reading. The pamphlet also includes the constitution and bylaws of the Association.

Catalogue No. 8, published by the Johnson Co., Johnstown, Pa. 162 pages.

The first fifty-one pages of this handsome catalogue are devoted to a description of the new "electric girder rail" system just brought out by the Johnson Co. for which they claim very important advantages. The rail dispenses with chairs, clips, rivets and all subconstruction, and the manufacturers state in the preface that they "propose to settle the vexed question of what form of subconstruction is the best by having none." They only ask how deep the railway company wish their cross ties, and how far apart they are to be located in order to furnish a rail to meet the conditions. The rail is homogeneous with the feet or base and has no combination of joints. The system, as shown in the catalogue, has been carefully worked out, and includes solid crossings, joints, etc. The company state that they have the largest electric welding plant in the United States, containing 2,000 H. P., which enables them to make switch pieces, crossings, etc. of one solid piece, accomplishing a revolution in this type of work, and that in their experience of over a year in which many thousands of welds have been made, they have not found one defective.

The Law of Electric Wires; by Edward Quinton Keasby. Published by Callaghan & Co., Chicago.

The marvelous increase in the use of electrical apparatus within the last few years has caused a proportionate increase in litigation concerning the use of streets in the distribution of the electric current. This has been especially true in the case of electric railways, the introduction of which has brought before the courts a train of complex problems, novel in character, and difficult of solution. Just how the courts have dealt with these involved controversies is stated in the volume named above. It is a legal volume, but its contents in the main are clearly within the comprehension of the layman, especially to

the railway managers who by no means a stranger to litigation. Mr. Keasby has a just appreciation of the necessity of the distribution of the electric current. His introductory section discloses his point of view. After enumerating some of the objections which may be urged against the maintenance of wires in the streets, he makes this observation: "The wires, however, are too useful to be dispensed with; the purposes they subservise are public purposes, and the conveniences they furnish are enjoyed by many. The use of them is likely to increase rather than diminish. Their purposes, if not the same as those of the highway itself are closely allied to them, and it is only by using the highway that they can fully serve their purposes." The general idea of the book has been stated; it remains merely to be said that the work seems to have been well done, while the matter is well arranged and convenient for ready reference. Some idea of the scope of the book may be gained by the headings of the chapters, some of which are as follows: "By What Authority the Streets May be Used for Electric Wires," "Municipal Control," "Poles and Wires as an Obstruction of the Highway," "Underground Wires," "Rights of Abutting Owners," "Interference of Different Kinds of Electric Currents," etc.

Equipment Notes.

The Austin Engineering Co., have been incorporated with a capital stock of \$10,000; the incorporators are: Edward F. Austin, D. W. Dunn and Joshua L. Clark.

C. Purcell Taylor, patent expert, 57 Chancery Lane, London, Eng., writes us that at a recent fire which had destroyed all his tools and instruments, his valuable library was saved as well as many valuable papers.

John A. Roebling's Sons Co., Trenton, N. J., supplied the two cables in use on the Otis Elevating Railway, at Catskill, N. Y. This company are also doing a large business in the supply of wire for electric railways.

Smith & Wallace is the title of a firm recently formed with headquarters at 8 Oliver Street, Boston, Mass., by A. Otis Smith and J. Edward Wallace. Smith & Wallace will deal in all supplies needed in the equipping and running of electric railways.

The Ball & Wood Co., of No. 15 Cortlandt Street, New York, have closed a contract for one 1,000 H. P. steam plant complete at Lancaster, Pa., within the past week. Three of their large cross compound engines will be used in this connection.

Pepper & Register, of Philadelphia, Pa., have secured the contract to build the Easton, (Pa.) South Easton & Phillipsburg Electric Railway, now consolidated and called the Easton Transit Co. Work will begin not later than September 10, and will be completed by the end of November.

Bartlett & Co., of 21-23 Rose Street, New York, have recently issued a small pamphlet entitled, "A Modern Triumvirate" as a specimen of the kind of printing and engraving which they can turn out. The excellent work of this firm is so well known that it is almost unnecessary to say that the design of the brochure is attractive, the reading matter crisp and the illustrations and printing of the best.

The Hall Signal Co., of New York, are now constructing at their works the block system to be used by the Illinois Central in Chicago. It will be an automatic, electric block system similar to that in use upon the Pennsylvania Railroad. There will be signal bridges at Twenty-seventh Street, Forty-third Street, Sixty-seventh Street, Grand Crossing, Burnside and Kensington. The contract cost of the system will be \$103,432.

The Pierce & Miller Engineering Co., of New York, have recently completed the additional equipment ordered by the Merrimack Valley Street Railway Co., of Lawrence, Mass., described in our June issue. This station is now using three McIntosh & Seymour engines. The company are also installing a 1,200 H. P. plant for the Globe Street Railway Co., Fall River, Mass., which will also use McIntosh & Seymour engines.

The John Stephenson Co., Ltd., of New York, are booking, as usual, orders from all sections of the country for their standard cars. One of the latest of the Stephenson cars—that for the Broadway, New York, cable line—is illustrated in this issue, and the manufacturers are at work on the completion of this order. A trip through the many departments of this company's works shows the usual number of cars in course of construction, and evincing the continuance of a well earned popularity.

The Lewis & Fowler Manufacturing Co., of Brooklyn, are, as usual, turning out a large number of cars, and their shops present to the observer a very busy appearance. The other departments of the company are also well supplied with orders. The company have received a number of orders for snow plows from railway companies who wish to be well prepared for the cold season before it sets in. The snow plows of the company gave excellent satisfaction last year in different cities where they were in use.

The Lamokin Car Works, of Philadelphia, write us that among their recent orders are the following: One 16 ft. closed motor car with McGuire truck for the Gallipolis Street Railway, of Ohio; six 18 foot vestibuled cars for the Mahanoy City (Pa.) Shenandoah, Girardville & Ashland Railway Co., and eight 16 ft. vestibule cars for the Paterson Central Electric Railway, Paterson, N. J. Among their August deliveries they have shipped the Citizens' Passenger Street Railway Co., of Harrisburg, Pa., four 18 ft. vestibule cars, and the Belle City Street Railway Co., of Racine, Wis., four 16 ft. closed cars.

Kingsley & Brewer, is the title of a firm of consulting engineers recently organized with headquarters at 44 Broadway, New York, by Maurice Kingsley, C. E., and Frank Brewer, C. E. One of the members of the firm has had twenty two years experience in railroad work, mining and surveying in connection with lands, roads and irrigation in the United States and Mexico; the other has had eleven years of similar experience. The firm has already made a number of reports to English capitalists seeking investment in the United States, and make a specialty of reporting on railroads, mines and similar property.

J. G. Brill Co., of Philadelphia, find their car appliances as much in demand, if not more so, than ever before. They have recently sent four cars to Dubuque, Ia., and include among their other contracts during the last month the following roads: Delaware Electric Railway Co., Delaware, O.; Washington, Mt. Vernon & Alexandria Railway Co., Alexandria, Va.; Toledo Consolidated Street Railway Co., Toledo, O.; Philadelphia Traction Co., Philadelphia, Pa.; North Hudson County Railway Co., Hoboken, N. J.; the McKeesport & Reynoldston Passenger Railway Co., McKeesport, Pa., and the Mobile Electric Railway Co., Mobile, Ala.

The Charles Scott Spring Co., of Philadelphia, Pa., have gained a high reputation in the manufacture of springs for steam railroads, which is a guarantee of first class material and workmanship, and have been adding constantly to this reputation by the excellent springs which they manufacture for electric, horse and motor cars. Their large output, about 5,000 tons per year, enables them to reduce the cost of manufacture, and consequently their prices are very reasonable. Their springs are all made from very high grade stock, and are thoroughly inspected and tested before shipment is made. A full assortment for all the standard trucks is also kept in stock. The company are represented in the sale of street car springs in the West by the Railway Equipment Co., Pullman Building, Chicago, and A. S. Partridge, Bank of Commerce Building, St. Louis, Mo.

The Genett Air Brake Co., New York and Chicago, are meeting with a large call for their air brakes for street railway cars, which we described in our last issue. The reliability and prompt action of these brakes fits them especially for electric and cable cars where the brake is not sufficiently powerful. The Genett Air Brake Co. have already equipped a number of cars in several leading cities, and find that wherever they have installed their appliance it has given the best of satisfaction. They believe it will not be long before their brakes will be considered indispensable on every electric or cable railway which runs in crowded streets or elsewhere where quick stops have to be made. Among the lines upon which this company have already installed their brakes, are the 125th Street branch of the Third Avenue Railway Co., New York, operating by cable; the Denver, Colo., Electric Railway and the Central Electric Railway, of Paterson, N. J.

The Berlin Iron Bridge Co., of East Berlin, Conn., have been asked by the Suffield & Thompsonville Bridge Co., lately organized at Thompsonville, Conn., for plans and estimates for a bridge over the Connecticut River, 1,060 ft. long. Sixty-nine bids were received from fourteen different bridge companies, and, after careful consideration, acting on the advice of their engineer, Mr. Edward S. Shaw, of Boston, the company have placed the contract for the bridge with the Berlin Iron Bridge Co. It will consist of five spans of 210 ft. each, with a roadway twenty feet wide in the clear, and will cost \$60,000. The Berlin Iron Bridge Co., will design and build the new buildings for the New Orleans & Carrollton Railroad Co., at New Orleans, La. The power house is 83 x 130 ft. with brick walls and an iron roof. The car shed will be built entirely of iron, 130 x 140 ft. It is the intention of the New Orleans & Carrollton Railroad Co., to have the finest electric railroad plant in the Southern states.

The Carpenter Enamel Rheostat Co. now have their works at Bridgeport, Conn., in full operation. The extreme cheapness and evident advantages of this rheostat have been the cause of an unexpectedly large business, although the works have only been in operation a short time. Orders have already been received from over fifty different concerns, one order alone being for one thousand rheostats. The capital stock of the company is \$100,000 fully paid. The officers of the company are, H. Ward Leonard, president; Geo. H. Finn, vice-president; Charles E. Carpenter, secretary and treasurer. Several prominent and wealthy New York gentlemen are financially interested. The manufacture of the rheostats involves a great many trade secrets, which, together with several strong patents and extremely low prices and a progressive business policy, is likely to give the rheostat manufactured by this company a prominent place among electrical apparatus. The company promise some startling developments in the patent situation at an early date.

M. Rounds, of Boston, manufactures a line of street railway appliances which give good satisfaction wherever used. The following are extracts from two letters from Mr. A. T. Potter, general manager of the Union Railroad Co. of Providence, R. I., and show what that company think of the Rounds transfer table and snow plow: "We have had in use at our electric car house since January 1, 1892, the transfer table designed by you for twenty-five foot electric cars, and take pleasure in saying that the same has given perfect satisfaction, one man being able (with your starting device) to start the table with a car weighing ten tons as easily as a man could an ordinary sixteen foot horse car with other tables in use by this company." "On March 1, we had one of the most severe snow storms that we have had in years, the wind blowing a gale, and the snow drifting badly, but, by starting your plow early in the storm, and keeping it in constant use for forty-eight hours, we were able to keep our road (which is about five miles long) one half being double track, in such a condition that our electric cars did not lose a single trip, and were run on schedule time. We were equally successful during the storm of the following week, but were unable to do this on our horse and cable cars."

The Ball Engine Co., of Erie, Pa., are evidently finding a large demand for their engines, as the following list of shipments for three weeks clearly shows: Compania Mexicana y Luz Electrica, City of Mexico, two 60 H. P. engines, two 60 H. P. heaters, etc.; Hot Springs Electric Co., Hot Springs, Va., one 100 H. P. engine, two 80 H. P. boilers, one 200 H. P. heater, one 200 H. P. pump; Ames-Bonner Co., Toledo, O., one 80 H. P. engine; Brooklyn Navy Yard, Brooklyn, N. Y., one 80 H. P. engine; Arnold Ore Mines, Ferrona, N. Y., one 35 H. P. engine; Northwestern Supply Co., Tacoma, Wash., one 25 H. P. engine; Carbon Iron Co., Pittsburgh, Pa., one 130 H. P. engine; Diamond Light & Power Co., Sheldon, Ia., one 80 H. P. engine; North Hudson County Railroad Co., Hoboken, N. J., one 250 H. P. engine; Puget Sound Pulp & Paper Co., Everett, Wash., one 25 H. P. engine; Pittsburgh Iron & Steel Engineering Co., Pittsburgh, Pa., one 130 H. P. engine; Whitman & Barnes Manufacturing Co., Akron, O., one 80 H. P. engine; Fort Clark Street Railway Co., Peoria, Ill., one 130 H. P. engine; Boulder Electric Light Co., Boulder, Colo., one 100 H. P. engine, one 100 H. P. boiler, one 150 H. P. pump, two 100 H. P. heaters; Shamokin Electric Railway Co., Shamokin, Pa., one 130 H. P. engine; North Avenue Street Railway Co., Baltimore, Md., two 130 H. P. engines; Mt. Vernon Electric Light Co., Mount Vernon, O., one 150 H. P. H. F. Watson & Co., Erie, Pa., one 350 H. P. cross compound engine; Rock Cut Clay Co., Alfred Centre, N. Y., one 60 H. P. engine; Metropolitan Telephone Building, New York City, one 60 H. P. engine; La Gran Fundicion Nacional Mexicana, Monterey, Mexico, one 60 H. P. engine.

The R. D. Nuttall Co., of Allegheny, Pa., are, as usual, very busy in getting out a large number of their appliances which they find meet with a growing demand. They write us that their works are still running on double time and that they at present employ 135 men. In the line of gears, pinions, bearings, etc., they report very large sales, and that in the near future they expect to place on the market a line of material for overhead construction which will be superior to anything at present in use. Of all their departments, however, none is quite so busy as that of trolley poles and wheels. The Nuttall trolley seems to be doing everything which could be desired on the different roads where it has been installed, and the company have received many orders for it recently as well as testimonials from customers. Among the letters recently received by them are the following: Mr. J. B. Wilson, president, of the Martinsburg Street Railway Co., Martinsburg, W. Va., writes: "Enclosed please find check in payment of amount due, for which please send your receipted bill. We are very much pleased with your trolley and would like to get several more if we can dispose of our present trolleys. What kind of a trade can you give us on them?" Mr. J. S. Hill, superintendent of the LaFayette Street Railway Co., LaFayette, Ind., writes: "We ship you to-day seven trolley stands of another make and one "Nuttall" pole for which we enclose bill of lading. Our agreement was, I believe, to exchange six trolley stands with you, but I find we have seven, and so have sent you all of them and you may ship us by freight another "Nuttall" to square us up, as your trolleys are very satisfactory and we are much pleased with them."

The Page Belting Co., of Concord, N. H., have sent us a list of their recent orders which include the following: A 30 in. belt for the Geo. W. Wheelwright Paper Co., Boston; also a number of other belts including a 16 in., 14 in. and 12 in. double; a 36 in. for the Houston City Street Railway Co., Houston, Tex.; a 36 in. for Portland, Ore.; a 36 in. for Camden & Thomaston Electric Light Co., Rockland, Me., and two 16 in. dynamo belts; a 26 in. to Philadelphia, Pa.; a 22 in. to Dayton, O.; a 20 in. to Hoboken, N. J.; a 20 in. to Dallas, Tex.; an 18 in. for Star Thread Co., Athens, Ga. They have also filled orders for their Eureka dynamo belt (slotted) as follows: Two 18 in. to Schuylkill Electric Railway Co., Pottsville, Pa.; one 18 in. to Houston City Street Railway Co., Houston, Tex.; one 16 in. to the Detroit Electric Light Co., Detroit, Mich.; two belts to the Brooklyn City Railroad Co., Brooklyn, N. Y.; one to Nebraska City Water & Light Co., Nebraska City, Neb.; one to the Reading Electric Light & Power Co., Reading, Pa.; one 13 in. and one 16 in. to the Plainfield Gas & Electric Light Co., Plainfield, N. J.; one 16 in. to the Hampton & Old Point Railroad Co., Hampton, Va.; three 25 in. to the Central Railroad Co., Baltimore, Md.; one 25 in. and two 23 in. to the United States Electric Light Co., Washington, D. C. They have shipped recently three 13 in. regular dynamo double belts to Toledo Consolidated Street Railway Co., Toledo, O., and have sent Acme link belts to the following cities: Norfolk, Va.; Ceiba Huera, Cuba; Clearfield, Pa.; Jamaica, L. I.; Penn Yan, N. Y.; Washington, D. C.; the Rosseau Electric Works, New York City and Huntington, Mass. They say that their trade is steadily growing in special belts as well as their standard belts.

WESTERN NOTES.

The Enterprise Electric Co., of Chicago, have started a branch office at North Ninth Street, St. Louis. W. H. Ferris is in charge.

B. E. Tilden & Co., of the Monadnock Building, Chicago, have received a great many flattering testimonials from railway managers in reference to their replacing frogs. Joseph S. Minary, secretary of the Southern Railway Co., in ordering six pairs after having made a thorough test, wrote that his company "are very much pleased with them."

Dorner & Dutton, of Cleveland O., have issued their catalogue No. D which, besides containing illustrations of their track cleaner, gives a list of railways equipped with their cleaner, and a large number of letters from prominent railway companies speaking in the highest terms of this appliance. It is easy to see in glancing over this publication that the cleaner gives good satisfaction and that the users are well pleased with its performance.

The Cushion Car Wheel Co., of Indianapolis, Ind., are transferring their manufactory to Ft. Wayne, Ind., where they will have ample facilities for manufacturing. When settled in their new quarters, the company will be prepared to fill orders promptly. At present the facilities are too limited to enable them to keep up with the demand. The Bass Foundry & Machinery Co. are now largely interested in the enterprise of the Cushion Car Wheel Co.

The Sioux City Engine Works, Sioux City, Ia., report a large number of orders on hand, and that they are now operating a night force in order to take care of the orders which they are receiving. The engine manufactured by this company is meeting with great success in all sections of the country. The company intend to issue shortly a catalogue of their engines, which will soon be ready. They are also preparing a list of some of the users of the Sioux City engine which will indicate the large demand which these engines are having.

The McGuire Manufacturing Co., of Chicago, have found their business increasing so rapidly that they have decided to build an extension to their present manufactory. The lot at the corner of Kinzie and Morgan Streets has been secured, and the construction of a building adjoining the present plant, 125 X 116 ft., will immediately be begun. The company have of late received a number of large orders, and they are particularly pleased with the fact that their truck has been adopted as standard by the Joliet Street Railway Co. of Joliet, Ill.

The Stirling Boiler Co., of the Pullman Building, Chicago, are selling large numbers of their boilers to electric companies who find that its employment conduces to the economy in working of their plants. They are receiving many inquiries from those intending to make extensions to their steam plants. Among the most recent orders received by the company are the following: Edison Electric Illuminating Co. (second order), 200 H. P.; Indianapolis Light & Power Co., 1,500 H. H.; Mobile Electric Light & Power Co., for use in the street railway power plant, 350 H. P.

The Railway Equipment Co., of Chicago, are meeting with great success with their new and improved line devices, which are recognized as being of superior quality in point of strength and insulation. Large orders have been received during the last few weeks, among others from Toronto, Montreal and Winnipeg, Can.; Racine, Wis.; Springfield, O.; Galesburg, Ill.; Duluth, Minn.; Defiance, O., and Bloomington, Ill. The company have lately gone largely into the field of furnishing magnet wire and a large business has already been done in the high grade offered by them.

Sargent & Lundy, of the Monadnock Building, Chicago, have completed in remarkably quick time the work on the Belle City Street Railway, at Racine, Wis. The contract awarded to them July 15, included the overhead and the track construction. Before the end of August, the work was completed, notwithstanding the fact that it was found necessary to set three-quarters of the poles in barrels on account of quicksand. There was twelve miles of track constructed, of which three was laid with girder rail and the remainder with T rail. The motors of the Detroit Electrical Works will be used on the system.

The Short Electric Railway Co., have closed a number of orders recently and find their motors are enjoying their usual popularity. Through their New York office, Mr. Edward J. Wessels, general Eastern agent, they have sold the Hartford & Wethersfield Horse Railroad Co. a double equipment of Short, twenty horse power, single reduction gearless motors, as well as some street railway supplies. The Trenton Passenger Railway Co., described in this issue, is equipped with Short electric motors, and the company, as stated, are so well satisfied with the equipment that they have ordered seven additional equipments.

The Brownell Car Co., of St. Louis, Mo., have recently shipped two of their Accelerator cars to the West End Street Railway Co., of Boston, which have given very good satisfaction in that city. They have recently received an order for twenty from Columbus, O., as a result of the satisfactory operation of an Accelerator car in that city. The Accelerator in Columbus received most complimentary notices from the local press for its excellent qualities, showing that the citizens of that city seem well satisfied with the Accelerator type. Twenty of these cars have also been ordered for the Covington & Cincinnati roads, and other orders are being received constantly by the manufacturers.

S. D. Dodge, of 46 Wilshire Building, Cleveland, O., is confident that the new Mehling car, designed for summer and winter use, will prove of great advantage to street railway companies. The East Cleveland Railroad Co., who have had one of the cars in operation on their Euclid Avenue line for several weeks, have written as follows to the patentee: "Car No. 288, built by us and now in operation, gives general satisfaction. Our patrons enjoy riding in the same and our employes say they can take care of the passengers with greater ease and comfort all around. It has, I think, met with the approval of all the officers of the road, and we believe the car can be used all the year around. Very truly yours, The East Cleveland Railroad Co. By Chas. W. Wason, Vice President."

The Fulton Foundry Co., of Cleveland, O., have supplied, among their recent orders, one from the Toronto Railway Co. They are in receipt of a letter from Mr. H. A. Everett, general manager at Toronto, stating that the company are "satisfied that there is no better truck in the market." They have also received a letter from Mr. Chas. W. Wason, vice-president of the East Cleveland Railway Co., in which he says: "We have tried about all the iron trucks in the market and do not think we shall purchase any more. We can most assuredly recommend your truck to parties wishing to equip their

roads, and would be pleased to answer any questions which they might desire putting to us."

The International Register Co., of Chicago, are meeting with great success in the sale of the Pratt portable fare register described in our May issue. This machine has a capacity for registering 100,000 fares, weighs only sixteen ounces and is very compact. One turn of the knob with the thumb and forefinger cancels the face or trip register, and at the same time reverses the direction sign. The various details of the appliance are carefully constructed, and the bell has a pleasing tone and can be heard distinctly all over the car. The International Register Co. guarantee their registers fully, and will either sell them or lease them on a royalty. They have recently issued a folder giving details of the register as well as a list of the street railways upon which the register is in use. This list, as a glance at the circular will show, has reached considerable proportions, although it is less than seven months since the company commenced the manufacture of the register, which shows that it is popular with those who have to use it. The manager of the International Register Co. is Mr. England. The number of roads upon which the International register is being used is increasing daily, and the management of the company write us that at present they have orders on hand for nearly 300 machines.

The Siemens & Halske Electric Co., of America, Monadnock Building, Chicago, are preparing for a large demand for their apparatus. The company are the American representatives of the Siemens & Halske Co., of Berlin, and they are prepared to enter into contracts for the heaviest electrical machinery. Their plant on Blue Island Avenue, adjoining the factory of the Wells & French Co., is rapidly approaching completion. The first building will be 250 ft. in frontage and in depth, and work will be turned out in the plant some time during the fall. The Pabst Brewing Co., of Milwaukee, Wis., have placed an order with the Siemens & Halske Co., for their new 10,000 light incandescent central station. This installation will consist at first of two 250 H. P. dynamos and one ninety horse power dynamo which will be of the well known Siemens & Halske direct coupled type, the armature being placed on the end of the engine shaft. The Lake Erie Engineering Works are building the engines. The ultimate capacity of this plant will be 40,000 lights. The electrical work is being done under the supervision of Mr. Geo. W. Gibbs, M. E., and the steam engineering under the supervision of the Osborn Engineering Co.

G. P. Altenberg, of 220 Walnut Street, Cincinnati, agent for the National Electric Manufacturing Co., of Eau Claire, has recently secured some important contracts, among them being an order from the Bucyrus Steam Shovel & Dredge Co., of Bucyrus, O., now removing to South Milwaukee, who will depend solely and exclusively upon electric motors in the operation of their business. The only engine in the establishment will be an Allis-Corliss engine belted direct to two 200 H. P., slow speed, National generators which will in turn operate two National stationary motors and the electric cranes. The same generators will furnish current for twenty-five arc and 125 incandescent lamps. The cranes, stationary motors and lights will be supplied from the same dynamo. Mr. Altenberg will furnish everything except cranes. He writes us that he has also sold a 2,000 light alternating central station to the Wilmington (Ind.) Jenney Electric Light Co.; a direct current incandescent lamp to the Crescent Cotton Oil Co., Memphis, Tenn.; a sixty arc light plant to a Cleveland (O.) syndicate., an arc outfit to the Bristol (Tenn.) Gas & Electric Light Co., and several weeks ago sold a fifty light arc lamp to the Covington (Ky.) Electric Light Plant.

The Bates Machine Co., of Joliet, Ill., have sent us a list of their shipment of engines during the last sixty days, among which are the following: To the Joliet Sheet Rolling Mill Co., Joliet, Ill., one 28x48 engine; Sioux Falls Linen Mills Co., Sioux Falls, S. D., one 14x36 engine; Guetzkow Bros. Co., Milwaukee, Wis., one 16x42 engine; Chicago Corset Co., Chicago, Ill., one 14x36 engine; J. U. Borden Manufacturing Building, Chicago, Ill., one 12x30 engine; Salem Lime & Stone Co., Louisville, Ky., one 20x42 engine; W. H. Lathrop Brick Plant, Racine, Wis., one 12x30 engine; Cappon & Bertsch Leather Co., Holland, Mich., one 20x48 engine. They also number among their sales during July the following: People's Electric Street Railway Co., Springfield, Ill. (second engine), one 24x48 engine; Field Engineering Co., New York City, for the West Side Electric Street Railway Co. Elmira, N. Y., two 16x42 engines; Roberson Avenue Electric Railway Co., Springfield, Mo., two 16x42 twin engines; Elgin, Joliet & Eastern Railway Co. car shops, Joliet, Ill., one 14x36 engine; Pullman Palace Car Co., for electric light plant, one 18x42 vertical, two 24x48 vertical engines. They state that their business was never as good as at the present time, and the Bates-Corliss engine seems to be growing in favor constantly. The simplicity of the valve motion and consequent durability, together with the uniform regulation, make this engine particularly adapted for electrical purposes.

The E. G. T. Colles & Co., of 22 S. Jefferson Street, Chicago, Ill., state that their business has been good, but somewhat interrupted by the protracted strike of the boiler makers. They have been quite full of orders, however, and among their latest shipments are: A large heater for the city of Chicago for one of their electric light plants (second order); a 500 H. P. heater for the Chicago Copper Refining Co.; a heater and filter for the Judkins company; a heater, filter and pumps for L. R. Harsha; a filter (fourth order) for the Enterprise Building; a heater and filter for S. M. Peterson; two heaters, pumps and filters for the Harland Brick Co.; two heaters, 1,300 H. P., for J. B. Legnard; heater for the Western Cut Stone Co.; heater and filter for the John McEwen Manufacturing Co.; 400 H. P. heater for Pullman Palace Car Co.; filter (second order) for the Winslow Bros., all of Chicago, Ill.; a large heater for the Nelson Hotel Co.; a filter and

heater for the Standard Furniture Co.; a filter for the Union Furniture Co.; one heater and filter for the Palace Folding Bed Co.; a filter (second order) for the Royal Sewing Machine Co.; a heater and filter for the Diamond Furniture Co., all of Rockford, Ill.; a heater and filter for the Zinn Malting Co.; heater and filter for Richter, Shubert & Dick; two filters for the National Distilling Co.; heater and filter for the Merrill Building; filter (second order) for James E. Patton & Co.; 300 H. P. heater for the Northwestern Fuel Co.; two filters for the Geo. Ziegler Co.; a filter for John Langenberger; two filters for T. W. Goodrich & Co.; two filters for the Gugler Lithographing Co. and eight large filters for another firm, all of Milwaukee, Wis.; a heater for the Sandoval Manufacturing Co., Sandoval, Ill.; a heater and filter for the Laeude Gas Light Co., St. Louis, Mo.; pump and filter for I. H. Snyder, Mt. Pulaski, Ill.; heater for the Kearsarge Mining Co., Calumet, Mich.; 500 H. P. heater for the Gibbs Chair Co., Kankakee, Ill.; heater for the Planters Oil Mill, Helena, Ark., and a number of others in the adjacent states.

The Detroit Electrical Works have been receiving recently an unusual number of orders, and find their apparatus to be growing in popularity. In order to keep pace with this growing demand, they have recently greatly increased the capacity of their works, and have added a large amount of improved machinery, so that their new factory when completed will be one of the best arranged for street railway work in the country. They make a very interesting exhibit at their Chicago office in the Monadnock Building. At one side of the office is constructed a raised track the full length of the room. On this structure a complete and handsomely finished working model of the company's motor, mounted on a Sheffield truck, is operated. The truck has a wheel base of fourteen inches, and the model is sufficiently large, so that the working of the motor can be readily watched. The track has a grade of 9 1/2 per cent. up which the motor travels at a handsome pace. The idea is one which is greatly appreciated by railway men, as the installation gives them a fine opportunity to watch the exact operation of the motor. Mr. L. E. Meyers, their agent in Chicago, has taken the contract for the electrical equipment for the Delta Electric Co., of Cairo, Ill. The first installment of apparatus will consist of five thirty horse power motor cars and one generator. Mr. Myers has just sold to the Calumet Electric Railway Co. the fifth increase in equipment for their road in the south suburban district, Chicago. The increase consists of four forty horse power motor cars and one 80,000 watt generator. This company now operate sixteen motor cars and two generators of the Detroit Standard type. The company are doing a large business, and are operating their road with great success. They are highly pleased with the motors of the Detroit Electrical Works. It is stated that of the second installment of motors which were put into operation in May last, only one has required any repairs, and in that case only an insignificant amount of work was required to repair the controlling stand. The other cars have not been in the repair shop. The motors sold to the Dubuque Street Railway Co. by the Detroit Electrical Works are giving great satisfaction. J. A. Rhomberg, president of the company, when in Chicago recently, stated that while the cars have covered a mileage of 100,000, no repairs of any kind have been necessary.

What Our Friends Say of Our New Book.

The following extracts are a few selected from the many letters received from persons who have a good word to say for our handbook "Street Railways," and from reviews found in our exchanges:

OFFICE OF
CHICAGO CITY RAILWAY CO.

CHICAGO, August 8, 1892.

MR. C. B. FAIRCHILD,
EDITOR STREET RAILWAY JOURNAL:

DEAR SIR:—Your book of "Street Railways" received. I will prize this volume much more than any book among the many that I have, and, from a casual survey of its contents, believe that it will carry me over many a rough place. Yours truly, M. K. BOWEN,
Superintendent.

ENGINEERING DEPARTMENT,
BALTIMORE CITY PASSENGER RAILWAY CO.

BALTIMORE, August 8, 1892.

C. B. FAIRCHILD, ESQ.,

EDITOR STREET RAILWAY JOURNAL:

DEAR SIR:—I must congratulate you upon the work. It certainly meets, in a most satisfactory way, a long felt want. It shows plainly the great care and study you have put in it.

Very sincerely yours, A. N. CONNETT,
Chief Engineer.

ENGINEERS' OFFICE,
NEW YORK & BROOKLYN BRIDGE,

179 WASHINGTON STREET.

BROOKLYN, August 5, 1892.

C. B. FAIRCHILD,

DEAR SIR:—The work you have accomplished belongs to a type of which, unfortunately, the world has too little; full and complete in detail, broad and symmetrical as a whole, the certainty on its author's

part that it was faithfully and conscientiously done, and thereby an essential addition made to human knowledge, will be your greatest reward; although I trust a more substantial return may not be lacking.
Yours truly, G. LEVERICH.

CENTRAL PARK, NORTH & EAST RIVER RAILROAD CO.
NEW YORK, August 4, 1892.

C. B. FAIRCHILD,
EDITOR STREET RAILWAY JOURNAL:
I congratulate you upon your splendid success as a street railway author, as evidenced not only by the work named but also by the monthly installment of good things served to us readers of the STREET RAILWAY JOURNAL. I am, Sincerely yours,
C. D. WYMAN, Vice-President.

KANSAS CITY, August 15, 1892.

C. B. FAIRCHILD, ESQ.,
EDITOR STREET RAILWAY JOURNAL,
New York.

MY DEAR SIR:—I have never placed any book in my library with higher feelings of pleasure, than I find in placing your *excellent* work in my collection. I congratulate you upon your success, in compiling and arranging so valuable a handbook for street railway men; it meets a long felt want, and the selection of the data and the information given could not, in my judgment, be improved; it is most complete.
I am, Very truly, ROBERT GILLHAM,
Civil Engineer.

F. P. LITTLE & CO.
BUFFALO, N. Y., August 4, 1892.

EDITOR STREET RAILWAY JOURNAL:
DEAR SIR:—Your new book entitled, "Street Railways, Their Construction, Operation & Maintenance," was received by us this morning. We beg to compliment you upon the handsome appearance of the volume, and from the few moments' observation which the writer gave the contents, he has no hesitation in saying that the handsome appearance is more than equaled by the mass of information and interesting reading inside the covers. Again complimenting you, we are
Yours very respectfully,
F. P. LITTLE & Co.,
Per F. P. LITTLE, Manager.

SUPERINTENDENT'S OFFICE,
THIRD AVENUE RAILROAD CO.,
NEW YORK, August 6, 1892.

MR. C. B. FAIRCHILD,
EDITOR STREET RAILWAY JOURNAL:
DEAR SIR:—Copy of "Street Railways" received. I must say that the book has been gotten up in handsome shape, and it is going to make a splendid book of reference for all engaged in the maintenance, construction and operation of street railways. Yours truly,
J. H. ROBERTSON, Superintendent.

"This book is by far the most complete work on street railways that has thus far been published in this country. The work will be of particular value to those who desire reliable information on car building and track construction. A chapter is devoted to each of these subjects. There are many other interesting and valuable features in this work which will commend it to street railway managers. Under the head of "Discipline and Rules," directions are given for the conduct of a model road. These are especially commended to superintendents as forming the ground work for rules for the guidance of their employes. Many excellent suggestions are also contained in the chapter on bookkeeping and classification of accounts that will be readily appreciated by accountants."

"Throughout the entire work the author has shown a familiarity with the most minute details that will at once inspire confidence. His suggestions are practical, and they disclose an intimate knowledge of the requirements of modern practice. Altogether the work is a most timely and valuable contribution to street railway literature.—*Western Electrician*.

"It is surprising how much detail the book covers, and it would be hard to mention any street railroad, that is not referred to in some way. Electric Traction (Chapter 1) is considered from the first principles in electricity and magnetism down through the motor to every detail of electric railway construction and operation, and this chapter is one of the most valuable and interesting in the book, because it enables one who is in childlike ignorance regarding electricity, to learn about it in an easy manner and step, by step, attain a knowledge of electric railroading in practice and theory that will be valuable. We think that this book will be of great value to every manager of a street railroad, whether it be horse, steam, cable, electric or any other kind. He will have constantly before him facts and figures concerning his own system that will be of great help to him in meeting the practical problems of operation.—*Electrical Age*.

"Altogether the most complete and, in fact, the first exhaustive treatise on street railways ever published. The subject is a much larger one than is generally supposed, and even railway managers will be surprised at its range and extent. The work not only consecutively

takes up every department of street railroading, from track repairs to the general office, but follows out details with a faithfulness that places the street railways of the country under great obligations to the author."
—*Street Railway Review*.

"Knowing something of the extreme care used in collecting and verifying the facts presented in this volume, we can confidently recommend it as a careful resumé of the best American practice in street railway construction."—*Engineering Record*.

"On perusing the book it will be seen that the author has fully covered the ground indicated in his prefatory outline, and it is without doubt the most comprehensive work on the subject yet issued. The reader is gradually carried upward from the veritable A B C of electric traction to the final outcome—'Charter, Franchises, Stocks and Bonds,' followed by a fully illustrated chapter on the leading types of cars, and auxiliary appliances. Although the author modestly disclaims any attempt at typographical merit, yet the appearance of the book is both neat and tasteful, and should command, as it undoubtedly deserves, a wide circulation."—*Practical Electricity*.

List of Street Railway Patents

ISSUED BY THE U. S. PATENT OFFICE, JULY 26, 1892, TO
AUGUST 16, 1892, INCLUSIVE.

JULY 26.	
Brake Mechanism for Cars, Henry V. Hartz, Cleveland, O.....	479,420
Electric Railway, Mark W. Dewey, Syracuse, N. Y.....	479,493
Motor Frame for Electric Locomotives, Sidney H. Short, Cleveland, O....	479,469
Trolley, Frederick F. Poole, Newark, N. J.....	479,608
AUGUST 2.	
Cable Railway, John H. Pendleton, Brooklyn, N. Y.....	479,919
Cable Railway, John H. Pendleton, Brooklyn, N. Y.....	479,920
Cable Railway, John H. Pendleton, Brooklyn, N. Y.....	479,921
Closed Conduit for Electric Railways, Edward H. Johnson, New York.....	479,809
Driving Mechanism for Cars, Jacob V. Motter, Brooklyn, N. Y.....	479,915
Electric Railway, Charles H. Baker, Lake Geneva, Wis.....	480,004
Gas Car Heater, Samuel Stewart, Newark, N. J.....	480,216
Rail Clamp, Henry L. Wolpert, Lancaster, Pa.....	479,867
System of distributing Electric Currents, Charles J. Van Depoele, Lynn, Mass.; C. A. Coffin and Albert Wabl, executors of said Van Depoele, deceased.....	479,964
Track Construction for Railways, Thomas W. Hutchins, Wyoming, Pa....	479,805
Trolley for Electric Cars, George E. Purple and Charles W. Purple, Minneapolis, Minn.....	480,240
AUGUST 9.	
Automatic Car Brake, Richard Condon, Lyons, Ia.....	480,250
Cable Gripper, William A. Butler, New York, N. Y.....	480,489
Cable Railway, Samuel D. Root and Gordon C. Vineyard, Anaconda, Mont.....	480,519
Closed Conduit for Electric Railways, Alexander L. Lineff, London, Eng.....	480,409
Electric Railway, Francis B. Badt, Chicago, Ill.....	480,543
Motor Truck, John A. Brill, Philadelphia, Pa.....	480,362
Rail Joint, Milton C. Niles, Oak Park, Ill.....	480,506
Tram Car, Adolf Worner, Buda-Pesth, Austria-Hungry.....	480,310
Truck for Railway Cars, Ernest D. Dorchester, Malden, Mass.....	480,495
AUGUST 16.	
Car Wheel, Benjamin F. Haugh, Indianapolis, Ind.....	480,922
Charles W. Howlett, Kansas City, Mo.....	481,029
Electric Locomotive, Rudolf Eickemeyer, Yonkers, N. Y.....	480,918
Electric Railway, Rudolph M. Hunter, Philadelphia, Pa.....	480,550
Guide for Replacing Electric Trolleys, Charles Fortin, Florissant, Mo.....	480,766
Joint for Electric Wires, Walter E. Harrington, Atlantic City, N. J.....	481,025
Operating Device for Fare Registers, John W. Meaker, Chicago, Ill.....	480,732
Pilot or Guard for Locomotives and Cars, Robert A. Crawford, Allegheny, Pa.....	480,713
Railway Rail Chair, Byron Jennings, San Jose, Cal.....	481,032
Supply Station for Car Heating Systems, James F. McElroy, Albany, N. Y.....	480,777
AUGUST 23.	
Automatic Release for Cable Grippers, Andrew J. Smith, St. Louis, Mo....	481,431
Cable Railway Curve, George Muller, Hoboken, N. J.....	481,412
Cable Traction System, George Muller, Hoboken, N. J.....	481,413
Car Brake, Charles A. Dahls'ron, Chicago, Ill.....	481,163
Conduit for Electric Railways, Wilton F. Jenkins, Richmond, Va.....	481,403
Grip for Cable Railways, George Schorpp and Louis Schorpp, Phila., Pa.....	481,512
Rail Joint, George G. Stacy, New York.....	481,433
Railroad Joint, Urban H. Hane, Lakeland, Fla.....	481,171
Railway Construction, William J. Morden, Chicago, Ill.....	481,368
Sanding Device for Street Cars, John H. Vogan and George L. Vogan, New Castle, Pa.....	481,535
Street Car, Frederick B. Brownell, St. Louis, Mo.....	481,467
Street Car, Frederick B. Brownell, St. Louis, Mo.....	481,468
Trolley for Electric Railways, Wilton F. Jenkins, Richmond, Va.....	481,401
Trolley for Electric Railway Conduits, Wilton F. Jenkins, Richmond, Va....	481,402
Trolley Protector, John Walsh, Cleveland, O.....	481,517
Trolley Switch, Jacob S. Merklins, Highlands, Col.....	481,503

We will send copies of specifications and drawings complete of any of the above patents to any address upon receipt of twenty-five cents. Give date and number of patent desired. STREET RAILWAY PUBLISHING COMPANY, WORLD BUILDING, NEW YORK.

QUOTATIONS OF STREET RAILWAY STOCKS.

BROOKLYN STOCKS AND BONDS.—Corrected by C. E. STAPLES & Co., 215 Montague Street, Brooklyn, Aug. 18. Stock quotations are per cent. values.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
Atlantic Avenue R. R. Co	50	1,250,000	Q.—J.	1½	.....	112	.....
Broadway R. R. Co	100	525,000	Q.—F.	2	.....	240	.....
Brooklyn City R. R. Co	10	6,000,000	Q.—J.	2	.....	188	.....
Coney Island & Brooklyn R. R. Co	100	500,000	.....	.....	.....	145	.....
BONDS.							
Atlantic Ave. R. R. Co, 1st mort.	.....	140,500	M. & N.	7	May, 1894	104	.....
Atlantic Ave. R. R. Co. Cons.	.....	900,000	A. & O.	5	Oct. 1909	.....	104
Broadway R. R. Co	.....	350,000	J. & J.	5	6 m. notice	100	.....
Coney Island & Brooklyn R. R. Co, 1st bonds	.....	300,000	J. & J.	5	Jan. 1909	.....	103
Coney Island & Brooklyn R. R. Co, certificates	.....	300,000	J. & J.	6	July, 1894	101	.....
South Brooklyn Central R. R. Co, 1st	.....	125,000	F. & A.	7	Aug. 1897	106	.....
South Brooklyn Central R. R. Co, 2d	.....	150,000	F. & A.	6	July, 1941	102	.....
Brooklyn City R. R. Co, 1st	.....	3,000,000	J. & J.	5	July, 1916	108	.....

ALBANY STOCKS AND BONDS.—Corrected by SPENCER TRASK & Co., Bankers and Brokers, corner State and James Streets, Albany, N. Y., Aug. 18.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
Albany R. R. Co	100	750,000	Q Feb.	1½	1890	119	120
Watervliet Turnpike & R. R. Co	100	240,000	.....	.....	1863	3	.....
BONDS.							
Albany R. R. Co., 1st Mort.	1865	40,000	J. & J.	5	1905	105	.....
" " " 2d Mort.	1873	20,000	M. & N.	7	1893	102½	.....
" " " 3d Mort.	1875	28,500	J. & J.	7	1895	102	.....
" " " 4th Mort.	1880	11,500	M. & S.	6	1905	102	.....
" " " 5th Mort.	1888	50,000	M. & S.	5	1913	102½	.....
" " " Consol Mtg	1890	350,000	J. & J.	5	1930	105½	.....
" " " Debenture.	1891	200,000	M. & N.	6	1901	113	.....
Watervliet Turnpike & R. R., 1st Mort.	1889	350,000	M. & N.	6	1919	115	118
Watervliet Turnpike & R. R., 2d Mort.	1889	150,000	M. & N.	6	1919	108	113

NEW YORK STOCKS AND BONDS.—Corrected by H. L. GRANT, 26 Broad St., New York, Aug. 18. Stock quotations are per cent. values.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
Bleecker St. & Fulton Ferry	100	900,000	J. & J.	¾	.....	28	30
Broadway & Seventh Avenue	100	2,100,000	Q.—J.	1	.....	197	200
Cent'l Park, North & East River	100	1,800,000	Q.—J.	1	.....	145	150
Central Crosstown	100	600,000	Q.—F.	1	.....	130	.....
Dry Dock, E. B'way & Battery	100	1,200,000	Q.—F.	2	.....	117	120
42d & Grand St. Ferry	100	748,000	Q.—F.	2	.....	250	.....
42d St., Manhat. & St. Nich. Av.	100	2,500,000	Q.—J.	2	.....	54	55
Eighth Avenue	100	1,600,000	Q.—J.	2	.....	250	.....
Houston, W. St. & Pav. Ferry	100	1,000,000	Q.—F.	2	.....	200	.....
Second Avenue	100	1,862,000	J. & J.	2	.....	116	120
Sixth Avenue	100	1,500,000	M. & S.	2	.....	200	204
Third Avenue	100	2,000,000	M. & N.	2	.....	205	210
23d St.	100	600,000	Q.—F.	2	.....	250	.....
Ninth Avenue	100	800,000	.....	3	.....	125	130

Bonds.	Date of Issue	Amount.	Interest Paid.	%	Principal Due.	Bid.	Ask'd
Bleecker St. & Fulton Ferry	700,000	J. & J.	7	July, 1900	110	113
B'way & 7th Ave., 1st mort.	1,500,000	J. & D.	5	June, 1904	105	.....
2d mort.	500,000	J. & J.	5	July, 1914	104	.....
Broadway Surface Guaranteed	1,500,000	J. & J.	6	July, 1924	105	.....
Additional	1,000,000	J. & J.	5	July, 1905	95	.....
Cent'l Park, North & East River	1,200,000	J. & D.	7	Dec., 1902	116	120
Central Crosstown	250,000	M. & N.	6	Nov., 1922	117	120
Dry Dock, E. B'way & Battery, 1st mort.	840,000	J. & D.	7	June, 1893	100	101
Scrp	1,200,000	F. & A.	6	Aug. 1914	101	.....
42d & Grand St. Ferry	236,000	A. & O.	7	April, 1893	100	103
42d St. Manhat. & St. Nich. Av 1st mort.	1,200,000	M. & S.	6	Sept., 1910	110	112
2d mort.	1,200,000	F. & J.	6	1915	59	61
Eighth Ave., Scrp	1,000,000	F. & A.	6	Aug., 1914	105	109
Houston, W. St. & Pav. Ferry	250,000	J. & J.	7	July, 1894	100	107
Second Avenue	1,600,000	M. & N.	5	Nov., 1909	103	105
Third Avenue	5,000,000	J. & J.	5	Jan., 1937	112	114
23d St.	250,000	M. & N.	7	May, 1893	102	104

BOSTON STOCKS.—Corrected by R. L. DAY & Co., 40 Water Street, Members of Boston Stock Exchange, Aug. 18. Stock quotations are prices per share

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
West End Pref.	50	\$6,406,000	J. & J.	4	1887	87½	87¾
West End Com'n.	50	9,085,000	J. & J.	5	1890-1892	73¼	74

PROVIDENCE STOCKS.—Corrected by CHACE & BUTTS, Bankers, Providence, Aug. 18.

Company	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
Pawtucket St. Ry. Co	100	\$270,000	New.	.....	Oct., 1887	83	100
Union R. R. Co., Prov.	100	2,000,000	Q.—J.	2	1862-1863	200	210
Providence Cable Tramway	100	300,000	.....	.....	Owned by Union Railroad Co.	.....	.....

HOLYOKE STOCKS.—Corrected by J. G. MACKINTOSH & Co., Bankers, Holyoke, Mass. Aug. 18.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
Springfield Street R. R. Co	100	1,000,000	J. & J.	4	.....	210	225
Holyoke Street R. R.	100	200,000	J. & J.	4	.....	212	225
Northampton Street R. R.	100	50,000	.....	.....	.....	25	50

CHARLESTON STOCKS AND BONDS.—Corrected by A. C. KAUFMAN, Charleston, S. C., Aug. 18. Stock quotations are prices per share.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
Charleston City Ry. Co	50	\$100,000	J. & J.	3	.....	.....	55
Enterprise Ry. Co	25	250,000	.....	.....	.....	.....	8
BONDS.							
Charleston City Ry. Co	.....	100,000	J. & J.	6	1915	.....	.....
Enterprise Ry. Co	.....	50,000	J. & J.	5	1906	.....	.....

NEW ORLEANS STOCKS AND BONDS.—Corrected by GEORGE LE SASSIER, 174 Common Street, New Orleans, La., Aug. 18. Stock quotations are prices per share.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
*Carrollton R. R. Co	100	800,000	Quart.	1½	1867	124	126
Crescent City R. Co	100	1,150,000	"	1½	1866	96½	98
Canal & Claiborne R. R. Co	40	240,000	.....	.....	1888	28½	35
New Orleans City & Lake Co	100	1,500,000	Quart.	1½	1860	143½	147
Orleans R. R. Co	50	185,000	"	2	1868	63	66
St. Charles Street R. R. Co	50	600,000	"	2	1866	93	95
Bonds.							
Canal & Claiborne Sts. R. R.	1879	150,000	A & O	6	1887	102½	.....
Crescent City R. R. 1st Mort.	1883	100,000	M & N	6	'93-'99	.....	.....
do do new	1886	40,000	M & N	6	1896	.....	.....
N. O. City R. R. Co	1879	495,200	J & D	6	1903	119	.....
N. O. & Carrollton R. R. Co	1882	300,000	F & A	6	'92-'06	113½	.....
St. Charles Street R. R. Co	1881	165,000	J & D	6	'89-'01	.....	.....

* Bids on Carrollton R. R. are ex-privilege of new stock.

NEW HAVEN STOCKS AND BONDS.—Corrected by H. C. WARREN & Co., Bankers and Brokers, New Haven, Conn. Aug. 18. Stock quotations are prices per share.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
F. Haven & Westville R. R. Co	25	\$300,000	J. & J.	4	.....	35	.....
State Street Horse R. R. Co	25	23,000	J. & J.	3	.....	40	.....
New Haven & W. Haven R. R. Co	25	.....	.....	.....	.....	26	.....
New Haven & Cent'l E. R. R. Co	.....	.....	.....	.....	.....	.....	.....
Whitney Ave. Ry. Co	50	25,000	.....	.....	.....	7	.....
Bridgeport Horse R. R. Co	100	140,000	.....	.....	.....	.....	.....
Hartford & Westfield Horse R. Co	100	200,000	J. & J.	3	.....	125	.....
BONDS.							
State Street Horse R. R. Co	1874	20,000	J. & J.	7	Jan., 1894	104	.....
New Haven & W. Haven R. R. Co	1889	50,000	J. & J.	5	July, 1889	103	.....
Bridgeport Horse R. R. Co	.....	50,000	.....	6	.....	.....	.....
Hartford & Westfield Horse R. R. Co, Deb. Series A	1888	100,000	M. & S.	5	Sept., 1908	.....	.....
Hartford & Westfield Horse R. R. Co, Deb. Series B	1890	100,000	M. & N.	5	May, 1910	.....	.....
Hartford & Westfield Horse R. R. Co, Deb. Series C (Not yet issued)	.....	100,000	M. & N.	5	May, 1910	.....	.....

MONTREAL STOCKS AND BONDS.—Corrected by GORDON STRATHY & Co., Members Montreal Stock Exchange, 9 St. Sacrament Street, Aug. 18. Stock quotations are per cent. values.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
Montreal St. Ry. (p'd up sh.)	60	\$900,000	M. & N.	4	May, '91.	232	233
BONDS.							
Montreal St. Ry.	1885	£60,000		5	1965		

LOUISVILLE STOCKS AND BONDS.—Corrected by ALMSTEDT BROS. Stock and Bond Brokers, 610 West Main Street, Louisville, Ky., Aug. 18.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
Louisville St. Ry. Co., pref.	100	\$1,000,000	A. & O.	5	Jan. 1891	91	92
Louisville St. Ry. Co., com.	100	5,000,000			Jan. 1891	28	28½
BONDS.							
Louisville St. Ry. Co., 1st mort	1890	6,000,000	J. & J.	5	1930	100	100½
Louisville City Ry. Co. Cons.	1884	1,000,000	J. & J.	6	1909	115	
Central Passenger Ry. Co.	1888	400,000	M. & N.	6	1908	115	
New Albany St. Ry. 1st Mort.	1888	150,000	J. & J.	6	1913	95	100

CHICAGO STOCKS AND BONDS.—Corrected by WILLIAM B. WRENN, 82 Washington Street, Chicago, Ill., Aug. 18.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
Chicago City	100	\$7,000,000	Q.—J.	3		470	480
Chicago Passenger	100	1,000,000	A. & O.	2½		99½	
North Chicago City	100	500,000	Q.—J.	7½		500	
North Chicago Street	100	5,000,000	J. & J.	4		270	275
West Division City	100	1,250,000	Q.—J.	8½		625	
West Chicago Street	100	10,000,000	Q.—F.	1½		215	218
BONDS.							
Chicago City		4,619,500	J. & J.	4½		98½	98½
Chicago Passenger	1883	400,000	F. & A.	6	1903	109	
North Chicago City, 1st mort.		500,000	M. & N.	6	1900	101½	102
North Chicago Street 1st mort		1,850,000	M. & N.	4½	1927	96½	
West Chicago Street		2,350,000	J. & J.	5	1906	100½	
West Chicago Street, Tunnel.		4,160,000	M. & N.	5		101½	
		1,500,000	F. & A.	5			96½

PITTSBURGH STOCKS AND BONDS.—Corrected by REA BROS. & Co., 115 Fourth Avenue, Pittsburgh, Pa., Members of New York, Philadelphia and Pittsburgh Stock Exchanges, Aug. 18. Stock quotations are prices per share

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
Central Traction R. R. Co	50	1,500,000				29½	30
Citizens' Traction R. R. Co	50	3,000,000	J. & J.	3			
Pitts. & Birmingham R. R. Co	25	3,000,000					
Pittsburgh Traction R. R. Co	25	2,500,000	J. & J.			57	59
Federal St. & Pleasant Valley	50	1,400,000	J. & J.	3		25½	26½
Pittsburgh, Allegheny & Man	50	3,000,000					
West End R. R. Co.	50	200,000	J. & J.				
Second Avenue R. R. Co.	50	300,000	J. & J.	3			
Penn Incline Plane Co	50	250,000					
Monongahela Incline Plane Co	50	140,000	F. & A.				
Fort Pitt Incline Plane Co	50	60,000					
Mount Oliver Incline Plane Co	50	100,000					
Pittsburgh Incline Co.	100	150,000					
Duquesne Traction Co.	50	3,000,000					
BONDS.							
Citizens' Traction R. R. Co	1887	1,250,000	A. & O	5	1927		
Pitts. & Birmingham Traction Co.	1889	1,500,000	M. & N.	5	1929		
Pittsburgh Traction R. R. Co	1887	750,000	A. & O.	5	1937		
Pleasant Valley Ry.	1891	1,250,000	J. & J.	5	1919		
P., A. & M. R. R. Co.	1891	1,500,000	J. & J.	5	1931		
Duquesne Traction Co.	1890	1,500,000	J. & J.	5	1930		
Second Ave. Electric R. R. Co	1889	1,500,000	J. & J.	5	1909		
Central Traction Co.	1889	375,000	J. & J.	5	1919		
Union R. R. Co.	1881	100,000	A. & O.	5	1901		
West End R. R. Co.	1887	75,000	J. & J.	5	1907		
Fort Pitt Incline Plane Co.	1881	30,000		6	1901		
Mount Oliver Incline Plane Co	1871	44,500	M. & N.	6	1901		
Penn Incline Plane Co 1st Mort.	1883	125,000		6	1903		
Monongahela Incline Plane Co.	1887	50,000	A. & O.	5	1892		
Monongahela Incline Plane Co.	1887	50,000	A. & O.	5	1897		
Pittsburgh Incline Co.	1889	250,000	J. & J.	6	1919		

SAN FRANCISCO STOCKS AND BONDS.—Corrected by PHILIP BARTH, Broker, 440 California Street, San Francisco, Cal., Aug. 18.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
City R. R. Co	100	800,000					100
California St. Cable Co	100	1,000,000	Monthly	5			115
Central R. R. Co	100	1,000,000					12
Gearv St., Park & Ocean R. R. Co	100	1,000,000		1		95	
North Beach & Mission Ry. Co	100	1,000,000				45	65
Ferries & Cliff House R. R. Co	100	2,500,000				33	39
Omni-bus Cable Co.	100	2,000,000	Monthly	4		56	58½
Presidio & Ferries R. R. Co	100	1,000,000				22½	25½
BONDS.							
Ferries & Cliff House		650,000	M. & S.	6	1914	101	
Market Street R. R.		3,000,000	J. & J.	6	913	120	
Omni-bus R. R.		2,000,000	A. & O.	6	1918	114½	116½
Powell Street R. R.		700,000	M. & S.	6	1912	112	
Park & Ocean R. R.		250,000	J. & J.	6	1914	111½	
Park & Cliff House R. R.		350,000	J. & J.	6		95	
Cal. St. Cable R. R.						103	

ST. LOUIS STOCKS AND BONDS.—Corrected by JAMES CAMPBELL, Banker & Broker, 307 Pine St., St. Louis, Mo., July 18. Stock quotations are prices per share.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
Benton-Bellefontaine	100	\$324,000	Q.—J.	3	1864	110	150
Cass Ave. & Fair Grounds	50	300,000			1876	45	46
Citizens'	100	1,500,000	A. & O.	1½	1887	90	95
Jefferson Avenue	100	112,000			1885	102	105
Lindell	100	2,500,000	Q.—J.		1890	72	74
Missouri	100	2,000,000	Q.—J.	2	1891	225	250
Mound City	100	1,000,000			1890	190	200
Northern Central	100	200,000			1884	100	105
People's	50	1,000,000	M. & S.	6	18-9	45	50
St. Louis	100	2,000,000	J. & J.	6	1890	150	160
4th Street & Arsenal	50	150,000	Jan.	50	1872	10	12
Union	50	600,000			1870	20	25
Union Depot	100	1,200,000			1890	200	250
St. Louis & Suburban	100	2,500,000			1891	48	50
BONDS.							
Benton-Bellefontaine	1891	\$500,000	F. & A.	6	1911	102	102½
Cass Avenue & Fair Ground	1892	1,000,000	J. & J.	5	1912	96	98
Citizens' Cable	1887	1,500,000	J. & J.	6	1907	106	107
Lindell	1890	1,500,000	J. & J.	5	1895-1910	99	100
Mound City	1890	525,000	A. & O.	6	1900-1910	105	106
Missouri Cable	1887	500,000	M. & S.	6	1907	102	105
People's 1st mort.	1882	125,000	J. & D.	6	1902	102	105
People's 2d mort.	1883	75,000	M. & N.	7	1902	104	105
People's Cable	1889	800,000	J. & J.	6	1889-1914	97	100
St. Louis Cable	1890	1,500,000	M. & N.	5	1900-1910	97½	98
Union	1885	1,500,000	M. & N.	6	1885-1915	102	102
Union Depot	1890	1,600,000	L. & O.	6	1900-1910	105	106

PHILADELPHIA SECURITIES.—Corrected by ROBERT GLENDINNING & Co., 143 South Fourth St. (Bullitt Building), Philadelphia, Aug. 18. Stock quotations are prices per share.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
Citizens'	50	\$500,000	Q.—J.	4	1858	260	270
Continental	50	1,000,000	J.—J.	6	1873	125	126
Frankford & Southwark	50	1,250,000	Q.—J.	5	1854	210	212
German town	50	1,500,000	Q.—J.	2½	1858	102	103
Green & Coates	50	500,000	Q.—J.	3	1858	120	121
Hestonville	50	2,050,000			1859	32	34
Lombard & South	25	500,000	A. & O.	8	1861	59	61
People's Common	25	1,500,000	M.—S.	21½	1873	49	50
Preferred	25	750,000	M.—S.	21½		49	
Philadelphia City	50	1,000,000	J.—J.	7½	1859	150	151
Philadelphia & Gray's Ferry	50	617,500	J.—J.	3½	1858	65	70
Philadelphia Traction (50 pd.)	50	5,000,000	M.—N.	3	1883	85	88
Ridge Avenue	50	750,000	Q.—J.	5	1872	220	225
Second & Third	50	1,060,200	Q.—J.	5	1853	160	162
Thirteenth & Fifteenth	50	1,000,000	J.—J.	9	1858	200	203
Union	50	1,250,000	J.—J.	9½	1864	186	188
West Philadelphia	50	750,000	J.—J.	10	1857	200	202
Metropolitan (N. Y.) Traction	100	20,000,000	Q.—F.	1		135	137
Baltimore Traction	25	500,000			1889	24½	24½
Buffalo (N. Y.) Railway	100	6,000,000				44	45
Newark (N. J.) Passenger	100	6,000,000				29	30
BONDS.							
Baltimore Traction 1st Mort.	1889	1,500,000	M.—N.	5	1929	110	111
Imp.	1892	1,250,000	M.—S.	6	1901	105	106
Balt. Tr., No. Balt. Div., Gold	1892	1,750,000	J. & D.	5	1942	106	107
German town, 1st mort.		67,000	J.—D.	5	1904	103	
" 2d mort.		160,000	A.—O.	5	1899	103	
Hestonville, 1st mort.		300,000	M.—N.	6	1895	104	
" 2d mort.		124,500	J.—J.	6	1901	105	
" 3d mort.		75,000	M.—S.	6	1902	105	
People's, 1st mort.		219,000	J.—J.	7	1905	115	
" 2d mort.		285,000	J.—J.	5	1911	100	
" Cons. mort.		247,000	M.—S.	5	1912	95	
West Philadelphia, 1st mort.		246,000	A.—O.	6	1906	117	

OMAHA STOCKS AND BONDS.—Corrected by RICHARD C. PATTERSON, Banker and Broker, 907 N. Y. Life Building, Omaha, Neb., Aug. 18.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
Omaha St. Ry. Co.	100	5,000,000	M. & N.	....	Jan. 1, '89	60	....
BONDS.							
Omaha St. Ry. Co.	1889	2,250,000	M. & N.	5	M'y 1, 1914	95	98

CINCINNATI STOCKS AND BONDS.—Corrected by GEO. EUSTIS & Co., Bankers and Brokers, 26 West Third Street, Cincinnati, Aug. 18. Stock quotations are per cent. values.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
Cincinnati	50	\$6,000,000	Q.—J.	5	.....	109½	109½
Mt. Adams & Eden Park	50	1,400,000	Q.—J.	5	.....	108	108½
S. Covington & Cincinnati	50	275,000	J. & D.	6	.....	122	125
Mt. Auburn Cable	100	300,000	.....	.....	.....	40	.....
Cin. Inclined Plane Ry.	100	500,000	.....	.....	.....	91½	92½
" " " Pref.	100	100,000	.....	6	.....	100	101
BONDS.							
Cincinnati Street	.....	50,000	J. & J.	7	July, 1892	.....	.....
" " "	.....	50,000	J. & J.	7	July, 1893	103	.....
" " "	.....	50,000	J. & J.	7	July, 1894	107	.....
" " "	.....	50,000	J. & J.	7	July, 1895	108½	109
" " "	.....	50,000	J. & J.	7	July, 1896	110½	111½
" " " extended	.....	100,000	J. & J.	4	July, 1896	.....	101
" " " "	.....	50,000	J. & J.	5	July, '96	102	103½
Mt. Adams & Eden Park	.....	50,000	A. & O.	6	July, 1895	.....	.....
" " "	.....	50,000	A. & O.	6	July, 1900	104½	106
" " "	.....	100,000	A. & O.	6	July, 1905	.....	.....
" " " 10-20's Cable	.....	200,000	J. & D.	6	Je. '94-1924	105½	.....
Cin. Inclined Plane Ry.	.....	2,000,000	M. & S.	5	Mar. 1906	105	106
" " "	.....	125,000	J. & J.	7	July, 1899	116	.....
" " "	.....	300,000	J. & J.	7	Jan. 1914	107½	108
Mt. Auburn Cable	.....	200,000	J. & D.	5	June, 1907	.....	100
" " " 5-20's 2d.	.....	100,000	A. & O.	6	Ap. '93-1908	.....	111½
S. Covington & Cincinnati	.....	250,000	M. & S.	7	Mar. 1912	112	.....

BALTIMORE STOCKS AND BONDS.—Corrected by HAMBLETON & Co., Bankers, 9 South Street, Baltimore, Md., Aug. 18. Stock quotations are prices per share.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
Balto. City Pass. Ry. Co.	25	1,000,000	Quart.	3	.....	75	80
Union Pass. Ry. Co.	50	750,000	.....	.....	.....	.....	.....
Balto. Traction Co. (Cable)	25	5,000,000	Quart.	1	.....	24½	25
BONDS.							
Central Pass. Ry.	1882	250,000	J. & J.	6	1912	105	110
" " " cons. mort.	1892	500,000	J. & J.	5	.....	102½	103
Union Ry. Co. 1st mort.	.....	50,000	M. & N.	6	.....	105	110
" " " gen. mort.	.....	1,500,000	.....	.....	.....	105	.....
Balto. Traction Co. (Cable)	1889	1,500,000	M. & N.	5	1929	110½	111½
Balt. Trac. Co., No. Balt Div	1892	1,750,000	J. & D.	5	1942	108½	106½
" " " "	1891	1,250,000	M. & S.	6	1901	105	.....
City Pass. R. R. Co.	1891	2,000,000	" "	5	1911	111	112

WASHINGTON STOCKS AND BONDS.—Corrected by CRANE, PARRIS & Co., Bankers, 1344 F Street, N.W., Washington, D. C., Aug. 18. Stock quotations are prices per share.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
Wash'ton & Georgetown R. R.	50	500,000	Q. F.	....	1863	310	330
Metropolitan R. R.	50	750,000	Q. J.	....	1864	98	.....
Columbia R. R.	50	400,000	Q. M.	....	1870	.....	65
Capitol & North O St. R. R.	50	500,000	Q. J.	....	1875	37	.....
Eckington & Soldiers' Home	50	352,000	.....	.....	.....	.....	.....
Georgetown & Tenallytown	50	200,000	.....	.....	.....	.....	55
Rock Creek R. R.	100	401,700	.....	.....	.....	100	.....
Glen Echo R. R.	50	100,000	.....	.....	.....	.....	.....
BONDS.							
Washington & Georgetown	1883	500,000	J. & J.	6	1893-1923	102	.....
do. do. convert.	'83-'91	3,000,000	J. & J.	6	1899-1929	125	.....
Eckington & Soldiers' Home	.....	150,000	J. & D.	6	1896-1911	97	.....
Capitol & North O St. R. R.	1891	240,000	J. & J.	5	1921	.....	.....
Metropolitan R. R. convert.	1891	200,000	J. & J.	6	1901	110	.....
Anacostia R. R.	.....	200,000	A. & O.	6	1901-1931	102	.....

ROCHESTER, BUFFALO, PATERSON AND NEWARK STOCKS AND BONDS.—Corrected by E. W. Clark & Co., 139 So. Fourth St. (Bullitt Building), Philadelphia, Aug. 18.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
Rochester (N. Y.) Ry.	100	5,000,000	.....	.....	1890	40	42
Buffalo (N. Y.) Ry.	100	6,000,000	.....	.....	1891	44	46
Paterson (N. J.) Ry.	100	1,250,000	.....	.....	1891	.....	25
Newark (N. J.) Pass. Ry.	100	6,000,000	.....	.....	1890	29½	30
Columbus (O.) St. Ry.	100	3,000,000	.....	.....	1892	35	39
BONDS.							
Rochester (N. Y.) Ry.	1890	3,000,000	A & O	5	1930	92	95
Buffalo (N. Y.) Ry.	1891	5,000,000	F & A	5	1931	95	97½
Paterson (N. J.) Ry.	1891	850,000	J & D	6	1931	90	100
Newark (N. J.) Pass. Ry.	1890	6,000,000	J & J	5	1930	90	92
Columbus (O.) St. Ry.	1892	2,600,000	J & J	5	1932	92	97½

CLEVELAND STOCKS.—Corrected by W. J. HAYES & SONS, Bankers, Cleveland, O., Aug. 18. Stock quotations are prices per share.

Company.	Par.	Capital.	Period.	% last div.	Date of Issue.	Bid.	Ask'd
STOCKS.							
Broadway & Newburgh R. R.	100	1,000,000	.....	.....	.....	106	110
Brooklyn St. R. R.	100	310,000	.....	2	.....	176	175
Cleveland City Cable, common	100	4,000,000	.....	.....	.....	22½	25
" " " pref'd	100	.....	.....	.....	.....	95	105
East Cleveland R. R.	100	2,000,000	Quart.	2	.....	172	175
Woodlawn Ave. & West Side	100	1,100,000	Quart.	1½	.....	135	140

Annual Report of the West End Street Railway Co., Boston.

In the annual report of the West End Street Railway Co., is the following table which shows the remarkable growth in the earnings of the company during the last five years.

	1887-8	1888-9	1889-90	1890-1	1891-2
October	\$421,006	\$418,935	\$458,834	\$513,779	\$541,435
November	391,349	410,190	449,363	494,459	490,227
December	372,578	412,466	439,893	463,305	497,336
January	322,876	381,255	399,784	427,502	449,208
February	323,442	336,472	381,058	398,080	427,524
March	350,212	381,576	419,876	444,438	468,556
April	376,594	409,611	451,486	474,072	503,375
May	420,431	478,630	508,233	514,731	534,205
June	411,978	494,244	231,271	544,897	593,146
July	460,249	490,321	545,081	549,343	596,157
August	454,853	477,782	577,371	522,789	.....
September	427,938	465,928	511,486	539,506	.....

The track of the company now covers 260 miles, one half of which is practically new. The electric mileage is about two-thirds of the whole, and by the end of the year will probably be seven-eighths of the whole, or 15,000,000 for the year. The following table is also interesting showing the relative earnings per car mile of electric and horse cars.

Horse cars.—Nine months.		
Miles run	1891.	1892.
Net earnings	9,615,736	7,258,689
Net earnings per car mile	\$543,497.34	\$367,036.68
	5½ cts.	5 cts.
Electric cars.—Nine months.		
Miles run	3,494,231	5,477,571
Net earnings	\$312,765.01	\$810,024.00
Net earnings per car mile	10 cts.	15 cts.
Electric.—Three months.		
Total mileage	1891.	1892.
Total earnings	1,131,317	2,280,012
Net earnings	\$432,917.70	\$950,446.89
Net earnings per car mile	179,669.17	418,648.43
	16 cts.	19 cts.

	Nine months.	Three months.	Total.
Total mileage	12,736,260	4,500,000	17,236,260
Electric mileage	5,477,571	3,000,000	8,477,571
Net earnings	\$810,024	\$570,000	\$1,380,024
Net earnings per car mile	.....	.....	16 cts.

During the last year the operating expenses were 74.48 per cent. of receipts, a reduction of 3.81 per cent. since 1883. The company have paid regularly 8 per cent. on the preferred and 10 per cent. on the common stock since commencing operations. The fixed charges and dividends for the current year as estimated are \$1,850,000. The company is charging for the depreciation of horses \$11,000 per month and a large proportion of track repairs in operating expenses.

A BRAKE shoe has recently been put on the market, in which the face is cast with holes and into these are driven wooden plugs, giving a face against the wheel composed of both wood and iron. The manufacturers, the Safety Brake Shoe & Construction Co., of Boston, claim that by this method of construction the friction is so greatly increased that the car will stop in about one half the time required with the ordinary method of construction.

New Uses for Graphite.

A correspondent says: "I have used handhole and manhole gaskets eight to ten times by carefully smearing the surface next boiler shell, taken out at periods of three to four weeks, using steam pressure as high as 100 lbs. In packing water glasses, by putting a little graphite and oil on the gasket they would vulcanize as soft as lamp wick and retain their elasticity until the glass was changed, when the old rubber could be removed without trouble, while by the old way, I have spent much time in digging out the rubber, baked hard as vulcanite. Another thing I used it for was after putting back my handhole plate or plugs in back connection, I carefully brush away all soot and ashes, then with a small brush paint a good coat of graphite over flange, stud and nuts. After running boiler from three to six months, and using coke for fuel, with forced draft, the nuts can be removed without trouble as the heat has not been great enough to burn the lead."

Financial.

THE Citizens' Rapid Transit Co., of Nashville, Tenn., will issue \$100,000 of bonds.

\$ \$ \$

THE Georgetown (Ky.) Street Railway Co. have declared a semi-annual dividend of 4 per cent.

\$ \$ \$

AT a recent meeting of the York (Pa.) Railway Co. the capital stock of the company was increased from \$100,000 to \$200,000.

\$ \$ \$

THE Madison (Wis.) Street Railway Co. have amended their articles of incorporation, increasing their capital from \$30,000 to \$75,000.

\$ \$ \$

THE Columbus (O.) Street Railway Co. report receipts for July, 1892, \$44,695, a gain of \$7,875 over those of the same month in 1891.

\$ \$ \$

THE gross earnings of the West End Street Railway, of Boston, for July, were nearly \$606,000, as against \$551,000 for the corresponding period last year.

\$ \$ \$

THE stockholders of the Eddy Manufacturing Co., of Windsor, Conn., lately voted to increase the capital stock from \$100,000 to \$225,000, and the number of shares from 4,000 to 9,000.

\$ \$ \$

THE Wakefield (Mass.) & Stoneham Street Railway Co. have received permission from the State Board of Railroad Commissioners to add \$40,000 to their capital stock on account of electric equipment.

\$ \$ \$

THE New Jersey Traction Co., who operate the street railway system in Newark, report for the first two weeks in August, receipts \$47,496, against \$41,658 in the same weeks last year, an increase of \$5,838.

\$ \$ \$

THE quarterly dividend of 1 3/4 per cent. has been declared on the stock of the West Chicago Street Railroad Co. It had been rumored that a change might be expected, but the 7 per cent. rate has not changed.

\$ \$ \$

THE street car lines of Chicago have paid to the City Controller their license money for the quarter ending August 1. The amounts were as follows: South Side, \$4,556.25; North Side, \$2,727.50, and West Side, \$4, 814.64.

\$ \$ \$

THE Natick (Mass.) & Cochituate Railway Co. voted at a recent meeting to divide the surplus, which had accumulated since its construction, among their present stockholders and to raise \$6,500 new stock for its equipment with electricity as a motive power.

\$ \$ \$

THE directors of the Newburyport (Mass.) City Railroad Co. have authorized the treasurer to convert the investments into cash and to pay the bonded debt of the company, due September 1, amounting to \$25,000. The board also voted to transfer to sinking fund account a sum sufficient to make the full sum of \$25,000.

\$ \$ \$

THE total receipts for July 1892 of the Pittsburgh (Pa.) Traction Co. including the receipts of the Duquesne company were \$8,401. Last year for the same month the receipts, excluding those of the Duquesne company, were \$4,549, or a net increase of \$3,852. Three cent fares were in force during July 1891.

\$ \$ \$

THE stockholders of the Denver (Colo.) Tramway Co. were agreeably surprised at their annual meeting by the fact that the earn-

ings of the company for July were \$96,000. On July 4, 150,000 passengers were carried and \$7,000 earned. The company's stock is quoted at \$1.95, and there is none for sale.

\$ \$ \$

THE profits and assets of the East Middlesex (Mass.) Street Railway Co. last year amounted to \$398,554.32. The income was \$90,831. The company had fifty-six cars and 223 horses. During 1891, 1,587,913 passengers were carried. Indications show that the income the present year will show an increase of from 7 to 10 per cent.

\$ \$ \$

THE total receipts of the Chicago (Ill.) West Side Street Railway Co. for the month of July, 1892, were \$407,455, for the month of July, 1891, \$376,525; increase \$30,930. Including July, the receipts since January 1 have been \$2,546,245, against \$2,323,839 in the corresponding period of 1891, a gain for this year to date of \$322,406.

\$ \$ \$

A MORTGAGE has just been executed by the East Oakland Street Railroad Co. to the California Safe Deposit & Trust Co., dated June 1, 1892, in the sum of \$250,000 to secure 6 per cent. bonds, to be issued by the directors of the corporation. The mortgage is executed upon all property estate, rights, franchises and privileges of the company.

\$ \$ \$

MANHATTAN Railway Co., of New York, report for the quarter ending June 30, 1892: Gross \$2,773,449, increase \$228,236; operating expenses, \$1,420,681, increase \$133,913; net \$1,352,817, increase \$95,222; other income \$35,000; gross income, \$1,387,817, increase \$95,222; interest and taxes \$605,428, increase, \$4,881; net for quarter \$782,389, increase \$90,341.

\$ \$ \$

DRY Dock, East Broadway & Battery Railroad Co., of New York, report for quarter ended June 30: Gross earnings 1892, \$187,533; 1891, \$192,926; operating expenses 1892, \$130,057; 1891, \$132,197; other income 1892, \$1,663; 1891, \$2,618; fixed charges 1892, \$41,334; 1891, \$46,708; net income 1892, \$17,805; 1891, \$16,639; cash on hand 1892, \$61,496; profit and loss surplus 1892, \$16,383.

\$ \$ \$

It is understood that steps are being taken to organize a strong syndicate in Chicago to purchase the cable railway property of the Pacific Railway Co. at Los Angeles, Cal., at the coming foreclosure sale. It is reported that the road is earning considerable money at present, over and above operating expenses, and that the prospects are good for a still further increase in earning capacity.

\$ \$ \$

THE Metropolitan Traction Co., it is reported, have recently made an important addition to the number of street railways which they control in New York City. This latest railway to come under their control is the Central Park, North & East River Railway Co., commonly known as the "Belt Line" and extending along the river front on the North and East River sides of the lower part of the city as far as 59th Street. The price mentioned as paid per share was \$150.

**WE PURCHASE
Total Issues of Street Railway Bonds.**

CORRESPONDENCE INVITED.

**N. W. HARRIS & CO.,
BANKERS,**

163 Dearborn Street Chicago,
15 Wall St., New York. 70 State St., Boston.

CORRESPONDENCE OR INVESTIGATION

SOLICITED

From Manufacturers or Capitalists for arrangements to either manufacture the most durable, efficient and economical Electric Railway Car Truck, or to "place" the patents on royalty, stock company or sale.

The Ellery Radial Car Truck is the very best Electric Car Truck for Electric Railways.

Small model on successful exhibition.

Applications for patents allowed.

Inventor will advance no preliminary expenses to "promoter" or "company." Send for illustrated description.

R. L. ELLERY, Taunton, Mass.

The stockholders of the Ridge Avenue Passenger Railway Co., of Philadelphia, on August 18, ratified the lease of the line to the Traction company. 10,301 shares out of 15,000 were voted on, and all were in favor of the lease, which is to run 999 years, and which provides for the guarantee of \$10 a share for the first three years and \$12 a share thereafter. In addition, the Ridge Avenue Co. are allowed \$2,000 a year to keep up their organization, and the Traction Co. agree to do certain paving.

\$ \$ \$

The half yearly meeting of the Bristol Tramways & Carriage Co., Ltd., of Bristol, England, was held August 10. The report of the directors showed: Number of passengers carried during the last six months on the company's cars and omnibuses was 5,502,426; receipts during the half year are £38,127; net receipts £7,318; increase in street railway department £1,875; in carriage department £295. The usual 6 per cent. dividend was declared, and £1,133 carried to the Contingent and other funds.

PFEIFFER & PRONICK,

SCHERMERHORN BUILDING,

6 Wall Street, NEW YORK.

STREET RAILWAY SECURITIES

BOUGHT AND SOLD ON COMMISSION. CORRESPONDENCE SOLICITED.

RICHARD D. FISHER. WM. CHECKLEY SHAW

FISHER & SHAW,

4 South Calvert Street,
BALTIMORE, MD.

TOTAL ISSUES OF STREET RAILWAY BONDS PURCHASED.
Correspondence Invited,

WANTED TO PURCHASE,

A Horse Rail Road in good City.

State full particulars as to Mileage, Equipment, Earnings, and Operating Expenses, to "INVESTOR," care of STREET RAILWAY JOURNAL, New York City.

SPECIAL NOTICES.

FOR SALE.

FOR SALE.—30 twelve-foot cars, one-end type, with one fare box; in fair order. Gauge 4 ft. 8½ in. For all particulars apply to METROPOLITAN RAILROAD Co., Washington, D. C.

POSITIONS WANTED.

WANTED.—By a Practical Man, position with Street Railway Company as Superintendent or Manager. Have had experience with Electric, Steam Motor and Horse Lines. Satisfactory references as to ability and character in the construction, operation of Street Railways and Suburban Lines. Address, "STREET RAILWAY," 6,608 Evans Ave., Chicago, Ill.

WANTED—A position as chief engineer by a thoroughly competent man who understands doing all repairs, and also understands repairing and managing railway generators and motors, having had charge of the assembling and testing those machines in the Thomson-Houston works; also understands wiring and repairing cars. Can take entire charge of mechanical department of power house and station. Can furnish the best of city reference in Brooklyn and New York. Have first-class papers from both cities. Address ECONOMIC, STREET RAILWAY JOURNAL.

EQUIPMENT WANTED.

WANTED.—Bids for the construction of two and on miles of suburban street railway. Address J. C. COLLINS, Henderson, Ky.

FOR SALE.

125 tons second-hand 38 lb steel tram rails, in excellent condition.
100 tons second-hand 25 lb steel T rails, but little used.
100 tons 38 lb steel girder rail, excellent condition.

D. E. GARRISON & CO., - 219 N. 4th St., St. Louis, Mo.

FOR SALE CHEAP.

FORTY (40) OPEN AND FORTY (40) BOX (12 FOOT BOBTAIL) CARS, with fare box in each. All in good order. Gauge 4 ft. 10 in.
For full particulars write to

JAMES CAMPBELL, 307 Pine St., St. Louis, Mo.

FOR SALE.

A STREET RAILWAY AT PRESENT OPERATED BY HORSES. TRACK-AGE 3¼ MILES, OF WHICH 2 MILES ARE LAID WITH 50½ LB. GIRDER RAIL BONDED FOR ELECTRIC SERVICE.

Address

A. BAUMAN, Lancaster, Ohio.

FOR SALE.

CARS The Houston, West St. & Pavonia Ferry R. R. Co.,
COR. 7TH AVE. & 50TH ST., NEW YORK,

Have for Sale 14 and 16-foot Second-Hand Box Cars, in Good Running Order.—Gauge, 4 feet, 8½ inches. APPLY AT THE OFFICE,
761 SEVENTH AVE., N. Y. CITY.

FOR SALE.

TWO FIFTY H. P. ARMINGTON & SIMS ENGINES,

9½ x 12. These engines are in good condition, and are sold on account of change to water power.

PUBLIC WORKS CO., Bangor, Me.

FOR SALE.

RE-LAYING RAILS For Sale Cheap for Immediate Delivery, in Good Condition.

200 Tons....Johnson Girder. | 50 Tons....40-lb. Steel Tee.
50 Tons....35-lb. Steel Tee. | 100 Tons....35-lb. Iron Tee.

Rails Cut to Lengths for Buildings,

5,000 TONS IRON TEE—Weights from 28 to 56 lb. with Fastenings, Delivery any point of the M. K. & T. Line, Sept., Oct., Nov. Delivery. Now in use on Narrow Gauge Roads in Texas.

I am in the Market to BUY OLD RAILWAY MATERIAL. L. K. HIRSCH, 549 ROOKERY BUILDING, CHICAGO.

FOR SALE.

Electric Cars,

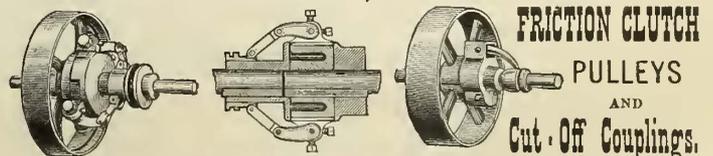
BOTH OPEN AND CLOSED.

QUICK DELIVERY AND AT LOWEST PRICES AND ON LONG TIME. THEY ARE REAL BARGAINS.

For Particulars write to

NEW YORK EQUIPMENT CO.,
15 Wall Street, NEW YORK.

J. H. & D. LAKE CO., HORNELLVILLE, N. Y.
MANUFACTURERS OF



The Simplest, Strongest and Best CLUTCH PULLEY made. Adapted to light or heavy work, stopping and starting machines easily and quickly without jar. Write for Illustrated Circular.

THE following annual reports were filed recently with the New York state board of railroad commissioners. Hudson Electric Railway Co. of Hudson: Gross income from all sources, \$7,668.15; net income, \$4,692.31; surplus for year ending June 30, 1892, \$1,692.31. Poughkeepsie City Railroad Co.: Gross income from all sources, \$3,961.06; net income, \$2,741.07; surplus, \$735.25. Frankfort & Ilion Street Railway Co., of Frankfort: Gross income \$1,501.65; net income, \$1,301.74; dividend declared, 10 per cent. on capital stock.

\$ \$ \$

A BIG mortgage has been executed from the Cincinnati, Newport & Covington Railway Co. to the Farmers' Loan & Trust Co. of New York, for \$3,000,000, secured by the property, right of way and franchises and 6,436 shares of stock in the South Covington & Cincinnati Street Railway Co., and the entire stock of the Cincinnati, Covington & Rosedale Street Railway Co., and of the Covington & Latonia Railway Co. The bonds are issued in denominations of \$1,000. The company giving the mortgage is the new corporation formed by the union of the South Covington & Cincinnati Street Railway Co., the Cincinnati & Newport Street Railway Co., and the Covington & Rosedale Street Railway Co.

\$ \$ \$

THE Metropolitan Traction Co. is to be reorganized under a New York State charter with a capital stock of \$30,000,000. The outstanding stock of the company comprises 200,000 shares, representing an aggregate par value of \$20,000,000. On these shares but 60 per cent. has been paid in, or \$12,000,000 of the total capital of \$20,000,000. According to the plan outlined, each holder of 100 shares of the present stock will receive 120 shares in the new company, thus taking \$24,000,000 of the new capital. It is also proposed to permit present stockholders to subscribe to 10 per cent. of their present holdings in new stock at par, which will put \$2,000,000 of money in the company's treasury. The remaining \$4,000,000 stock is to be held for future use in developing the property.

\$ \$ \$

A SYNDICATE composed of E. W. Clark & Co., J. & W. Seligman & Co., August Belmont & Co., Kuhn, Loeb & Co. and H. B. Hollins & Co., have recently secured control of several important street railway lines in the northeastern part of Massachusetts, and have organized the North Shore Traction Co., with a capital of \$6,000,000, under which name the road will be operated. The lines included are the Lynn & Boston, the Lynn Belt Line, the Naumkeag Street Railway and the Essex Electric Railway, comprising altogether 120 miles of track and forming a line from Boston to Marblehead. Except the Belt Line, in which it is said that 1,115 out of 20,000 shares were secured, the several lines were bought outright, about \$5,000,000 being necessary to complete the purchase. Of the \$6,000,000 capital of the new company, \$2,000,000 will be in preferred 6 per cent. stock and

\$4,000,000 in common stock. The preferred stock will probably be offered at par with a bonus in common stock equal to the subscription.

The Railway World.

The Railway World is the new name given to our English contemporary heretofore known as *The Tramway and Railway World*, published in London, and indicates that the managers of this enterprising and readable paper have decided to enlarge the field which the paper covers. We understand that this is a fact, and while the tramway and street railway field will remain a special feature the steam railway field will also be covered.

The last issue of *The Railway World* contains many interesting articles, among which a description of the manufacture and use of manganese and other steel castings at Hadfield's steel foundry, Sheffield, is especially worthy of mention. The advertisements in this issue show that the paper has the confidence of many leading manufacturers, not only of England but also of this country.

Great Railroad Traveling.

"I happened to take the 10:30 A. M. train the other day, from Chicago, on the Lake Shore and N. Y. Central, and thought the entire trip would be a bore," said Geo. W. Lederer to a *DRAMATIC TIMES* reporter. "But imagine my surprise, when I found upon entering the train, a *fac-simile* of their famous Chicago limited, and positively the same comfort, convenience and equipment which I have so often enjoyed on the latter. I arrived in New York City at 2:10 the next day, the train being on time to the minute, and had sufficient time left that day to transact a great deal of very important business. I shall return again to Chicago on the very same train, as it leaves here at 1:55 P. M., and gives me a good half day to settle up my unfinished business."—*New York Dramatic Times*.

The 10:30 A. M. train to which Mr. Lederer refers, is the popular "Chicago and Boston Special," the latest addition to the train service of the Lake Shore & Michigan Southern R'y. The equipment, which is of Wagner build, consists of two Vestibule Sleeping Cars, one Vestibule Buffet Smoking and Library Car, running through to Boston, arriving at 3:40 P. M. next day; one Vestibule Sleeper through to New York, arriving at 2:10 P. M.; a vestibule Dining Car, Chicago to Cleveland, and Utica to Boston, and day Coach, Chicago to Buffalo, and Buffalo to Boston.

The train leaves daily from Van Buren Street Station at the hour named above, and is the greatest favorite with business men and tourists, as by it not only are the cities on the B. & A. R. R. reached early in the afternoon, but the Atlantic Coast resorts are reached before dark.

RAILWAY FEEDER-WIRES

Experience has demonstrated the necessity for the
BEST INSULATION on Feeder Wires.

THE BEST IS NOT TOO GOOD.

SIMPLEX

IS THE BEST.

SEND FOR ESTIMATES TO

SIMPLEX ELECTRICAL CO.

620 Atlantic Ave., Boston, Mass.

GEORGE CUTTER, - Western Selling Agent, - THE ROOKERY, CHICAGO.