

# Street Railway Journal

VOL. XXIV.

NEW YORK, SATURDAY, NOVEMBER 19, 1904.

No. 21.

PUBLISHED EVERY SATURDAY BY THE  
McGRAW PUBLISHING COMPANY

**MAIN OFFICE:**

NEW YORK, ENGINEERING BUILDING, 114 LIBERTY STREET.

**BRANCH OFFICES:**

Chicago: Monadnock Block.

Philadelphia: 929 Chestnut Street.

Cleveland: Cuyahoga Building.

London: Hastings House, Norfolk Street, Strand.

Cable Address, "Stryjourn, New York"; "Stryjourn, London"—Lieber's Code used.

**ST. LOUIS HEADQUARTERS:**

Section 1, Electricity Building, Louisiana Purchase Exposition.

## TERMS OF SUBSCRIPTION

In the United States, Hawaii, Puerto Rico, Philippines, Cuba, Canada and Mexico.

Street Railway Journal (52 issues)..... \$3.00 per annum

Combination Rate, with Electric Railway Directory and

Buyer's Manual (3 issues—February, August and November) \$4.00 per annum

Both of the above, in connection with American Street Railway

Investments (The "Red Book"—Published annually in May;

regular price, \$5.00 per copy).....\$6.50 per annum

Single copies, Street Railway Journal, first issue of each month, 20 cents;

other issues, 10 cents.

*To All Countries Other Than Those Mentioned Above:*

Street Railway Journal (52 issues), postage prepaid..... \$6.00

25 shillings. 25 marks. 31 francs.

Single copies, first issue of each month, 40 cents; other issues, 15 cents.

Subscriptions payable in advance, by check or money order. Remittances

for foreign subscriptions may be made through our European office.

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Entered as second-class matter at the New York Post Office.

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Street railway news, and all information regarding changes of officers, new equipments, extensions, financial changes and new enterprises will be greatly appreciated for use in these columns.

All matter intended for publication must be received at our office not later than Tuesday morning of each week, in order to secure insertion in the current issue.

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STREET RAILWAY JOURNAL,  
114 Liberty Street, New York.

## Test of New York Central Electric Locomotive

On Nov. 12 the Electric Traction Commission of the New York Central Railroad Company and its guests witnessed the first public trial of the new electric locomotive designed for the New York Central service. The engineering public has been eagerly waiting for experimental data on this locomotive, and this interest in the tests is not confined to electrical engineers, but is fully shared by railway men in general. We are able to give our readers much more complete information of the details of the locomotive than hitherto published, together with reproductions of the locomotive and experimental track near Schenectady on a 6-mile section of the main line of the New York Central. From an historical standpoint, it is interesting to note that it was at practically this same place, or on the line between Albany and Schenectady, that the early steam locomotive trials were conducted by DeWitt Clinton some seventy years ago.

Considerable discussion has been raised in regard to the de-

sign of this locomotive, as is natural when so decided a departure is taken from previous lines of construction. The elimination of gearing and the bold step of mounting the armature directly upon the axle without an intermediate spring supported quill has caused comment, which has not all been favorable to the designing engineers. Whatever may be the effect upon the roadbed of this dead weight upon the axle, its presence is in no way noticeable when riding in the cab. The reduction in gear wear and in space occupied, and the increase in efficiency tend largely to offset any objection to the greater dead weight per axle imposed by the gearless over the geared motor. Compared with the steam locomotive, there is every reason to expect a great reduction in the wear and tear on the track, due to the following, among other reasons: (1) Less total weight on axle, due to four driving pairs instead of two; (2) uniform torque, hence a reduction of slipping effect; (3) absence of reciprocating parts, with their necessary counterbalances. The history of geared and gearless electric locomotives is given briefly in the accompanying article, and the differences between the present locomotive and those in the original Central London underground installation are pointed out, as are the reasons why the track pounding and vibrations noticed in London should not be expected in the present instances.

It is interesting to compare the results of the various preliminary tests made with the data given by Messrs. Arnold and Potter in their paper before the American Institute of Electrical Engineers at the June meeting in 1902. This paper discussed a set of tests made upon the "1400" type of steam locomotive especially designed for acceleration, or suburban work, and motor cars of approximately equivalent weight and capacity. Acceleration tests taken with this steam locomotive show that a train of 265 tons reached a speed of 30 miles per hour in fifty-five seconds. The "6000" type of electric locomotive in a recent test reached a speed of 30 miles in thirty-seven and one-half seconds with a train weighing 265 tons, both these weights including locomotives. The weights of trains were practically the same, and that upon the drivers approximately the same in each case, making the results comparable and entirely in favor of the electric locomotive.

It is well known that the steam locomotive is an inefficient piece of apparatus when running at variable speeds, but perhaps the superiority of the electric locomotive has not been so clearly brought out as is exhibited by the comparison of results of tests made on the "1400" type of steam locomotive and the present incomplete tests of electric locomotive of the 6000 type. The motor characteristics of the New York Central locomotive show the effect of the absence of gears and motor bearings, the efficiency reaching a maximum of 93 per cent, and being above 90 per cent at the free running speed of the locomotive. This is certainly a high efficiency, and if taken in connection with the simplicity and low cost of maintenance of the locomotive, constitutes a formidable obstacle to be overcome by the enthusiast of alternating-current motors for heavy train movements.

The operation of steam roads show that the three main items

affected by possible electrical operation—engine crews, fuel and locomotive maintenance—are each about 10 per cent of the total cost of operating the road. Should the New York Central Railroad Company have adopted the single-phase motor in its present stage of development, it would have required a geared motor, with attendant losses of from 3 per cent to 5 per cent, in addition to the greater losses of the single-phase motor itself as compared with the gearless d. c. motor. In place of 93 per cent maximum efficiency, the a. c. locomotive would probably have had a maximum of 87 per cent to 88 per cent, or from 5 per cent to 6 per cent greater loss than in the d. c. type of locomotive adopted. The extra losses obtaining in the a. c. locomotive would have largely offset the losses of the rotary converters required with the d. c. system, thus leaving the a. c. system of operation very nearly on a par with the d. c. system so far as energy consumption is concerned. The cost of maintaining an electric locomotive of the d. c. gearless type must also be considerably less than one of the a. c. type with its attendant gearing, more complicated and expensive winding and small air gap.

In so important a service as the New York Central terminal work, it would hardly be possible to operate sub-stations without attendants, even though they contained no moving machinery. The item of engine crew would, of course, be the same in each system, so that we fail to see how an a. c. system could have effected any economy over the d. c. system in operating the New York Central service as contemplated.

The first cost of a system if equipped with a. c. motors must have been somewhat less, as a high potential overhead trolley effects a considerable saving over the protected third rail, with possibly copper feeders. The saving in the cost of rotary converters would probably have been more than balanced by the increased cost of the locomotives, due to the gearing, and also the increased weight to make up for the pulsating torque delivered by the motors themselves. In fact, it is possible that, on account of the necessity for tremendous capacity within a limited space, an a. c. locomotive of the same capacity would have required six axles instead of four, as with the New York Central equipment.

The generating and high potential distributing system would have been the same in either case, leaving but a comparatively small saving in favor of the a. c. system. Against this saving must be balanced the possible cost of changing the tunnel to permit of sufficient clearance to use a high potential trolley.

Comparing the 550-hp gearless motors of the New York Central locomotive with the a. c. motors we have seen to date, we are impressed with the superior commutation of the d. c. machine, and while the a. c. motor has not reached the perfection of its design, we doubt whether it holds forth promise of giving the excellent results of its direct-current rival. The low commutator voltage for which a. c. motors must be designed is a serious handicap in the construction of larger sizes, and while motors of 50 hp and 100 hp of the a. c. type have shown themselves commercially operative, no promise has yet been given of equally good results in motors of 500 hp and over. Whether the large amount of experimental work and gray material now being expended in the development of the a. c. motor will produce a railway motor equal to its direct-current competitor is a question which the future will decide, but there can be no doubt that the success attending the tests of the gearless locomotive have given the d. c. system advantages over the a. c. system not hitherto en-

joyed by it when restricted to the limitations of geared motor design.

We look forward to future tests upon the New York Central locomotive with much interest, as it opens up a field of main line railroad work upon which we believe the electric locomotive is just entering.

### Interurbans as Coal Roads

Every few days one hears of projects to build interurban electric railways from some large city to neighboring coal fields, the idea of the promoter usually being to either compete with existing steam roads or open up new fields. To build interurban passenger roads through coal mining districts is one thing, but to build electric roads for hauling the coal which is the product of the district is quite another. Interurban electric roads through mining districts and connecting such districts with some large town are well known to be among the most profitable class of interurban roads, as miners usually are well paid, and plenty of their wages will go into interurban railroad fare if the opportunity is offered. But when it is proposed to build an electric interurban road for the express purpose of hauling coal, one is virtually proposing to attack one of the most difficult problems in electric railway economics that can be offered. If there is any one thing that the organization and equipment of a steam railroad is fitted to economically accomplish, and that the organization and equipment of an electric railroad is not fitted to economically accomplish, that thing is the hauling of large quantities of bulky freight like coal in long trains, but perhaps our promoter will say, we do not propose to haul coal in long trains. The minute, however, long train units are abandoned in favor of shorter ones, the expenses for train crews begin to creep up to a prohibitive figure. There are special cases, it is true, where electric traction can be used to advantage in the handling of coal. It is conceivable that if power is cheap and a combined freight and passenger service is to be given through a coal field, that it would pay to do all the passenger service and much of the switching by electric locomotives, leaving the heavier switching and longer trains to the steam locomotives. Such an arrangement as this may no doubt be profitably employed around many coal fields. A steam switching locomotive on light work is an expensive thing to maintain, both on account of the crew it requires and because of its maintenance, but for hauling heavy coal trains considerable distances and for the heavier switching, the investment required in electrical apparatus necessary to meet these large demands at infrequent intervals is sufficient to keep electric traction out of the game, for the present at least. We are speaking now only of general conditions and not of special cases. In general, it is the consensus of opinion of all engineers who have given the matter the most thought that the last field to be conquered by electric traction will be that of heavy freight service, and the hauling of coal from the coal fields to large cities certainly comes under this head, except in cases where coal fields are so near to the city that the bunching of coal cars into long trains involves more work than is justified by the economy to be gained in hauling.

### Concerning Rules

It goes without saying that a good set of rules is the foundation of all successful operation, and it is to be regretted that in starting new interurban roads or even in the operation of old roads so little attention is sometimes given to the framing of rules. There are many details of operation covered by rules or

by special bulletin that need very careful consideration, and we can hardly approve of the action of a manager of a new road who sits down for a few minutes with the rules of some other road, makes a few alterations such as occur to him on the spur of the moment, and publishes the result as rules for the government of conductors and motormen of the X. Y. Z. railway. The American Street Railway Association at its last convention recommended a set of rules for both city and interurban lines. These rules were not adopted simply to be ornamental; they were intended to be useful and were recommended to all street and interurban railway companies. It was not expected that these rules would be perfect or would conform to the ideas of all managers, and be suited to all local conditions. It was intended that they should be modified when necessary, but as far as possible they should be adopted in order that the advantages of uniformity of street and interurban railway rules over the entire country may be obtained. That such action was taken by the American Street Railway Association has been forgotten by many and overlooked by many others. We have called attention to it at least once during the past year, and take occasion to thus call attention to it again.

### Single or Double Tracks

One of the most important problems in the interurban railway field to-day is the question of single or double track. Unfortunately, the solution is often extremely difficult, on account of the uncertain factors which enter the case of each particular road. There is all the more reason, therefore, for careful consideration of the subject on the part of owners and managers. The importance of safe operation is coming more and more to be appreciated by electric railway officials throughout the country, and it is generally agreed that the double track affords a maximum of relief from the distressing collisions which have of late become frequent; provided that the discipline of the operating department is not relaxed when a road escapes from the bondage of a single-track line and its turn-outs.

If it were not for the added cost of double-tracking a line there would be little excuse for delaying the work on any existing system. Unfortunately, the public does not always realize the expense of building and maintaining a second track parallel to the first, and clamors for high-speed service with little appreciation of the risks involved. Even with the best equipment, high speed and the greatest safety are essentially antagonistic. If every one were willing to follow the example of the Asiatic prince who visited England three or four years ago and be content with the space-devouring maximum speed of 20 miles per hour, there would be little need of the unusual precautions now necessary to prevent accidents upon both steam and electric railways. It is manifestly unfair for a community to demand the highest speeds upon lines where the traffic is too small to allow the expenses of double-track service to be incurred. The argument is often advanced that the cost of double-tracking a line is small, on account of the right of way having been bought and cleared when the first track was laid, and that the construction of a second track means little more outlay than the cost of rails, ties and trolley suspension. This attitude fails to take account of the annual charges incurred by such construction, extending perhaps over a route 30 miles to 40 miles long, and does not appreciate the cost of roadbed and right of way, which is properly charged against the second track.

Serious consideration of the double-track problem takes account of the traffic and schedule as factors in determining the

solution. Safe operation is absolutely essential, and this can only be obtained through the strictest discipline and the most positive certainty of car movements. The speed of the cars practically determines the safe headway, which in turn defines the traffic which can be handled.

Considering a line 10 miles long, built to carry cars at maximum speeds of from 30 miles to 40 miles per hour through ordinary open country, it is probable that with a traffic requiring ten minutes service it will pay to add the second track. Such a short interval would scarcely be reached without a steady increase in business from year to year, and the difficulty of operating safely at high maximum speeds under close headway furnishes a strong argument in favor of extended facilities. Aside from the absolute value of human life, two or three bad collisions might easily result in damages capable of paying the entire cost of the second track, and a single serious collision would easily wipe out the annual charge of the new construction. It is impossible to estimate the increased earnings probable from the better and faster service enabled by the cutting out of turn-outs and delays in special work, the increased public confidence in the safety of the system, and the more frequent service possible with a doubled average distance between cars. The peculiarities of each road must be analyzed carefully by the officials familiar with its operating details before the question of double-tracking can be satisfactorily settled, but enough has been said to indicate a line of attack upon the problem and to hint that congratulations are in order when a road's business justifies such an extension of its physical features.

### Bracket Versus Span Wire Construction

At the present time bracket overhead construction for interurban roads seems to have the best of the situation, if numbers count for anything. The advocates of span wire construction for interurban roads, however, are not by any means extinct. They have some good arguments on their side. Two points usually given in favor of bracket construction are, first, its lower first cost, and second, its neater appearance. As far as the appearance goes, there is but little doubt but that a neat bracket construction is better looking than any span wire construction that can be put up. However, to the passenger who is riding on the car, the difference in appearance counts for but little. Sometimes where the right of way is alongside a highway, a bracket construction with poles on the side of the track away from the highway is much less obtrusive. The advocates of span wire construction, on the other hand, question the lower first cost of the bracket construction if it is equally good in both cases. They point to the fact that if high-tension lines are to be run and a substantial job is to be made, very much larger poles should be used for bracket construction than for span wire, because the high-tension lines must be so far above the other lines and the pole must take the weight of both high and low-tension feeders and the bracket. As is well known, large poles are more expensive in proportion to their load than small ones. Furthermore, a break in the trolley wire is likely to be more demoralizing to a bracket line than to a span-wire line, because of the twisting around of the brackets on the pole. Span wire advocates also point to the desirability of keeping the telephone lines off of the poles on which power wires are placed, and this is best done with span wire construction. As to flexibility, there is perhaps a little in favor of span wire, but modern flexible brackets give such a flexible support to the trolley wire that the flexibility is nearly as good as with span wire.

### HIGH-SPEED ELECTRIC LOCOMOTIVE FOR NEW YORK CENTRAL & HUDSON RIVER RAILROAD

The formal exhibition and trial of the first electric locomotive designed and built for the New York Central & Hudson River Railroad by the General Electric Company and American Locomotive Works, took place on a section of the tracks of the New York Central Railroad just west of Schenectady, N. Y., on Saturday, Nov. 12. The test was witnessed by the Electric Traction Commission of the New York Central Railroad Company and their guests, who went to Schenectady for that purpose by special train. The commission, as is well known, consists of William J. Wilgus, chairman; fifth vice-president of the New York Central & Hudson River Railroad Company; John F. Deems, general superintendent of motive power of the New York Central Railroad Company; Bion J. Arnold, Frank J. Sprague, George Gibbs and Edwin B. Katte,

Place, general attorney; H. Fernstrom, chief engineer; A. B. Corthell, terminal engineer; H. A. Stahl, office engineer; A. T. Hardin, engineer of maintenance of way; J. D. Keiley, assistant electrical engineer; C. F. Smith, assistant general superintendent; Ira A. McCormack, manager of Grand Central Station, and M. C. Roach, general Eastern passenger agent.

Others present were: C. A. Coffin, Gen. Eugene Griffin, E. W. Rice, Hinsdill Parsons, W. B. Potter, J. R. Lovejoy, Prof. Elihu Thomson and A. H. Armstrong, of the General Electric Company; J. A. Sague, W. Dalton, James McNaughton and F. J. Cole, of the American Locomotive Company, which built the truck and upper structure; George Westinghouse and James H. McGraw.

Trial trips were made in both the morning and afternoon, the latter being witnessed by a party of editors of technical and daily papers from New York, and included trips with trains of Pullman and ordinary coaches, and a race with the Fast



NEW YORK CENTRAL LOCOMOTIVE AND TRAIN

electrical engineer of the New York Central Railroad, secretary.

Accompanying the commission were the following steam and electric railroad officials from other companies: F. D. Underwood, president Erie Railroad; Samuel Rea, fourth vice-president Pennsylvania Railroad; Theodore Voorhees, first vice-president Philadelphia & Reading Railroad; W. H. Marshall, general manager Lake Shore & Michigan Southern Railroad; H. H. Vreeland, president New York City Railway; W. G. Besler, vice-president and general manager Central Railroad of New Jersey; J. M. Graham, fourth vice-president Erie Railroad; M. B. Cutter, general superintendent Lehigh Valley Railroad; E. G. Connette, general manager Syracuse Rapid Transit Company; A. G. Yates, president Buffalo, Rochester & Pittsburg Railroad; A. I. Culverm, second vice-president Delaware & Hudson Canal Company; A. B. Mitchell, superintendent of motive power Lehigh Valley Railroad; A. S. Vogt, mechanical engineer Pennsylvania Railroad; J. Ledlie Hees, president Fonda, Johnstown & Gloversville Railroad; S. Higgins, general manager New York, New Haven & Hartford Railroad; C. Loomis Allen, general manager Utica & Mohawk Valley Railway; E. S. Fassett, superintendent United Traction Company, of Albany, and John J. Stanley, of the Cleveland Electric Railway Company.

The New York Central Railroad was represented by the following, among others: E. V. W. Rossiter, first vice-president; E. Van Etten, second vice-president; W. C. Brown, third vice-president; George H. Daniels, general passenger agent; Ira A.

Mail which left Schenectady shortly after 12 o'clock, in which the electric locomotive forged ahead and would have left the steam train far behind if the motorman had not been obliged to stop at the end of the third-rail section. At this time the electric locomotive was hauling a train of four Pullmans, one buffet car and two private cars, having an aggregate weight of 383.5 tons. The weight of the locomotive is 95 tons, so that the total train weight was 478.5 tons.

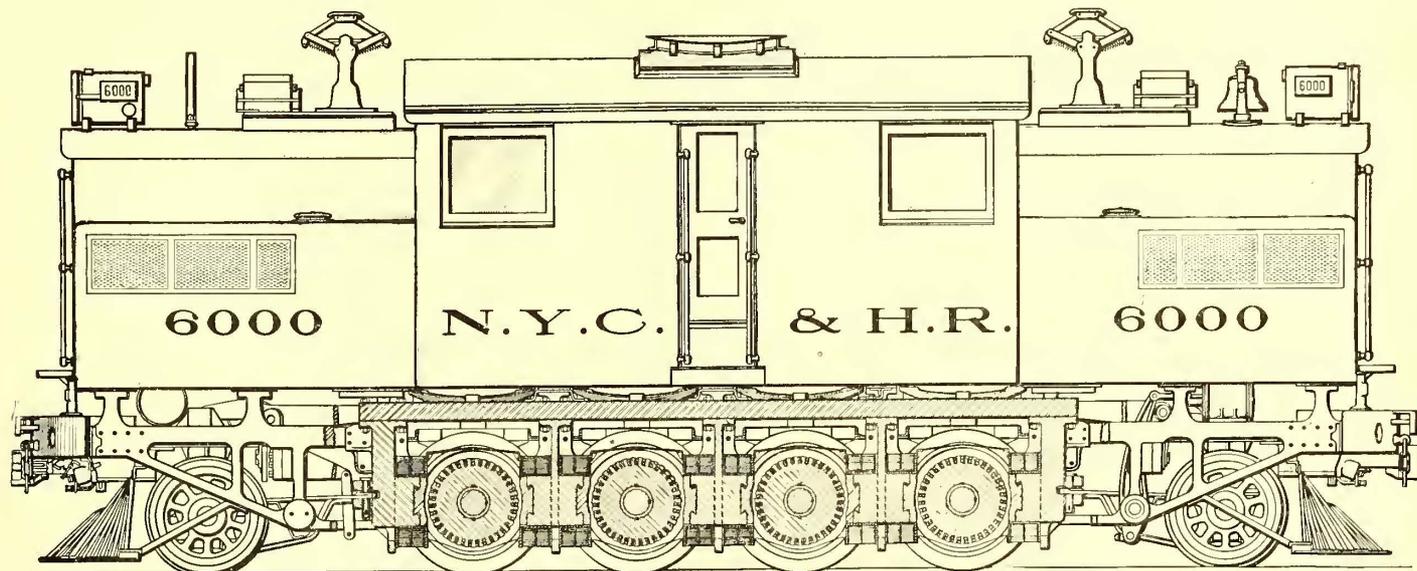
The locomotive possesses four driving axles, on each of which is mounted, without intermediate gearing, the armature of an electric motor having a normal rating of 550 hp. The total rated capacity of the locomotive is 2200 hp, although for short periods, a considerably greater power may be developed, making it more powerful than the largest steam locomotive in existence. It is equipped with the Sprague-General Electric multiple-unit system of control, so that if desired, two or more locomotives can be coupled together and operated from the leading cab as a single unit. A single electric locomotive will be able to maintain the schedule of from 60 to 65 m.p.h. with a 450-ton train, and two locomotives will be coupled together for heavier trains, some of which in the New York Central service reach 875 tons in weight.

Three special features of the locomotive, as shown in the longitudinal section herewith, will immediately attract attention. One is the fact that the motors are gearless, without spring suspended quills; the second is the shape of the pole pieces, and the third, the direction of magnetic flux.

In the original Baltimore & Ohio locomotives, described in

the STREET RAILWAY JOURNAL for July, 1895, gearless motors were used, but the armatures were mounted on quills and spring suspended from the driving wheels, and the motor frames were journaled around the armatures and were spring supported

somewhat less than is customary with steam locomotives. The chief wear on a steam railway track, however, comes from the impossibility of properly balancing the reciprocating motion of connecting and driving rods. This factor of wear

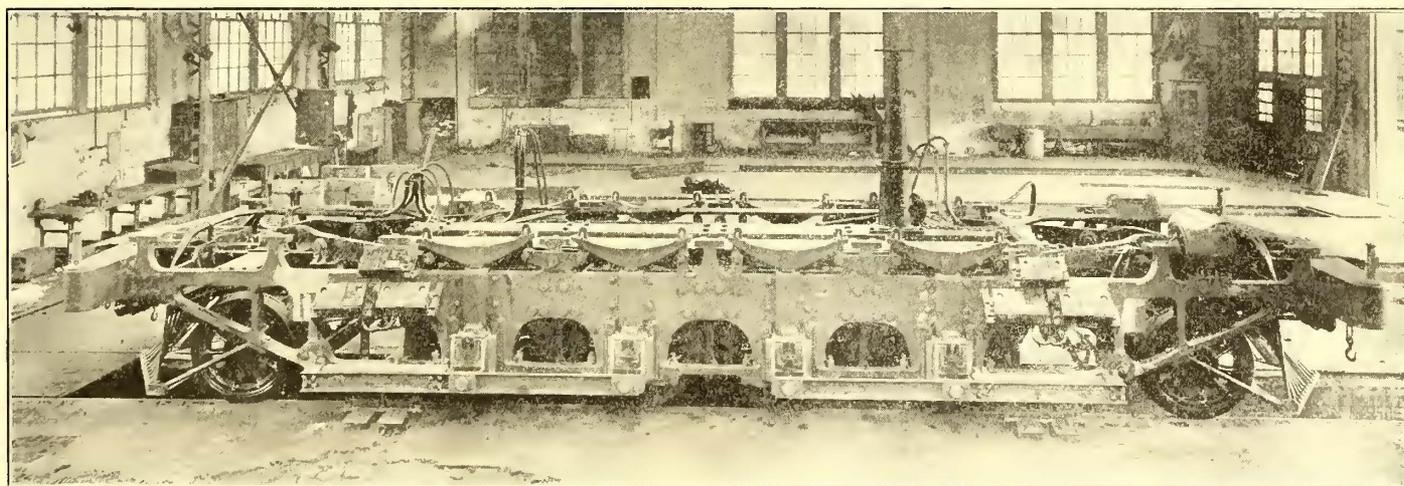


LONGITUDINAL SECTION OF LOCOMOTIVE

from the locomotive frames. In the later Baltimore & Ohio locomotives, described in the STREET RAILWAY JOURNAL for Aug. 22, 1903, geared motors are used. The quill method of construction was also employed in the gearless locomotives built for the Western Railway of France, and described in the issues of Nov. 15, 1902, and Feb. 28, 1903, while the Orleans Railway locomotives use geared motors. The only previous important example of gearless locomotives without quills is that of the original Central London underground locomotives, which were afterward abandoned in favor of motor cars. These locomotives were recognized to be very hard on the track, but in their construction, the entire motor was supported on the

will, of course, be entirely absent from the electric locomotive. It is thought, therefore, that the reduction in upkeep of the permanent way, due to the absence of pounding from the unbalanced reciprocating parts, and also from the intermittent torque, will be considerable. The extent of this saving it is impossible yet to determine accurately, but it was estimated by some of the steam railroad track engineers present at the test as from 20 per cent to 30 per cent.

The mounting of the armature directly on the driving axle of the locomotive necessarily called for an arrangement of pole pieces such that the armature should be free to move up and down between them with the riding of the frame on the springs.



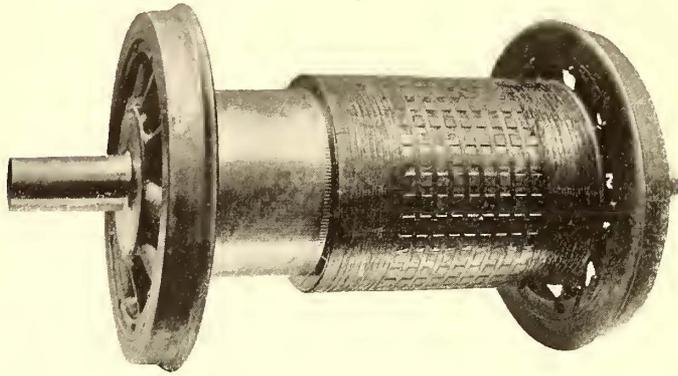
LOCOMOTIVE TRUCK

axle, instead of the armature only, as in the New York Central locomotive. Moreover, the track in the Central London installation was very light, and the vibrations were transmitted to and propagated in the surrounding soil of London clay in a way which would not be possible on a roadbed of the character of the New York Central.

The plan of mounting the armature only on the axle, adopted on the New York Central locomotive, involves a dead weight of each axle, including two 44-in. wheels and the armature, of only 11,000 lbs., an amount which is

This method was described in the previous article on this locomotive published in the STREET RAILWAY JOURNAL for June 4, 1904, but the longitudinal section published herewith gives a better idea of the plan followed than any illustration which was available at the time that article was printed. As will be seen, the pole pieces have nearly flat faces, being slightly concave. The distance from pole piece to pole piece in the center is  $30\frac{1}{2}$  ins., and at the tips is  $29\frac{1}{4}$  ins., so that as the armature is 29 ins. in diameter, the air gap, when the armature is in the center of the poles, is  $\frac{3}{4}$  in., and the clearance on each side

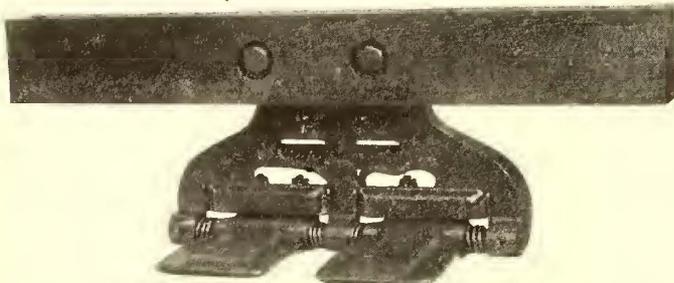
of the armature, when it is taken out for repairs, is  $\frac{1}{8}$  in. The armature is removed by lowering it, with its wheels and axles, from the truck, and this can be done and a new armature



ARMATURE AXLE AND WHEELS

can be replaced without disturbing the fields or any other part of the locomotive.

The magnetic flux is continuous from one end of the truck to the other; that is, the fields are arranged in tandem, and the flux passes through all poles and armatures in series, returning partly by the cast-steel side frames and partly by two bars placed between the frames, but not over the iron core of the armature. This design is entirely novel, and in order to take care of any inequalities of air gap and wheel diameters of the several elements, cross transoms are provided, which connect the side frames and act as equalizers for the individual motors. This makes each motor practically independent of the others, although in circuit with the main flux. The cross equalizing circuits are able to take care of from 40 per cent to 50 per cent of the main flux, but tests on the locomotive seem to indicate that a very small proportion of the main flux is carried in the equalizers. The end pole-pieces are cast as part of the end



THIRD-RAIL SHOE



FUSE BOX AND FUSE

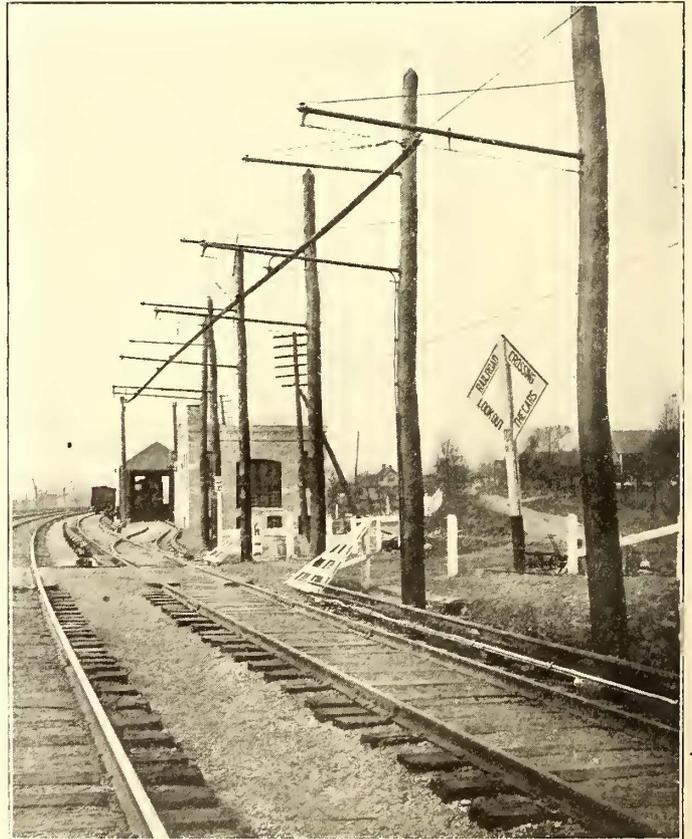
frames, while the double pole-pieces between the armatures are carried by the steel transoms already mentioned. The field coils are wound upon metal spools which are bolted upon the pole-pieces.

The arrangement of pole-pieces described makes the question of commutation a very interesting one. It is gratifying to

note that the designers have been very successful in this respect, in spite of considerable field distortion, a fixed point of commutation for either direction of rotation and the proximity of the field frame, which tends to increase the armature cross flux, with a consequent increased tendency to sparking. The armatures of the New York Central locomotive being bipolar, have a large number of cross ampere turns, but the absence of field frames increases the reluctance of the leakage circuit to such an extent that the actual flux passing through the neutral gap is small and does not interfere in any way with good commutation. In addition, the motor armatures are wound fractional pitch, thus reducing to some extent the armature reactance or cross magnetization due to the armature current. The result of these precautionary measures on the commutation is so good that a current of 1000 amps. at 650 volts does not in any way indicate its presence at the brushes, and the motors seem to be perfect in this respect. A further reason of the good commutation, necessitated by the design of the motors with its large air gap, is the very stable field, which bears a greater ratio to armature strength than is customary in standard railway motors. Good commutation appears to be a function of ratio of field to armature ampere turns and slot inductance, and that both of these factors have been very well taken care of in the design of the New York Central locomotive is evidenced by its sparkless running.

The brush holders are mounted on insulated supports, attached to the spring saddle over the axle journal, thus maintaining a fixed position of the brush holder in relation to the commutator. These brush holders are made adjustable so as to allow for wear of the commutator and journal bearings.

The motor is protected from mechanical injury from below



OVERHEAD CONDUCTOR AT CROSSING, NEW YORK CENTRAL TEST TRACK

by brass screens which extend from pole piece to pole piece, but which are not carried up at the side of the motor. This provides most effective ventilation, and at the same time all the mechanical protection which it is thought is required. Both fields and armature are thoroughly insulated, and this fact, with the large commutator and the consequent small difference of

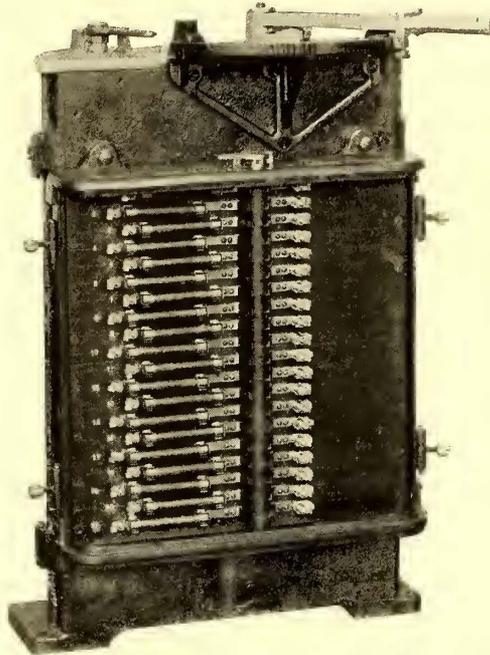
volts per bar, amply provides against trouble from dust and moisture.

Proper distribution and division of the weight of the locomotive among the axles has been accomplished by suspending the main frame and superstructure from a system of half elliptic springs and equalized levers of forged steel, the whole being so arranged as to cross-equalize the load and to furnish three points of support.

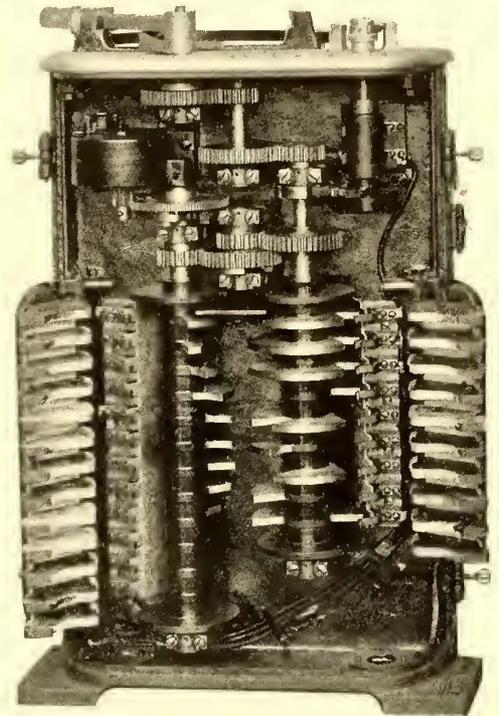
The pony trucks are of the radial type and are pivoted by means of radius bars to the end frame of the main truck. The frame of the locomotive immediately above the trucks is supported by means of suitable links, so that the truck is free to swing about its center, and is self-centering on a straight track. This design is similar to the standard construction adopted by the New York Central & Hudson River Railroad for its steam locomotives.

The superstructure consists of a central cab for the operator, containing master controllers, engineer's valves, and switches and valves required for operating sanding, whistling and bell ringing devices. This apparatus is furnished in duplicate, one set on each side of the cab, and is

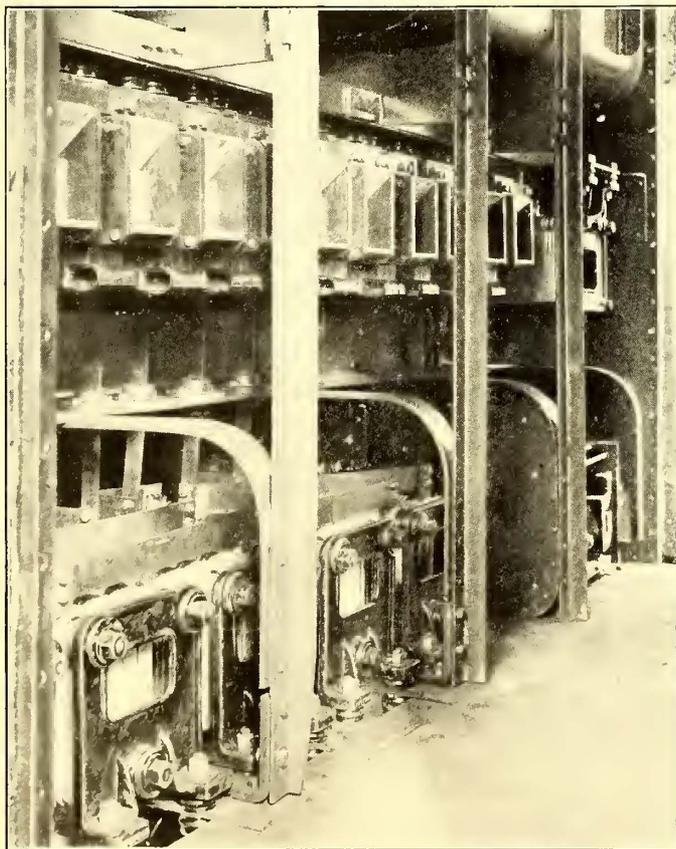
There is a central corridor extending through the cab so as to permit access from the locomotive to the cars behind, and the contactors, rheostats and reversers are arranged along the sides



MASTER CONTROLLER, BACK VIEW



MASTER CONTROLLER, FRONT VIEW

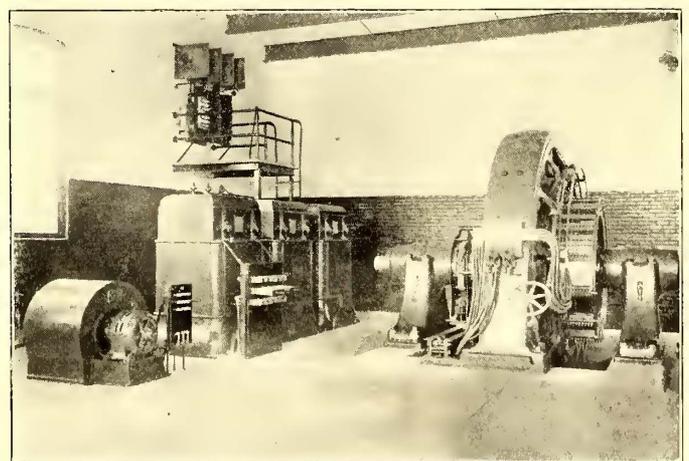


GROUP OF CONTACTORS AND RHEOSTATS ON LOCOMOTIVE

of these corridors in boxes of sheet steel, which are sheathed on the inside with fireproof insulating material. All of these appliances are therefore easily accessible for repairs or inspection, and at the same time well ventilated.

The total weight of the locomotive is 95 tons, of which 69 tons are carried on the four pairs of drivers. This is a very much larger percentage than in the steam locomotives of the company, the heaviest of which weigh, including tender, 150 tons, of which 47 tons are on the two pairs of drivers. In other words, there is over 25 per cent greater weight available for traction than on the largest locomotives in the New York Central service, with 37 per cent less dead weight and with 28 per cent less weight on each axle.

The control system permits three running connections, namely, four motors in series, two groups of two in parallel-series,



INTERIOR OF SUB-STATION OF TEST TRACK

arranged so as to be easily manipulated from the operator's seat, while at the same time a practically unobstructed view to front and rear may be obtained from the windows. The air gage, meters, etc., are located so as to be easily read by the driver.

and all four motors in parallel. The motor reverser, contactors, rheostats and other controlling appliances are all of the Sprague-General Electric multiple-unit type. The master controller, however, is fitted with a special operating lever about 24 ins. long and capable of being moved through an angle of

about 75 degs. A current limiting device is provided in the master controller, and consists of a friction clutch operated by an electric magnet, which is energized by the current passing through one of the motors, the arrangement being such that when the current exceeds a predetermined amount, the cylinder cannot be rotated further until the current has fallen suffi-

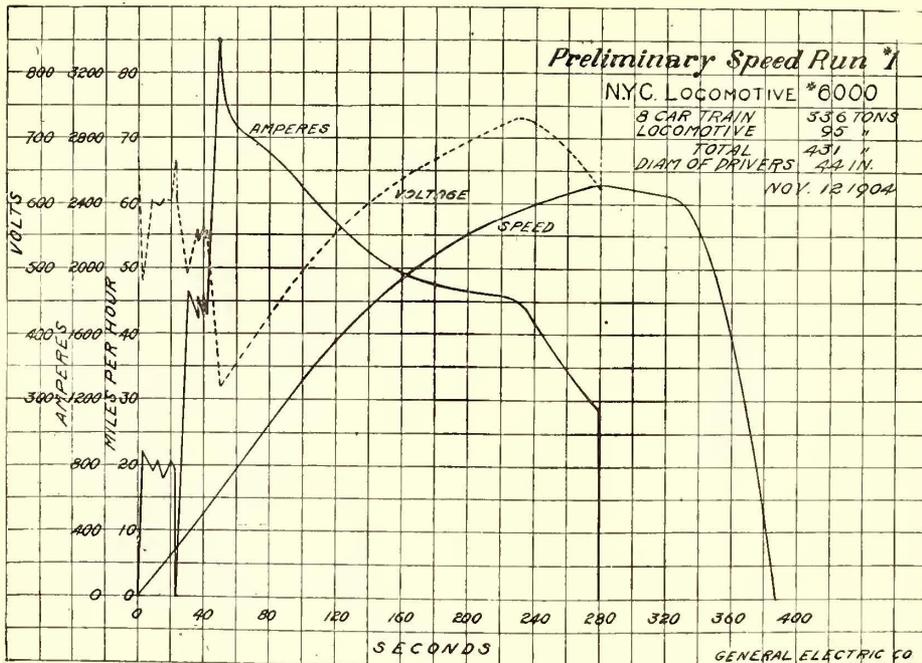
points. This device may be raised and lowered by air pressure controlled from the engineer's cab. A magnetic ribbon fuse is placed in circuit with each shoe and overhead contact device so as to secure protection in case of accidental short-circuit.

It is the intention of the New York Central & Hudson River Railroad Company and the General Electric Company to make

complete preliminary tests and trials on these locomotives under all conditions likely to obtain in service operation. For this purpose the New York Central & Hudson River Railroad Company has set aside a 6-mile stretch of track on its main line between Schenectady and Hoffmans, and equipped same with standard third-rail construction. The track is practically straight and ballasted so as to permit maximum speed of 70 to 80 m.p.h. being attained. It was on this test track that the experiments already mentioned were conducted.

Power for operating the locomotive is furnished by the General Electric Company, and for this purpose there has been installed in the new power house at the Schenectady plant a 2000-kw, three-phase, 25-cycle Curtis turbo-generator, delivering 11,000 volts to the line. A special high-tension transmission line has been constructed from the power station for a distance of 5

miles to the sub-station at Wyatts. This sub-station contains a 1500-kw, 650-volt, 25-cycle General Electric rotary converter, with necessary static transformers for reducing the line potential from 11,000 volts to 460 volts, and a switchboard consisting of a 600-volt d. c. rotary-converter panel, an a. c. starting panel and a high-tension panel with electrically operated type H oil switch. The rotary converter is self-starting from

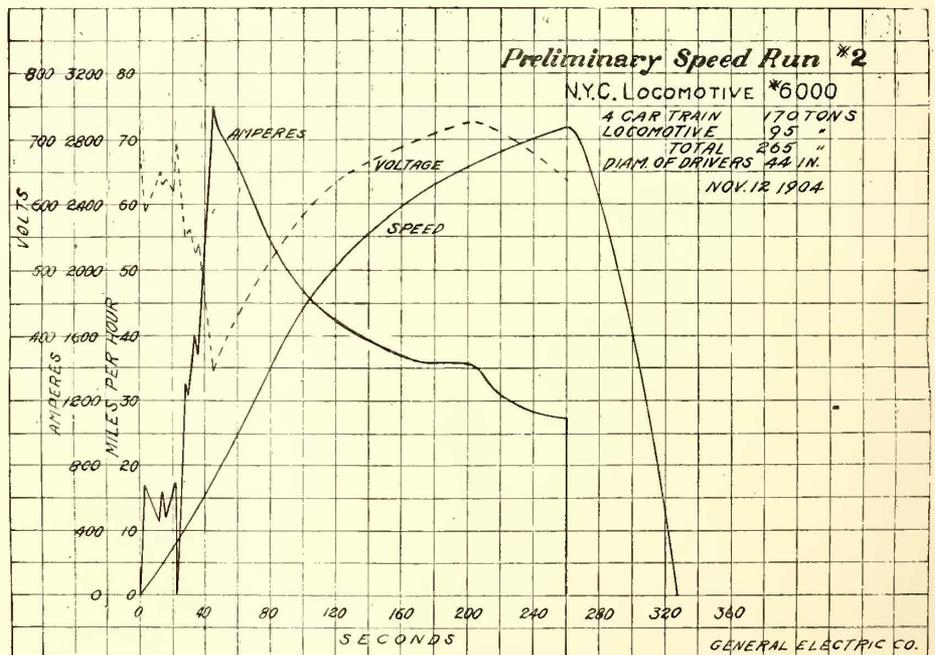


ciently to allow the relay to drop. As long as the current does not exceed the desired limit, the automatic feature is not in operation.

In the operator's cab there is placed a General Electric motor-driven air compressor having a capacity of 75 cu. ft. of free air per minute, and consisting of a twin vertical-cylinder compressor driven by two 600-volt direct-current series motors. The compressor is controlled by a governor which automatically cuts the motors in and out of circuit when the air pressure falls below 125 lbs. or rises above 135 lbs. A reduction in air pressure sufficient to actuate any governor, simultaneously starts up the air compressors in both locomotives when running double-headed, and likewise when the air pressure has been raised and any one air compressor is closed down, the other will be cut out of service.

It is expected that in the majority of instances sufficient heat will be retained in the trains, delivered to the electric locomotives at the end of the steam run, to carry the cars to the terminals without additional heat from the locomotive. However, in order to meet contingencies, it is probable that a flash boiler of the "automobile" type will be used, which will occupy a small amount of space in the operator's cab.

Current is collected from the third rail by multiple-contact spring-actuated third-rail shoes, whose supports are carried on channel irons attached to the journal box. There are four of these shoes on each side of the locomotive. In the yards at the terminal, the large number of switches and crossings necessitates an overhead construction in places, and additional contacts are therefore mounted on the top of the locomotive for collecting current when the locomotive is passing over these



the a. c. end, thus requiring no synchronizing or other complications when throwing machine into service. The step-down transformers are provided with taps giving one-third, two-third, and full voltage for starting the rotary converter, these voltages being applied successively by means of double-throw lever switches. The machine starts freely and easily without sparking and without drawing more than full load current from the line. The apparatus in the sub-station, the location and

arrangement of same, the width and dimensions are in general as proposed for the sub-stations to be built within the electric zone at the New York City terminal, so that practical experience with the plant may be obtained while the locomotive tests are being made and in advance of construction.

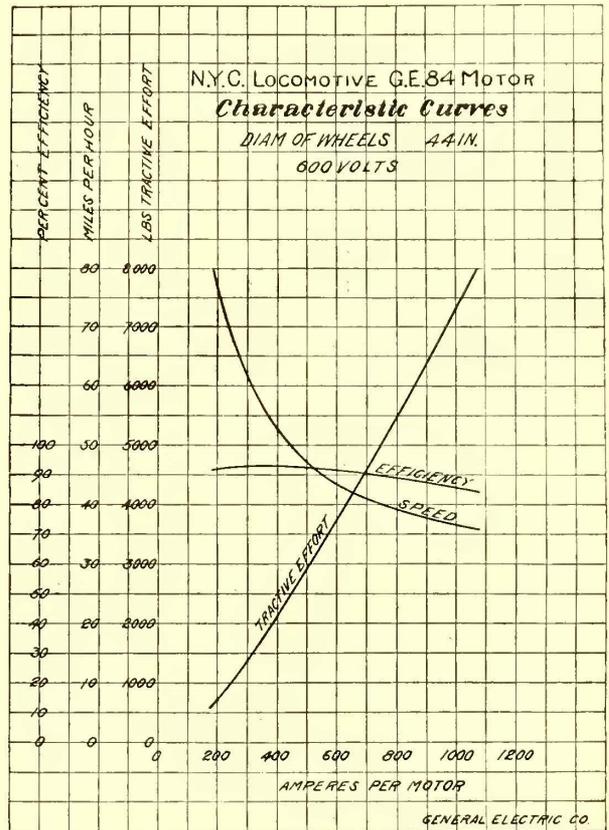
This power station, transmission line, sub-station equipment and 6 miles of track is undoubtedly the most complete testing plant ever provided for trial of electric railroad motive power, and with the facilities afforded in addition for testing the new locomotives, much interesting and valuable electric railroad information will unquestionably be obtained.

The general dimensions and data applying to the locomotive are as follows:

|                                     |               |
|-------------------------------------|---------------|
| Number of driving wheels.....       | 8             |
| Number of pony trucks.....          | 2             |
| Total weight of locomotive.....     | .95 tons      |
| Weight on drivers.....              | .69 tons      |
| Rigid wheel base.....               | 13 ft.        |
| Total wheel base.....               | 27 ft.        |
| Length over buffer platforms.....   | 37 ft.        |
| Extreme width.....                  | 10 ft.        |
| Height to top of cab.....           | 14 ft. 4 in.  |
| Diameter of drivers.....            | .44 ins.      |
| Diameter of pony truck wheels.....  | .36 ins.      |
| Diameter of driving axles.....      | .8 ft. 5 ins. |
| Normal rated hp of locomotive.....  | 2200          |
| Maximum hp.....                     | 3000          |
| Normal draw-bar pull.....           | 20,400 lbs.   |
| Maximum starting draw-bar pull..... | 32,000 lbs.   |
| Speed with 500-ton train.....       | 60 m. p. h.   |
| Voltage of current supply.....      | .600          |
| Normal full load current.....       | 3050 amps.    |
| Maximum full load current.....      | 4300 amps.    |
| Number of motors.....               | 4             |
| Type of motor.....                  | GE-84-A       |
| Rating of each motor.....           | 550 hp        |

Owing to the fact that only a portion of the track to be used for testing is available as yet, no complete locomotive tests have been made. There has been installed in the cab a full set of recording instruments, and records have been obtained of

of the locomotive running in regular service. Curve sheets are here shown, giving speed, current input and voltage at the locomotive, all on a time basis, with an eight-car train weighing



336 tons, and a four-car train weighing 170 tons, both exclusive of locomotive. The total weight of train, including locomotive and passengers, was 431 tons and 265 tons for the eight-car and four-car trains respectively.

Two sets of curves are shown with running tests reaching as high a maximum speed as possible with the length of track available, and two sets of starting tests showing the more rapid rate of acceleration possible with the higher maintained voltage available near the sub-station. The maximum speeds reached were 63 m.p.h. with an eight-car train, and 72 m.p.h. with a four-car train. It will be noted that the trains were still accelerating at these speeds, but the length of track so far equipped did not permit of attaining higher speeds.

The New York Central locomotives are not designed for abnormally high speeds at intervals, but rather to obtain a high average schedule, due to their ability to accelerate more rapidly than is possible with the present steam locomotives.

In the starting tests a speed of 30 m.p.h. was reached in sixty seconds with an eight-car train weighing, including the locomotive, 431 tons, corresponding to an acceleration of 1/2

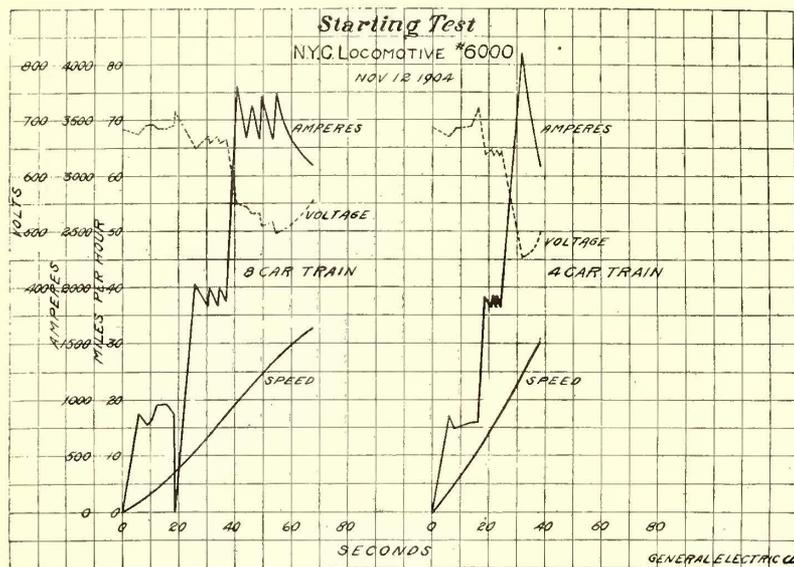
m.p.h per second. During certain periods of the acceleration, the increase in speed amounted to .6 m.p.h. per second, calling for a tractive effort of approximately 27,000 lbs. developed at the rim of the locomotive drivers. This value was somewhat exceeded with the four-car train, where a momentary input of



ONE OF THE NEW ELECTRIC LOCOMOTIVES FOR THE NEW YORK CENTRAL & HUDSON RIVER RAILROAD

some of the preliminary runs made to test the bearings and running qualities of the locomotive. Although these records will be superseded by careful tests made on the full length of track, bonded and with sufficient feeders supplied to minimize the drop, they indicate in a general way what may be expected

4200 amps. developed a tractive effort of 31,000 lbs. at the drivers, with a coefficient of traction of 22.5 per cent of weight on drivers. The average rate of acceleration with the four-car train weighing, including the locomotive, 265 tons, was 30 miles in thirty-seven and one-half seconds, or .8 m.p.h. per second, calling for an average tractive effort of 22,000 lbs.



The maximum input recorded, 4200 amps. at 460 volts, or 1935 kw, gives an output of the motors of 2200 hp available at the wheel. With 4200 amps. and a maintained potential of 600 volts, there would have been an input to the locomotive of 2520 kw, corresponding to 2870-hp output of the motors. This output is secured without in any way exceeding the safe commutation limit of the motors and with a coefficient of traction of only 22.5 per cent of the weight upon the drivers, thus placing this electric locomotive in advance of any steam locomotive yet built. No service capacity temperature runs have been made as yet, and the preliminary tests have not shown any appreciable warming up of the motors sufficiently to take thermometer readings.

Throughout both the starting and running tests the electric locomotive shows its remarkable steadiness in running, a distinct contrast in this respect to the steam locomotive, especially should the latter be forced to perform the work here shown to be accomplished by the electric locomotive.

The elimination of gear and bearing losses permits of a very high efficiency of the locomotive. Reference to the motor characteristics shows a maximum efficiency of approximately 93 per cent, this value being fully 4 per cent better than possible with motors of the geared type. This gain is especially noticeable at the high speeds, the efficiency curve remaining above 90 per cent even at the free running speed of the locomotive alone, in contrast to the 85 per cent or less, which would be a good showing for a locomotive provided with geared motors. The simple construction and high efficiency made possible with this design of gearless motor, together with the minimum cost of repairs attending such a construction, makes the direct-current gearless motor type of locomotive a distinct forward step in electric locomotive construction.

The Western Ohio Railway Company is planning to take its conductors and ticket agents on an excursion over a number of electric lines in the vicinity of Lima. The trip will be made for the purpose of teaching them the shortest routes between points and the running time on other roads, so that agents and conductors can give correct information to those who desire to travel to distant points on electric roads.

**ELECTRIFYING THE NEW WILLIAMSBURG BRIDGE**

J. G. White & Company, of New York, have just completed the electrical equipment of the double tracks which are to be operated by the Brooklyn Rapid Transit Company, paralleling the south roadway on the new Williamsburg Bridge. This contract was undertaken by J. G. White & Company through Naughton & Company, who had the contract for the track and overhead work. The track work by Naughton & Company is an excellent piece of work, of standard construction throughout.

The overhead construction, including troughing, special terminal work, bracket construction, plaza work, overhead feeders and track return feeders, is of unusually heavy special construction. The Manhattan overhead construction is of special steel lattice girders, supported on the steel poles, and also by attachment to the bridge structure proper. This superstructure is about 300 ft. long, and covers the five cross-overs at the Manhattan terminal. It is of hardwood oak troughing, to which are attached special bar-iron fittings on which trolley wheel operates. The contact bar, as shown in Fig. 1, is 3/8 in. x 2 1/2 ins., supported at frequent points by specially insulated hangers. The frogs and crossings were built of sheet steel. This special construction is necessary on account of the very large currents required for the handling of the immense number of cars switching at the terminals. The details of this special overhead troughing are shown in the engraving.

Along both approaches to the bridge proper are erected

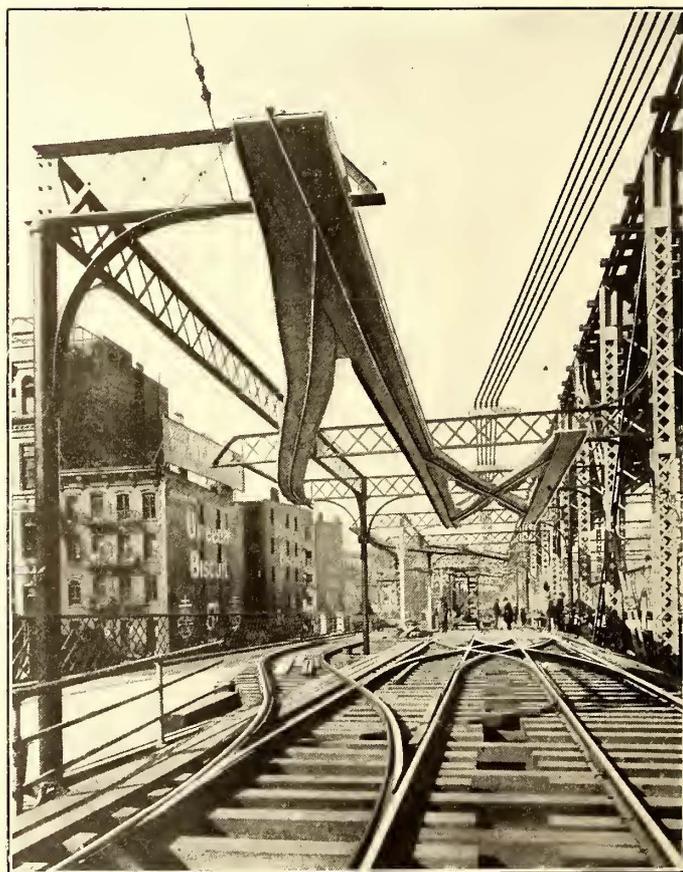


FIG. 1.—OVERHEAD CONSTRUCTION AT MANHATTAN TERMINAL, SHOWING OVERHEAD CONTACT BARS AND SHEET-STEEL TROUGHS.

heavy brackets extending over the double track. These brackets are fastened by special fittings to the structural work of the bridge and are provided with two heavy guy rods, with turnbuckles. The two trolley wires are supported by a span

wire along under the bracket. These brackets consist of 2½-in. extra strong pipe 18 ft. in length, and their general appearance is shown in Fig. 2.

There is about 10,000 lineal ft. of single troughing con-

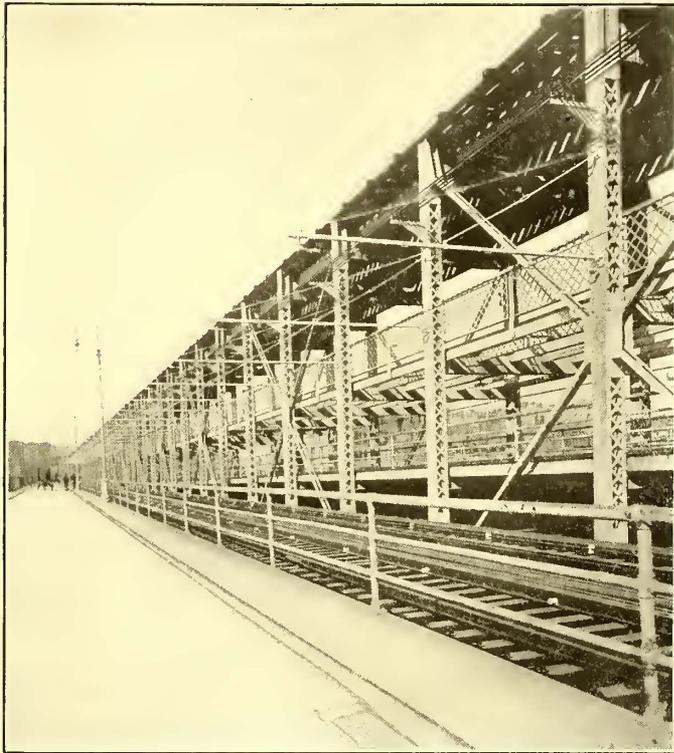


FIG. 2.—DOUBLE-TRACK SIDE BRACKETS

structed of specially selected oak and fitted with expansion joints at intervals. It is supported every 20 ft. on transverse girders by cleats, and at intermediate points by special hangers

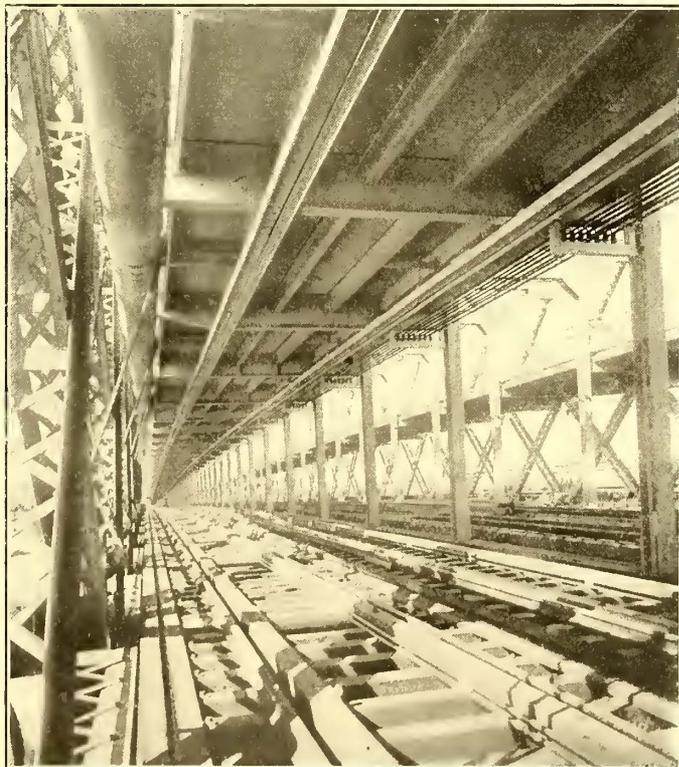


FIG. 3.—TROUGHING OVER TRACKS ON BRIDGE

attached to cross beams fastened to the longitudinal girders. The trolley wire is of No. 000 phono-electric type, supported every 15 ft. by specially designed insulating hangers. The troughing, as arranged over each track, is shown in Fig. 3.

At the two anchorages specially designed expansion joints are provided for each trolley wire, in order to allow for the expansion and contraction amounting to approximately 14 ins. at each joint. This trolley expansion joint operates very satisfactorily and causes no sparking of the trolley wheel and requires no insulated section. This joint is about 8 ft. in length,

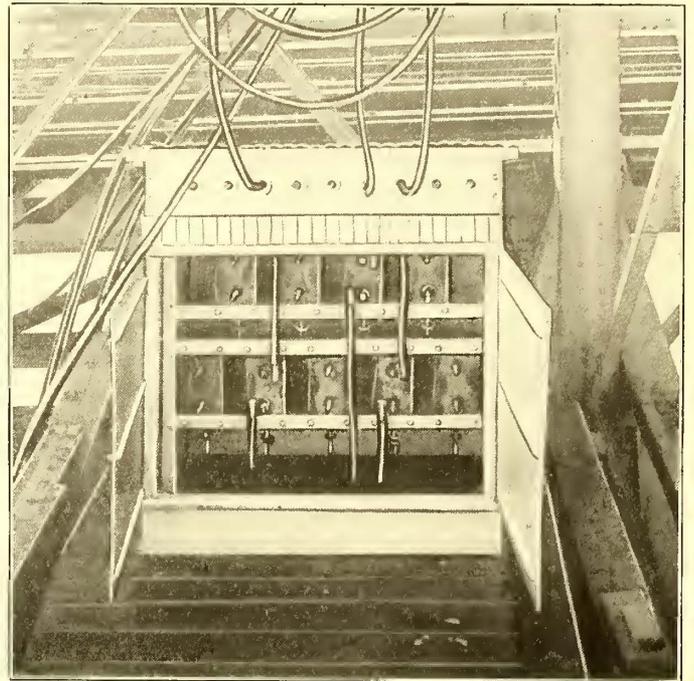


FIG. 5.—SWITCH HOUSE FOR CABLE CONSTRUCTION

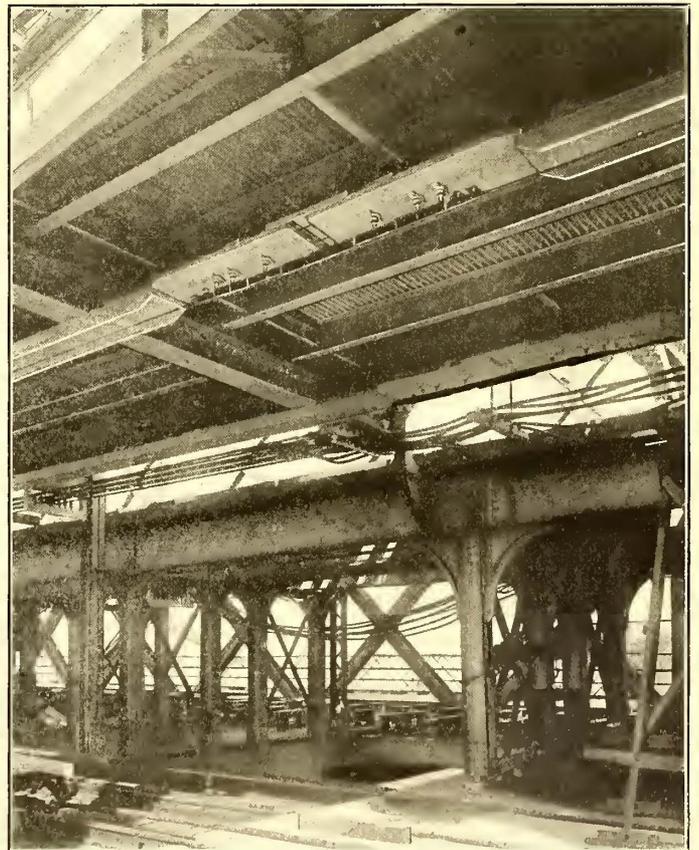


FIG. 4.—EXPANSION JOINT FOR TROLLEY CONDUCTOR

and is suspended by special hangers to the troughing, which also is designed for similar expansion. This expansion joint is shown in Fig. 4.

There are altogether 15 miles of 782,000 circ. mil stranded

weather-proof aluminum feeder cables erected. Of this number about 8 miles are overhead for the positive feeders and 7 miles are along the tracks for negative returns. The positive feeders are erected on special eight-pin malleable iron cross arms attached to the bridge structural work over the brackets on the approaches, and the cables are supported on malleable iron pins with heavy feeder insulators. Along the bridge be-



FIG. 6.—OVERHEAD CONSTRUCTION ON BROOKLYN PLAZA

tween the towers where troughing was required for the trolley wire, the feeders are supported by heavy oak cross arms attached to the bridge structural work by wrought-iron clamps. The negative feeders were erected on heavy porcelain insulators attached by lag bolts to the inside of the 6-in. x 6-in. guard timbers, there being eight track return feeders, two on each guard timber. On the Brooklyn approach near the bridge tower was erected a special steel frame switch house covered with corrugated iron, from which point extends the overhead and track return feeders. This switch house, with cable connections, is shown in an unfinished condition in Fig. 5.

On the Brooklyn plaza heavy steel poles were erected for the

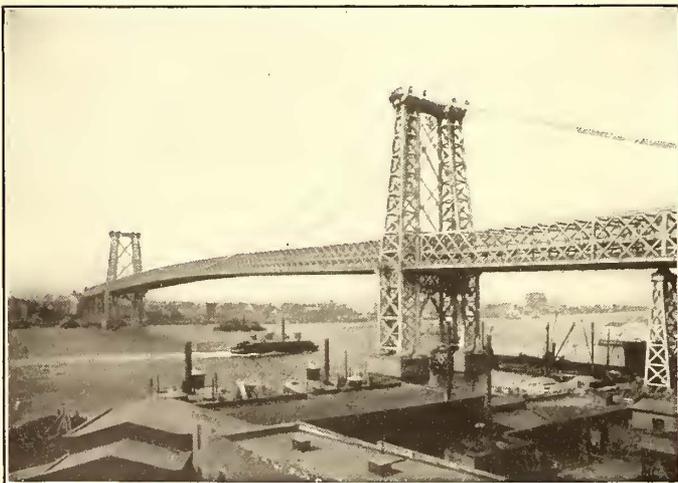


FIG. 7.—THE EAST RIVER BRIDGE, SEEN FROM BROADWAY, BROOKLYN

support of the overhead work. This work was done in accordance with the Brooklyn Rapid Transit specifications, necessitating special patterns, pull-offs, frogs, etc. This work was constructed for the Department of Bridges, City of New York, under direction of Kingsley L. Martin, engineer in charge of Williamsburg Bridge, and reflects great credit upon the sub-contractors.

## TRACTION LINES AS CITY BUILDERS

At the October meeting of the Commercial Club of Dayton, Ohio, Edward C. Spring, general superintendent of the Dayton, Covington & Piqua Traction Company, presented a paper on the subject, "Traction Railroads as City Builders." Mr. Spring outlined the importance of Dayton as a traction center, and stated that it has more electric roads than any city of its size in the country. He said that for the year ending Sept. 30 the various interurban roads entering Dayton handled an average of 205,000 passengers per month, or 2,463,000 passengers for the year. Less than one-third of this number of passengers represented citizens of Dayton, while more than two-thirds represented people who had come into the city from outlying districts, giving the city practically a population of 175,000 people. The interurban lines operating into the city over the local lines paid to the city companies last year \$45,513 as their share of the passenger and freight business in and out of the city. Two of the largest companies enter on their own tracks, and so paid nothing to the local companies. Mr. Spring described the growing importance of the Dayton interurbans as carriers of freight and express, and dwelt at length upon the importance of this business to the city merchants as well as to the people in the country districts. Mr. Spring's ideas on these subjects have already been brought to the attention of STREET RAILWAY JOURNAL readers in his article describing the Dayton, Covington & Piqua Traction Company's system, which appeared in the issue of Sept. 17, 1904, and through his interesting article on methods of handling freight, which was published in the last Souvenir number.

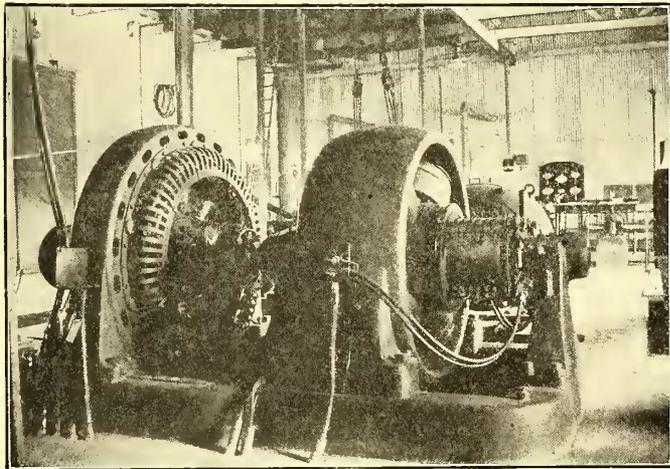
Mr. Spring expressed regret that the various interurbans had been unable thus far to get together on the matter of a union freight and passenger station, and explained that the various managers were a unit in their desire to secure such a station, but that all the plans brought forward involved excessive expense and the liability of litigation. As a remedy for the difficulty, he suggested that the right be given the interurbans to place three tracks on Fourth Street between Ludlow and Jefferson Streets, affording a loop for every line entering the city, which would relieve the congestion at Third and Main Streets. He thinks the city ought to make an appropriation and construct a steel roof over the street at a point where a station could be located, also that a union freight station ought to be located in a part of the city where it would not interfere with the passenger traffic.

Mr. Spring described some of the latest developments for the improvement of passenger service, including the sale of through tickets to distant points over other roads, the sale of interchangeable transportation good on many Ohio roads, the through checking of baggage, the parlor car and buffet service, etc., intimating that the Dayton roads are further in advance in these advantages than those of any other district. He said that the Dayton managers are ever willing to co-operate with the city in everything tending to the advancement of the city's interests so long as the judicious and consistent operation of the railway properties is not interfered with. He said that the recent effort on the part of some of the merchants in inaugurating a system of cheap excursions over the various roads had called forth some unjust criticism as to the manner in which the various managers had viewed the proposition, and that it was not a fair proposition for the city merchants to expect the traction lines to bring people into the city every week for the mere operating cost of the business, thereby injuring the regular traffic. He expressed the opinion that the business would surely come into the city if it was judiciously sought after, and reminded the merchants that their present prosperity is due to the regular traffic brought into the city by the interurbans.

Mr. Spring's paper met with the approval of the Commercial Club. It was discussed heartily at the meeting by a number of prominent business men.

## MONTEREY COUNTY GAS & ELECTRIC COMPANY PURCHASES ADDITIONAL EQUIPMENT

The Monterey County Gas & Electric Company, of Monterey, Cal., has purchased the electrical machinery which constituted the exhibit of Kilbourne & Clark Company, the Pacific Coast agents of the National Electric Company, at the eighth annual convention of the Pacific Coast Electric Transmission Association, held in Monterey in June last. The installation consists of a National 200-kw generator and motor-generator set, consisting of a synchronous revolving field motor rated at 162 kw, which drives by direct coupling a 550-volt d. c. railway generator with a rating of 150 kw. The 200-kw a. c. generator is of the belted type, with two bearings, pulley, slide rails and belt tightening device, complete in every respect. It is of remarkably substantial construction, and follows very closely the structural design that has become well established in American types of revolving field generators. Its erected weight is 12,850 lbs., and its inherent regulation is well within 6 per cent at unity power factor. It is run at 600 r. p. m., and consequently to deliver a current at 60 cycles is provided with 12 poles on



MOTOR-GENERATOR SET

its revolving field. The usual temperature guarantee, namely, that with an atmosphere temperature of 25 degs. C., the temperature of the machine will not rise above 35 degs. under a continuous twenty-four-hour run at full normal load, proved considerably better as the actual rise under these load conditions was but 22 degs. above the temperature of the surrounding air. In fact, it has been found to stand a remarkably heavy overload without serious heating, and in regular service it has often been called upon to operate for considerable periods of time at an overload of over 50 per cent. The efficiencies of the generator are given as follows: Ninety-three per cent at 25 per cent overload; 92.5 per cent at full load; 91.25 per cent at three-quarter load, and 88 per cent at half load.

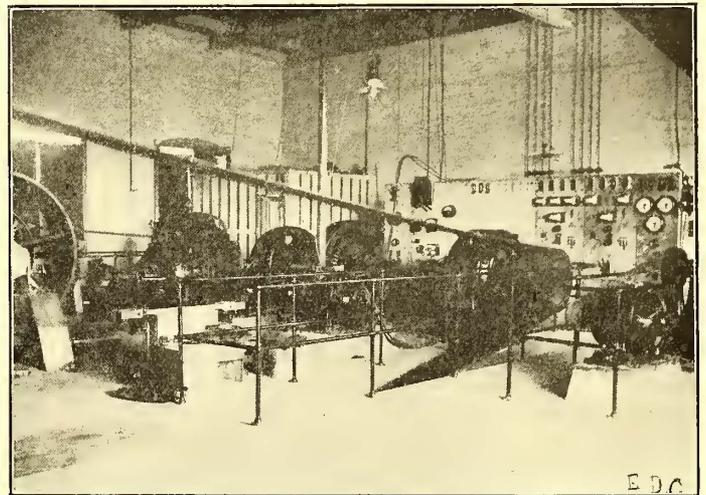
The exciter runs at 1450 r. p. m., is normally rated at 12 kw, at 110 volts, and is belt driven from a pulley placed on the end of the generator shaft. It, too, is remarkably cool in its operation, and there are no evidences of sparking or flashing at the commutator, even under conditions of extreme overload.

The motor-generator set runs at 720 r. p. m., and in operation it has been found that the temperature of the synchronous motor does not exceed 25 degs. C. above the temperature of the surrounding air, and the direct-current generator does not exceed a rise of 25 degs. C. in any part, when both machines are working under full load conditions. An interesting feature in connection with the motor-generator set is that a 22-in. pulley with a 16-in. face has been placed on the shaft between the motor and generator, and that this pulley is belted to the fly-wheel of a 200-hp high-speed Buckeye engine. This gives absolute flexibility to the plant, because during the hours of light

load both the units of the motor-generator set may be run as generators, and in that the motor-generator set affords the link by means of which the railway load may be coupled in with the two-phase load, or vice versa. Obviously, this enables a day alternating-current service to be maintained in conjunction with the railway load, at minimum efficiency in operation; and, though the installation of the motor-generator set may appear anomalous in view of the fact that the current for its operation is taken from generators located within the same premises, it is in reality the rational solution of the problems presented by the local conditions.

## TRAFFIC CONGESTION PROBLEMS IN NEW YORK

The necessity of providing relief from the traffic congestion at different points in New York is emphasized by a paper presented some time ago by Wisner Martin before the Municipal Engineers of the City of New York, and just reprinted in the proceedings of that body. Three points are selected by the author for remedial measures, viz.: Fifth Avenue and Forty-



INTERIOR OF POWER STATION

Second Street; Broadway, Sixth Avenue and Thirty-Fourth Street, and Columbus Circle.

At the first intersection, an overhead crossing for Fifth Avenue is suggested. This could be accomplished by lowering the surface of Forty-Second Street 14 ft. and raising that of Fifth Avenue 2.8 ft. The proposed bridge for Fifth Avenue is to be of steel, built so as to harmonize with the new Public Library, and provided with an asphalt roadway. The estimated cost of the work complete is \$330,000, which includes a retaining wall on Forty-Second Street around the Library grounds, and which will have to be built whether the present project is authorized or not.

At the intersection of Broadway, Sixth Avenue and Thirty-Fourth Street, a subway is proposed, at a cost of \$200,000, which would provide a tunnel for the Broadway cars from Thirty-Second Street to Thirty-Fifth Street. The Columbus Circle improvement is the proposed rearrangement of the tracks and the building of eight transfer platforms, which would also provide isles of safety between the sidewalk and the outside of the circle.

The Indianapolis & Northwestern Traction Company has made a contract for what probably is the largest shipment of freight ever handled by an electric railway in Indiana. The shipment is to consist of forty car loads of seeds and plants to be transported from Lebanon, Boone County, to Cumberland, Marion County. It is said that the shipment will exceed 8000 tons.

CONVERTING SUMMER TO WINTER CARS IN CLEVELAND

The Cleveland Electric Railway Company, of Cleveland, recently spent some time experimenting with schemes for converting its summer cars into cars that would be available for either summer or winter use. The experimental cars proved

as a closed car. Each of the shorter seats was fitted with an arm rest, which takes the place of the coupling used when the longer sections of the benches are put back into their original place for summer use. The arrangement of the interior of the car for winter use is shown in Fig. 2. The left side of the car before being altered is shown in Fig. 3, while the left side of the car after alteration, and with windows in place, is shown in Fig. 4.

It will be seen that the guard rail is removed, the protecting screen is cut in two and a single built up panel is inserted. This panel contains the sill for the window, and one side of each



FIG. 1.—OPEN CAR STRIPPED AND READY FOR CHANGES

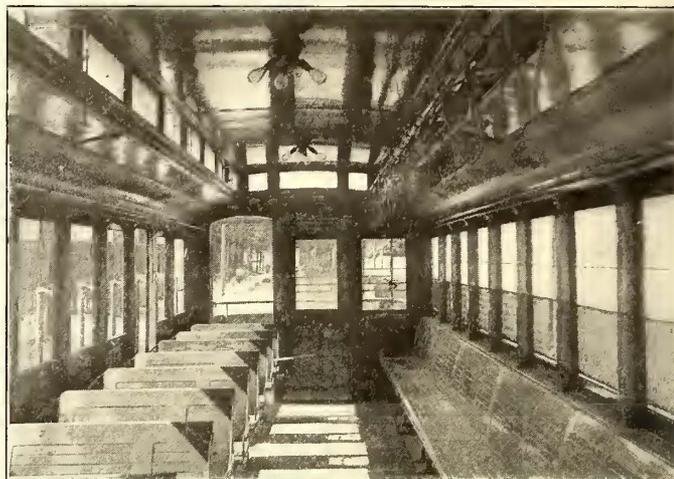


FIG. 2.—INTERIOR SHOWING SEATING ARRANGEMENT WHEN USED AS A CLOSED CAR

so satisfactory that the company is now altering all of its double-truck open cars. If the plan proves as satisfactory as the indications now point out, it will be unnecessary for the company to increase its supply of closed cars for a long time to come. At the same time the efficiency of the cars for summer use has not been injured.

The Cleveland open cars are nearly all of one standard type, having fourteen benches, including the one at the rear, and having closed bulkheads front and rear. The work of alteration was facilitated greatly through the fact that the loop system of operation is used and the cars run only one way. For this reason the left hand side of the car has always used a closed panel, as shown in Fig. 3, so that the alteration was confined largely to one side only.

In making the alteration, the cars were first stripped of the seats, and the front and rear bulkheads were cut out, as shown in Fig. 1. The trimmings and molding were removed, and the wiring for the push buttons, which were formerly in the rear of the seats, was placed in a molding above the inside windows, the buttons being placed in the inside posts. The seats were then cut into two parts, and each section was mounted on cast-iron legs. Only eleven of the fourteen benches were treated in this manner. The other three were mounted on legs, forming the extreme end seats in the body of the car and the seat on the rear platform when the car is used as a summer car, these being removed for winter use. Seven of the longer sections were fitted together with metallic end plates which lapped over at the back, and were secured with a bolt and nut, thus forming one longitudinal bench, seating twenty-three passengers. The shorter sections were placed in their original positions, there being eleven of these, each holding two persons, giving the car a total seating capacity of forty-three when used

post is cut away 1/2 in. to permit the insertion of the window sash. During summer, of course, no sash are used.

The ends were also rebuilt, and one of the posts was set over 6 ins. to allow for the door frame, and a sliding door was inserted. A partition with a sliding door was built into the front platform, forming a motorman's cab, and to allow for this it was necessary to set over the controller and brake. A view of the front platform with front door and partition is shown in Fig. 5. To increase the length of the rear platform the dash

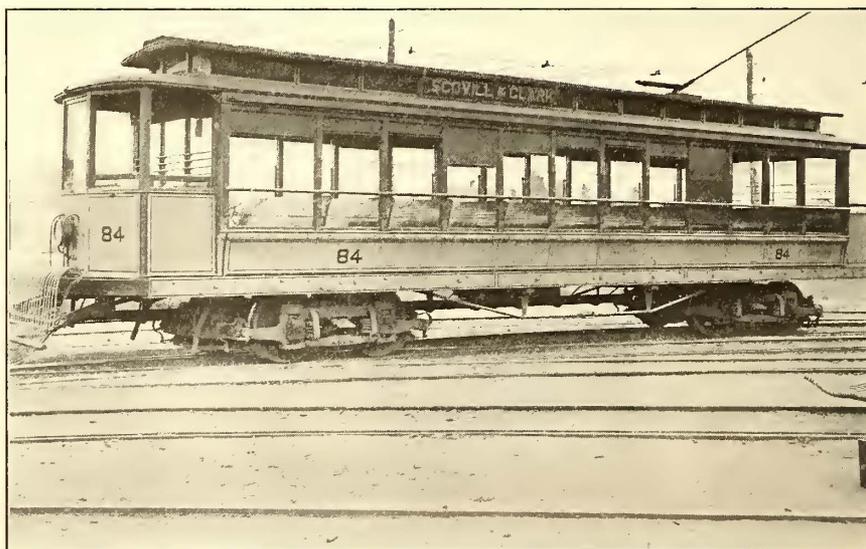


FIG. 3.—LEFT SIDE OF OPEN CAR BEFORE CHANGES ARE MADE

was extended to the end of the bumper and a 12-in. section was spliced into the hood.

The lower section of the side panels for the right side of the car consist of two thicknesses of sheet steel shaped to fit the curve of the side of the car. The two sheets of steel are separated by wood strips sawed to the proper shape. The outer section laps over the posts, while the inner section slips into

the curtain groove, the curtain wire being allowed to remain in place. By means of the tie bolts, which are lengthened as shown in Fig. 1, steel plates 2½ ins. wide are bolted securely over the ends of the sheet-steel panels. Felt protection strips are placed along the bottoms of the panels and below the steel plates to keep out the cold and prevent any movement. A wood sill is placed above the lower panel, and above this is placed another panel containing the window frame. As on the other side, the posts are cut away ½ in. to permit the insertion of the window sash, and the window stop which holds the window in place is allowed to remain in summer. On some of the later cars of a slightly different type, the steel panel is carried clear up to the bottom of the window sash, thus doing away with the intermediate sill.

The curtains are altered so that they will roll clear up and the upper portion of the window sash fits under them. Four of the windows in the transom are hinged and fitted with handles. Grab straps are placed along one side of the aisle.

they do not become mislaid or mixed. To facilitate the work of converting these cars, every piece that is changed is num-

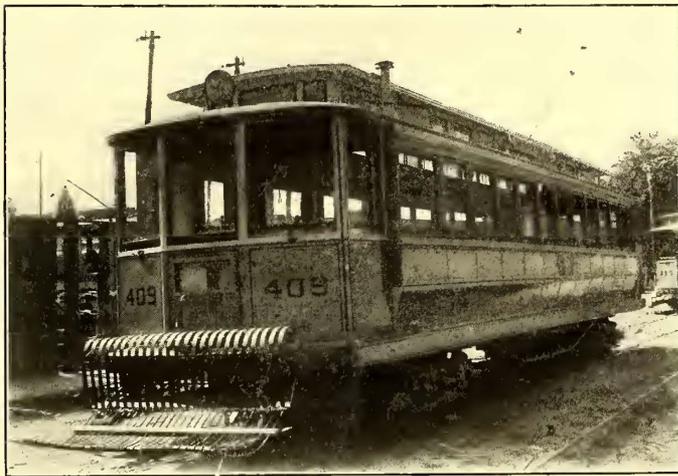


FIG. 4.—LEFT SIDE OF CONVERTIBLE CAR, SHOWING PANEL PUT IN

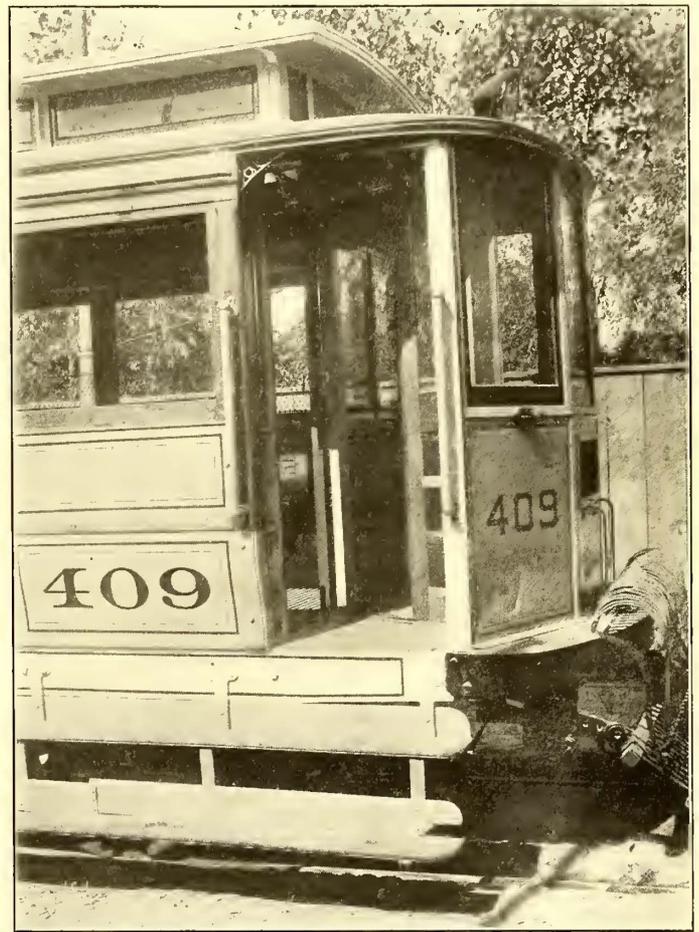


FIG. 5.—END VIEW, SHOWING SLIDING DOOR INSERTED INTO FRONT BULKHEAD AND PARTITION FOR MOTORMAN'S CAB

For this winter it is the intention to allow the handles and steps to remain on the cars, although a scheme may be worked out to dispense with them if desirable. The cars are to be heated by stoves placed in one corner. Of late the company has been running a number of these cars in a semi-closed condition; the windows being inserted in the inside and the outside being left open. This makes a very pleasant car for medium cool weather, and if a passenger becomes chilly he can move over to the closed side and be comparatively sheltered.

The alterations on these cars cost about \$330 each. All the work was done in the company's own shops, and forty-four men built over about four and one-half cars a week, the labor being the heaviest item in making the change.

The efficiency of the car for summer use is in no way injured, and thus far they appear tight and comfortable. It is expected that for winter use they can be kept practically as warm as a box car. The seating arrangement, giving both cross and longitudinal seats with ample aisle room, is being favorably commented on by the Cleveland public.

The most troublesome feature about any convertible car of this type is the difficulty of keeping track of the parts so that



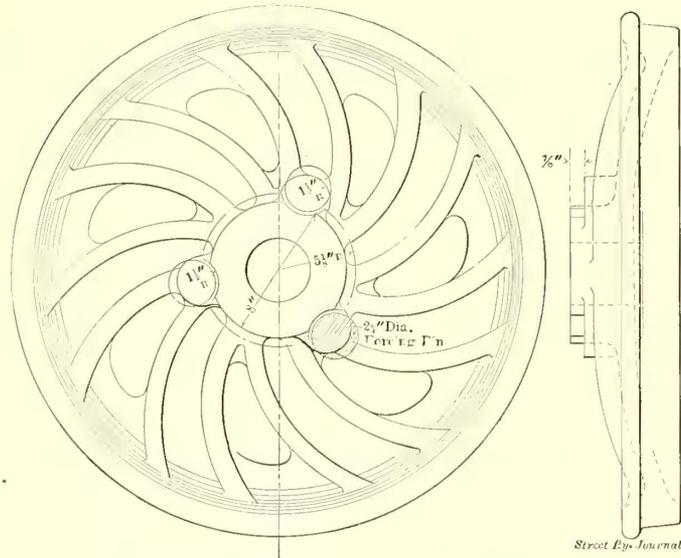
FIG. 6.—CONVERTIBLE CAR CLOSED FOR WINTER USE, SHOWING SECTIONS INSERTED

bered with serial numbers and with the number of the car, and a special storage room has been set apart for them in the stock room at the repair shops. The parts for each car have a sep-

arate compartment and the compartments are kept securely locked. Removing one part and substituting it on another car will not be permitted. The work of changing from summer to winter equipment, and vice versa, requires ten hours per car for one man.

**GEARS AND MOTOR LUBRICATION IN PROVIDENCE**

The Rhode Island Company, of Providence, is incorporating a number of new and useful improvements in street car mechanics. Among these, an interesting departure from ordinary



30-INCH WHEEL, WITH 8-INCH X 9-INCH HUB, USED WITH SOLID GEARS IN PROVIDENCE

practice is the employment of solid gears. According to W. D. Wright, master mechanic of the road, he finds that the average gear wheel will outlive two and sometimes three car wheels, from which he argues that there is no need of the ready dismounting of the gear wheel which the bolted split gear affords. Moreover, he states that when trouble arises with the bolts on the split gear it is always of a serious nature, amounting to the partial destruction of the gear and pinion and more or less damage to the armature, besides causing serious delay on the line, for the car with a wrecked gearing system can only be pushed home with difficulty.

A solid gear has therefore been designed which will be used on the 4-in. axles, and which is illustrated herewith. This gear will be pressed on to the axle at a pressure of about 40 tons. It will be noted that the gear is arranged with three of the interspoke spaces deeper than their mates. This is to permit of easy withdrawal of the traction wheels. The latter are arranged with pads cast upon them at three equidistant points. These pads will receive the pressure of the forcing device which is slipped upon the axle after one wheel has been removed. This forcing device has three arms, which thread through the spoke of the gear in the elongated spaces shown and press on the pad in the car wheel, thereby enabling the latter to be forced off. The gear, it will be noted, is keyed,

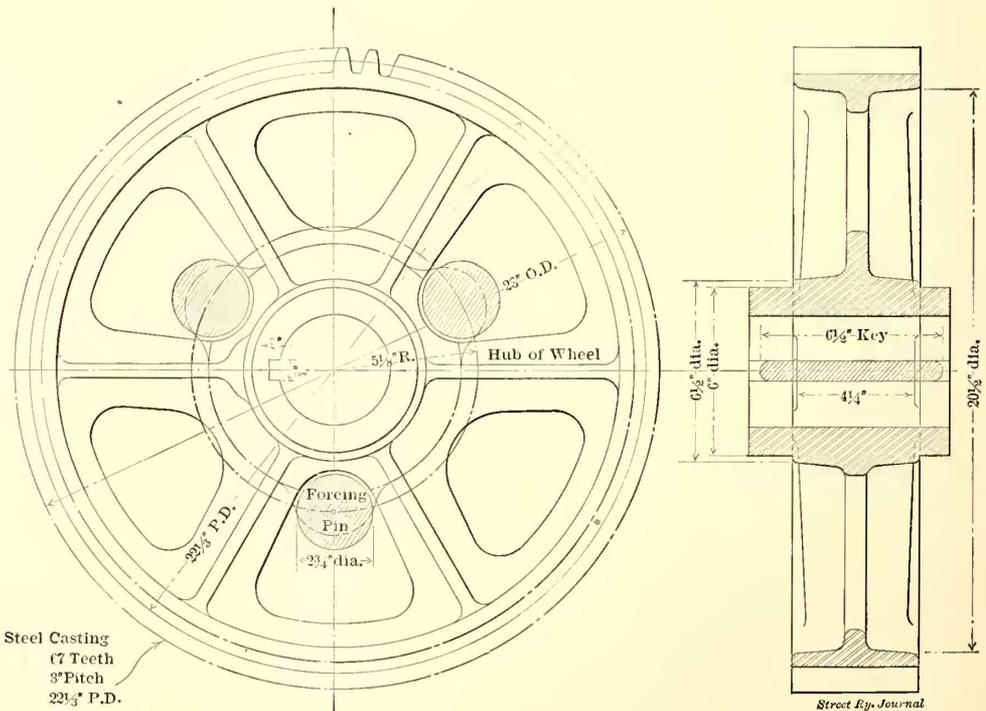
but the key is not as large as is common on the split-gear type, and, moreover, Mr. Wright does not intend that they shall be driven as tightly.

It will be further noted in the figure that the hub of the gear is longer, which it is expected will result in a material strengthening of the wheel axle, which if it fractures at all is apt to start from some point in the key way.

The solid gear also offers advantages with reference to the continuity of its gear surface. The split gear, unless it is set exactly the same as it was cut, has two points on its periphery which do not exactly mesh with the gears and cause roughness in operation. As it is impossible to assemble the solid gear in any position other than that in which it is cut, this difficulty is avoided, and the life of the gear is still further enhanced.

A difficulty which Mr. Wright foresees, but which he does not consider serious, is that of storing gear axles. They cannot be piled up as heretofore, but must be piled on A-shape racks, thereby occupying somewhat more space, but this is a matter which is insignificant in comparison with the advantages to be gained. The results of the use of these solid gears are yet to be announced, for Mr. Wright has not completed his experiments upon them. As this practice has been in use in the larger sizes of gears on elevated railway work, there seems to be no good reason why eminently satisfactory results should not be reached in this case, and the design of the parts as depicted in the prints seem to show no obstacle to entirely successful operation.

Another innovation at the Rhode Island car houses is the employment of oil lubrication for the motors instead of by means of grease cups. This Mr. Wright has successfully accomplished for the past six years without in any way altering the motor or its bearings. The grease cup is used as a receptacle for an oil cup, which is simply dropped in place in the grease cup and requires no further attention except occasionally filling with oil. The oil cup is a light rectangular casting of suitable shape to be conveniently fitted in the grease cup. The bottom of the oil cup is tapped to receive a screw



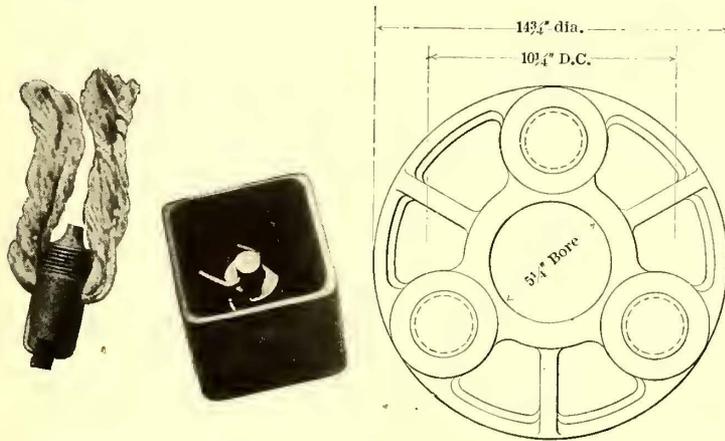
30-INCH WHEEL USED IN CONNECTION WITH SOLID GEARS. PROVIDENCE, R. I.

plug which penetrates through the bottom of the cup and acts as an oil drip. The cup and screw plug are shown in the illustration. The plug, it will be noted, is drilled at the top to receive a cotton wicking, which is threaded through the top of

the plug like a thread in the eye of a needle. In the top of the plug is a small screw, which can be screwed down upon the wicking compressing it, and through the plug itself is a hole of suitable diameter. The top screw in the plug is equipped with a U-shaped piece of wire, which normally hangs down on a squared head and prevents the compression screw to which it is attached from revolving under the influence of jar. The cup is filled with oil, and the wick absorbing the same transfers it to the hole in the plug, whence it is distributed through the longitudinal drip hole to the axle. The flow of the oil is controlled by means of the pressure screw, which compresses the wicking and regulates the amount of oil that the axle receives.

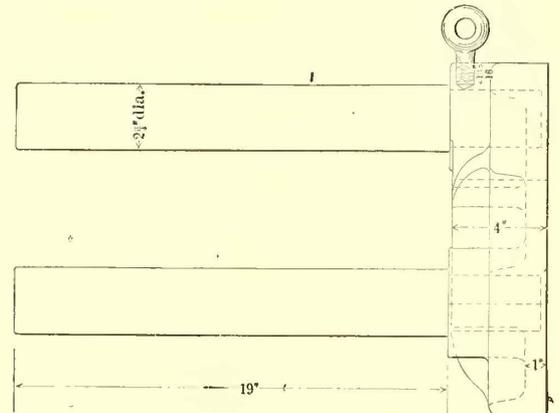
point of photographing important new work, and there is no reason to believe that other city systems are not doing the same thing.

It is frequently the case, however, that this photographic work is delegated to some regular picture maker in the city, instead of being done by some one on the company's staff. This practice may be well enough in construction matters, but in looking at operating problems there would seem to be good ground for a change in method. While many street railway accidents occur and are over in a space of time far too short for the securing of any direct photograph of the conditions obtaining at the moment, there are frequently times when a



SCREW PLUG AND OIL CUP

FORGING PLATE FOR WHEEL PRESS, PROVIDENCE, R. I.



Street Ry. Journal

This cup will permit operation for a week without renewal of oil, and has so far proven very satisfactory.

Mr. Wright is also working on a new cup which feeds automatically when the car is in motion, the details of which will be announced in a later article. The present cup, however, gives great satisfaction owing to its convenience, simplicity and the fact that it requires no alteration in the motor for its installation.

photograph taken within a few moments might prove to be of great value as evidence in subsequent law suits. In cases where tracks are blockaded by collisions, there would seem to be a special field for the snapshot artist of the company, increasing in direct ratio with the amount of physical damage done to the rolling stock and surrounding landscape. It may seem heartless to take a photograph of a scene of suffering before the injured passengers are all carried away to the hospitals, and there is no doubt that such a duty should only be entrusted to employees who will realize that the company's object is to secure a visible record of the operating conditions in force at the time, rather than to furnish information and illustrations to sensation mongers. These are days when there is no scheme too crafty to employ against both steam and electric railway companies on the part of unscrupulous persons who would mulct the corporation treasury, and as a matter of self-defense, no company can afford to fail to secure every possible item of evidence to assist it in fighting the legal battles which almost always follow an accident. To this end it would seem as though there should always be a "loaded" camera available at some central portion of a large street railway system, which could be used by certain designated employees as outlined above, in extraordinary events. Possibly it would work out well to equip each emergency crew's wagon with a camera, giving regular inspectors authority to use the apparatus, with good judgment and discretion in times of great traffic congestion, derailments, collisions, extra heavy business, etc. Certainly if a road depends upon an outside photographer in times of stress and strain, it will generally secure no operating photographs good for anything as evidence, because whatever is done must be done quickly. It is well to have one's own official photographs to exhibit, in contrast with those of irresponsible amateurs which may be presented as evidence on the other side, when the matter has reached the courts. Of course, there are obvious difficulties in the way of securing good photographs in times of excitement, but the cost of a few cameras is a small matter if their use succeeds in saving a single damage suit from going against a company in a year of operation. At any rate, the plan suggested would seem worth a trial.

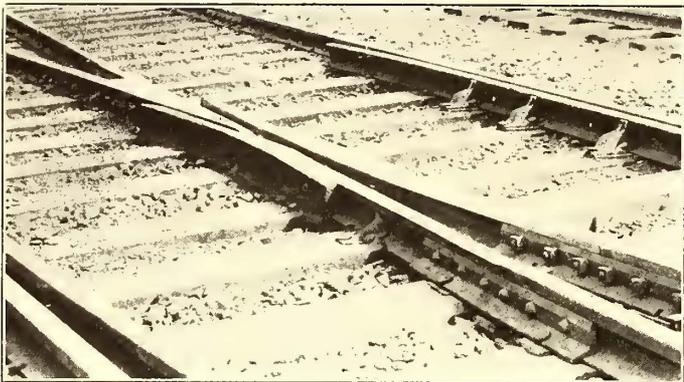
### THE CAMERA AND THE STREET RAILWAY

The importance of keeping a record of the significant events of an individual life is seldom realized until circumstances arise which call for exact knowledge of past happenings. Then, when it is too late, one appreciates the ease with which the salient features of bygone days might have been preserved in illustrated or printed form. Particularly is this true in legal matters, and in no operating engineering system is the importance of correct records of accidents and other unusual events more vital than in the case of the street railway. In telephone work, electric lighting and power transmission, the physical property of the company remains in a fixed position with regard to the public, so that there is less legal ground for the preservation of photographic records of daily business than in transportation systems. As far as mere routine work is concerned, there is no special need of the camera even upon the street railway.

In recent years the camera has attained a wide usefulness in regard to new construction, and more than one road has secured a continuous collection of photographs extending from the earliest stages to the completion of all important work. The Boston Elevated Railway Company obtained in this way 3000 or 4000 excellent pictures contemporary with the construction period of its overhead lines and subway train system, illustrating every phase of the work from views of Boston from the top of the stack at the Lincoln power station to photographs of trucks, track work and structural foundations. In Minneapolis and St. Paul, the Twin City Rapid Transit Company makes a

## EXPERIMENTS WITH MANGANESE FROGS IN THE BROAD STREET TERMINAL, PHILADELPHIA

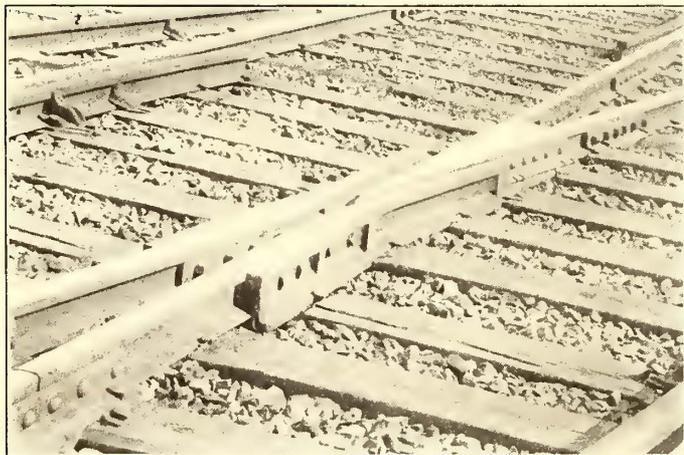
In their terminal track construction, steam railroads have many of the same problems as street railways, because the wear on the points and crossings is continuous and heavy. For this reason many street railway companies will be interested in the trials which have been made during the last three or four years



MANGANESE RAIL IN BROAD STREET TERMINAL. AFTER SERVICE OF OVER FOUR YEARS

with hard-steel frogs in the main passenger and freight tracks of the Broad Street terminal of the Pennsylvania Railroad. The material employed has been largely manganese steel, supplied by Wm. Wharton, Jr., & Company. The manganese steel frogs have lasted from twelve to fifteen times as long as the ordinary steel frogs, and have proved very satisfactory.

The Pennsylvania officials report that it is very difficult to give an idea of the immense tonnage that passes over these frogs daily, but the manganese frogs have been in general use during the last four years and very few of them have worn out during that time in main-line service. This statement gives a better idea of their durability than any figures which can be



REHABILITATED MANGANESE RAIL, AFTER FOUR MONTHS' SERVICE

quoted in tons of traffic. In the main tracks the frog numbers range from No. 10 to No. 20, and on the modern interlockings they are from No. 15 to No. 20, the No. 20 frog being used almost exclusively for high-speed passenger trains running from one track to another.

A specially interesting feature of the Broad Street terminal work has been the experiment which has been tried of rehabilitating manganese frogs, which has turned out very successfully. By this means a frog which has been in use for a long time can be pressed up and made practically as good as new. The views accompanying this article show a manganese frog before and after this was done to it. This manganese steel frog, which was built with 85-lb. rail, was in-

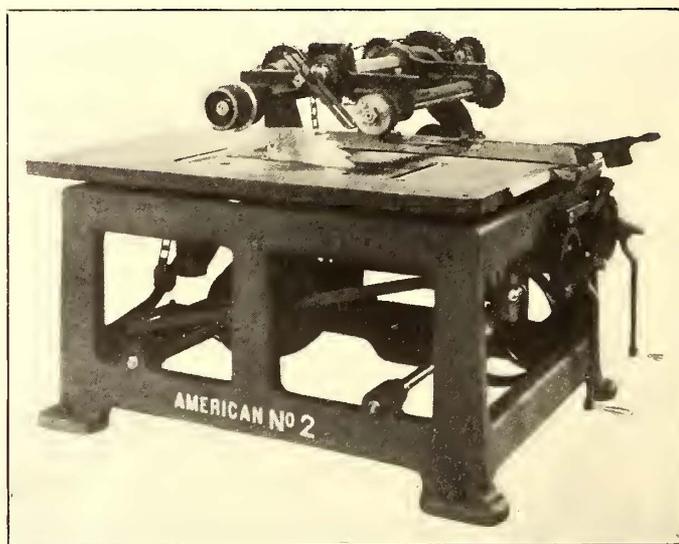
stalled March 11, 1900, and remained in continuous service until April 27, 1904, giving a service of four years and forty-seven days in a position where an ordinary steel frog never lasted but three months. New rails were then fitted into the ends and the point of the frog was pressed up from below by a hydraulic press, after which the inequalities produced by wear were ground off to a level surface. The frog was then reinstalled on June 30, and the photograph shown in the second engraving was taken Oct. 22.

To test the value of the different types of T-rails for curve service, the Pennsylvania Railroad Company is proposing to make a trial of five types of rails on its horseshoe curve next spring. The types selected are manganese rail, Pennsylvania steel, Cambria steel, nickel steel and Bessemer steel. A section 200 ft. in length will be laid with each type of rail on the same radius of curve and for the same class of service. The down grade freight tracks have been selected for the experiment on account of the severe braking required.

## SELF-FEED RIP-SAW TABLE

The machine illustrated in the accompanying cut has been designed by the American Wood Working Machinery Company, of New York, to furnish a first-class self-feed rip-saw table for ripping either hard or soft wood up to 25 ins. wide and 6 ins. thick.

The frame is very heavy and internally ribbed, making a strong, substantial tool. The table is 40 ins. wide x 55½ ins. long, and is provided with two adjustable idler rolls and an iron throat plate, so that two or more saws can be used at the same time. The extreme distance between the saws is 6½ ins. The rise and fall of the table is regulated by the first right hand crank, which is held firmly in position by a pawl engaging with the ratchet wheel. One movement of the crank raises the table



A SUBSTANTIAL SELF-FEED RIP-SAW TABLE

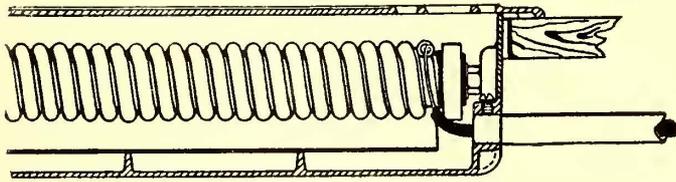
to the desired height. Each notch in the ratchet wheel indicates a ¼-in. movement. The extreme height to which the table can be raised is 5 ins. The table is also counterbalanced by a weight at the rear of the machine, and is fitted in front with an index plate showing the width to be ripped. The distance between the saw and guide is 25 ins., but by placing the saw against the outside collar next to the nut 31 ins. in width can be ripped.

The company's improved self-locking gage is furnished with each machine. By simply raising the handle or the lever attached to it (as shown in cut), the gage is instantly released and can be moved to any desired point on the scale or index plate, where it is securely held by the weight of the handle or

lever when allowed to drop back into position. The feed consists of a corrugated and spur feed roll in front, with a corrugated feed roll with spreader in the rear of the saw. These rolls are 5 ins. in diameter. They are adjustable so that they can be set up close to a 10-in. saw or can be expanded to take in a 20-in. saw. All feeding adjustments are fitted to the main sliding head stock, which rises and falls parallel with the table by the use of the second right hand crank in the front of the machine. One movement of this crank will raise the rolls to the desired height, each notch on the ratchet wheel indicating a 1/4-in. movement. The rolls are driven by chain, sprocket wheel and expansion gearing. Their shafts run in connected boxes, which are fitted to two swinging housings having independent lift. Three changes of feed are provided—60 lineal ft., 120 lineal ft. and 180 lineal ft. per minute—controlled by the handle at the left of the operator. A bevel siding attachment is furnished when ordered as an extra.

**ELECTRIC HEATERS WITH WIRING IN CONDUIT**

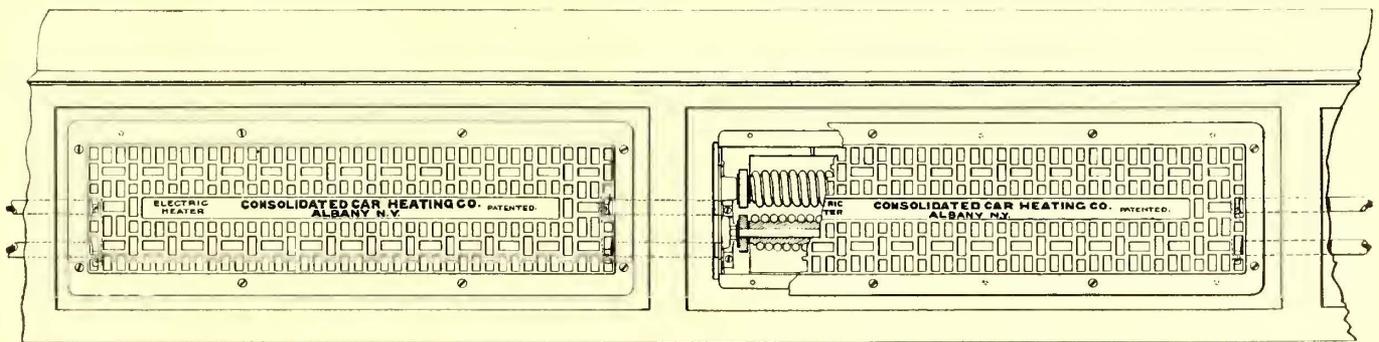
The accompanying cuts illustrate the Consolidated Car Heating Company's new panel heater, designed for the New York City Railway, and now being furnished for 150 new cars belonging to that company. The heaters are especially interest-



DETAIL OF NEW HEATER

ing from the fact that they are to be wired in accordance with the new rules of the National Board of Fire Underwriters, published in the STREET RAILWAY JOURNAL for July 16. These rules, it will be remembered, provide that the heaters shall be so constructed that the current shall be carried at least 4 ins. from the woodwork, and that the circuits are to be run in approved metal conduits.

Each car is to have sixteen heaters, and the connecting wires



NEW PANEL HEATER DESIGNED FOR THE NEW YORK CITY RAILWAY COMPANY

are carried in metal conduits extending into the heater cases, as shown in the illustrations. Attachment of the heater cases to the riser is made by flanging the heater back, which is fastened to the riser independent of the heater front. The conduit is then put in place from the front and held by set screws. The wire is then pushed through the conduit and soldered at either end to the coils. There are no exposed wires and no joints outside of the heater cases. With these equipments more than 1/2 mile of wire is used in the coils for each car.

**MECHANICAL DRAFT APPARATUS**

The application of fans to induced draft work has made necessary many changes from the established standards of fan builders to avoid difficulties never met with in other lines of fan work, and even hardly anticipated in this. Most of the fans on the market to-day are built with two or three spiders, except in the very small sizes. A fan of the standard type usually has a bearing on each side of the fan, making the distance between bearings comparatively short. With this arrangement there is

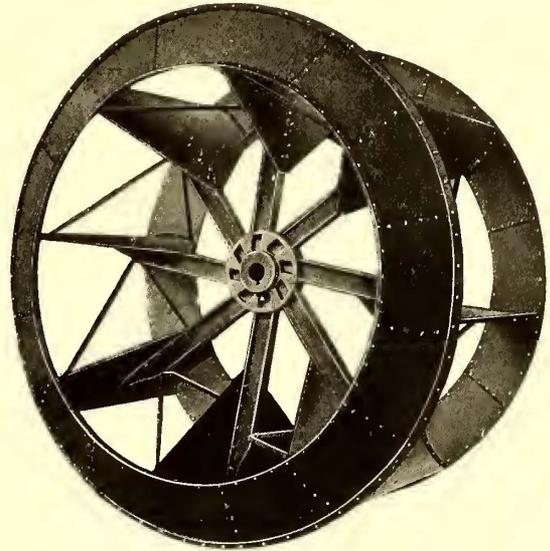


FIG. 1.—WHEEL FOR MECHANICAL DRAFT APPARATUS, WITH SPIDER BUILT UP OF I-BEAMS

no deflection to the shaft, and the fan wheel is very smooth running. But when these fans have to be adapted to the handling of hot gases, it is positively necessary to keep the bearings removed from the path in which the gases travel, as the bearing would become overheated. This necessitates either having an overhung wheel or placing one bearing outside of the inlet chamber built onto the side of the fan. Unless the bearings were placed very close to the center of the fan, the overhang will cause deflection, which will work the keys loose and more likely cause the fan wheel to strike the housing. The same is in a large measure true of the two bearings far apart. Increasing the diameter of the shaft is not a relief, as by its own weight

it will deflect. Then again, the intense heat within the housing causes it to expand, and as the steel frame work of the housing is outside and at much lower temperature than the shell, the natural curvature, if any, is inward. Just how much this expansion will amount to can never be predetermined, hence the greatest of care in setting up will often prove of no value when the fan is in operation, causing the wheel to strike on one or the other of the sides at certain points.

These are points for very serious consideration with anyone

who has had experience with this line of work, and the American Blower Company has devoted a great deal of time to the improvement of these details. Fig. 1 shows a wheel of its latest type of construction, a number of which are in satisfactory operation. The spider is made up of "I" beams, which have about three times the strength of a double set of tee arms as usually employed. In addition to this, every blade is braced with bar-iron braces from the outer rim to the center, which completely overcomes any tendency to twisting. In the side of the fan housing is built a very deep cone which reached in close to the hub. A special arm of very heavy construction is built on the cantilever principle to carry the inner bearing, which is water-jacketed. This is placed at the very apex of

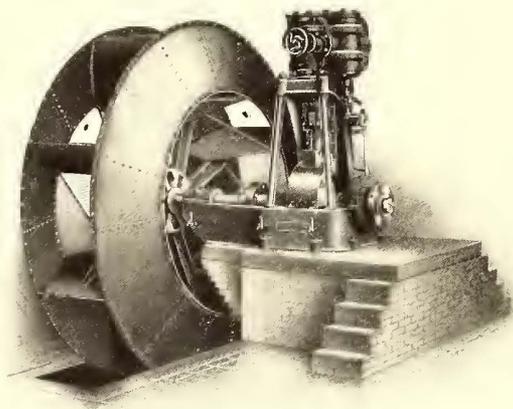


FIG. 2.—FAN WHEEL MOUNTED ON SHAFT WITH DIRECT-COUPLED ENGINE

the cone. The distance from the end of the apex to the end of the projecting shaft seldom exceeds a foot.

Fig. 2 shows a fan wheel mounted on a shaft with a direct-coupled engine erected on this form of construction. It is not always customary to make an extension of the base of the engine as here shown. In some cases an "I" beam grillage is built into the brick foundation, the engine being set on top of the outer ends of these "I" beams and anchored down, which makes practically a complete unit of the entire outfit. Two large units of the character shown by Fig. 2 have been furnished the Wilkesbarre & Wyoming Valley Traction Company, of Wilkesbarre, Pa. These wheels are encased in a three-quarter steel-plate housing, the wheels being 11 ft. in diameter and driven by 12-in. x 10-in. vertical engines. They are intended to furnish induced draft in the power house in the above railway plant.

### INSULATED COUPLING FOR GAS AND WATER PIPES

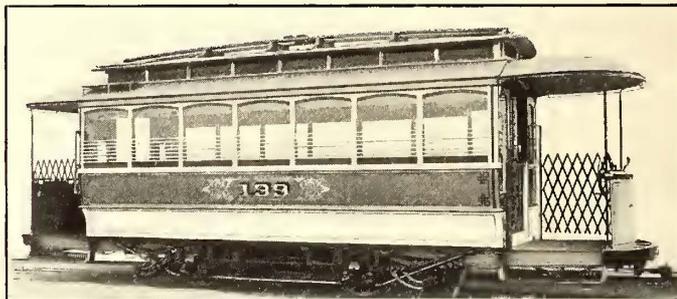
Considerable attention was attracted at the St. Louis Exposition by the system of insulated couplings for gas and water pipes shown by S. R. Dresser, of Bradford, Pa., in the court of the Electricity Building.

The coupling is manufactured in a variety of shapes, but consists essentially of a rubber ring, which is held between the pipe couplings so as to destroy their electrical conductivity, but which is hermetically sealed from the action of gas, acids and other substances contained in the earth, so that it will have a long life. Although the coupling has been on the market for only a short time, it has been used by a number of gas and water companies, including the East Ohio Company, which has about 3000 miles of pipe with this coupling in Cleveland; the Buffalo Natural Gas & Fuel Company, 150 miles; Newton & Watertown Gas & Water Company, of Newton, Mass., 2 miles; Natural Gas Company of West Virginia, at Wheeling, 40 miles; Pennsylvania Natural Gas Company, of Erie, Pa., 50 miles; Northwest Ohio Natural Gas Company, near Canton,

Akron and Massillon, etc. Tests of the insulation resistance provided by these couplings in pipes parallel to electric railway return circuits have been made in Wheeling, by William Brophy, of Boston; in Bradford, by J. H. Rose, and in other cities, and seem to prove the claims made by the manufacturers. The frequency of the couplings varies from 2 to 3 to the mile up to one every 400 ft. or 500 ft.

### NEW CARS FOR MEMPHIS, TENN.

The American Car Company, of St. Louis, recently delivered to the Memphis Street Railway twelve closed cars like the one shown in the engraving. The railway company operates all the lines in Memphis, upwards of 100 miles of track in all, and employs about 200 cars. The city is the largest in the State,



STANDARD TYPE OF CLOSED CAR USED IN MEMPHIS, TENN.

having a population of about 120,000, and rapidly growing. It is the most important commercial center between St. Louis and New Orleans.

The car interiors are finished in cherry, with decorated maple three-ply veneer ceilings, which, with the spring cane upholstered longitudinal seats, give a bright and attractive appearance. As the streets of Memphis through which the cars run are narrow in places and there is a liability of vehicles colliding with the cars, six-bar window guards are used to protect passengers when the windows are lowered. Narrow awnings are attached to rods which follow the configuration of the hoods.

The general dimensions of the cars are as follows: Length



INTERIOR OF MEMPHIS CAR

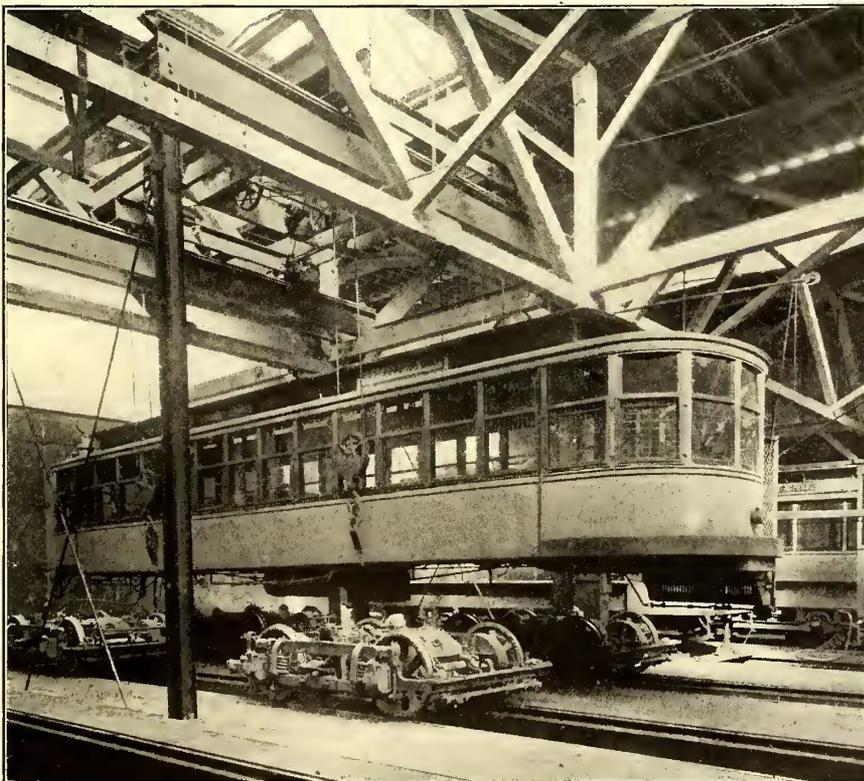
over the end panels, 20 ft., and over the crown pieces, 29 ft.; from the end panels over the crown pieces, 4 ft. 6 ins. The width over the sills, including the panels, is 6 ft. 3 ins., and the width over the posts at the belt, 7 ft. 6 ins. The sweep of the posts is 8 ins. The distance from center to center of side posts is 2 ft. 7¾ ins. The side sills are 3¾ ins. x 5¾ ins., and the end sills, 4½ ins. x 5½ ins. The thickness of the corner posts

is  $3\frac{3}{4}$  ins., and of the side posts,  $1\frac{3}{4}$  ins. The platform steps are  $15\frac{1}{4}$  ins., and the height of the risers, 13 ins. The cars are equipped with Brill specialties, as follows: Angle-iron bumpers, radial draw-bars, Dedenda gongs, Dumpit sand boxes, and folding gates; the trucks are also of the same make, No. 21-E type, and have a wheel base of 8 ft. The motors are 25 hp each.

**ELECTRIC TRAVELING HOIST USED IN DULUTH**

The interesting electric traveling hoist shown in the accompanying cut has been installed recently in the shops of the Duluth Street Railway Company by the Northern Engineering Works, of Detroit, Mich. The apparatus in question consists of a 20-ton double-drum electric trolley hoist with four lift hooks. The trolley has a frame of structural steel. One 25-hp direct-current motor is used to hoist the load, while the travel for the trolley is operated by one  $7\frac{1}{2}$ -hp motor. The control is from the floor. The hoisting speed for full load is 10 ft. per minute, and for lighter loads about 25 ft. per minute; traveling speeds vary from 100 ft. to 150 ft. per minute. These speeds are, of course, much greater than when the work is performed by hand power. The entire crane has a minimum safety factor of 5. Cut spur gearing is used throughout, and all of the sheaves have machined grooves.

The load is automatically sustained by a mechanical brake, and also by an electric brake, which will set automatically when the current is off. A limit stop is provided, attached to a limit switch, which throws off the current when the hook reaches a desired point in the lift, thus preventing the over-



ELECTRIC TRAVELING HOIST HANDLING CAR-BODY IN SHOP OF THE DULUTH STREET RAILWAY COMPANY

travel of the hoist. The steel runway which supports the traveling hoist consists of four Z-bar columns supporting the double I-beam runway girders, between which the lifting hooks are hung. The stresses on the structural beams are thus well balanced and insure proper rigidity in handling the load.

In operation, this crane is used principally to lift car bodies from one set of trucks to another, and the hoist covers two lines of tracks. Steel clamps are attached to the car bodies, to which the crane hooks are fixed, and as all the blocks travel at

the same rate of speed the car body is lifted from one set of trucks and the hoist traveling motor is put into operation, transferring the body from one set of trucks to the other. This is work for but a few moments, and only one man is required to do the lifting and traveling, although it is advantageous to have helpers to properly locate the trucks under the body when the body is lowered. It is claimed for this machine that it saves a large amount of labor and very soon pays for its cost. It can be manufactured in various capacities to suit the weight of the car body, and can be used with either direct-current or alternating-current motors of any voltage.

**SOLDERED BONDS FOR THE ELECTRIC DIVISION OF LONG ISLAND RAILROAD**

In the conversion of the Long Island Railroad system from steam to electricity a novel type of bond was selected for the bonding of the track rails. The available space under the

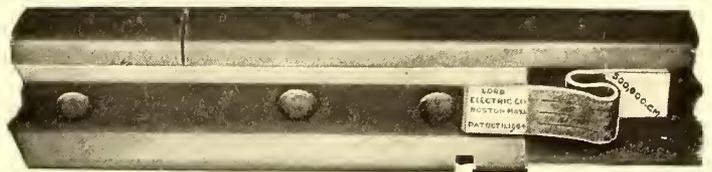


FIG. 1.—SHOWING APPLICATION OF SOLDERED BOND

joint-plates was too limited to permit of installing concealed bonds of the required capacity, and the plan of attaching the bonds to the base of the rail had to be abandoned, as the connection between the bond and cinder ballast would interfere with the proper working of the signal system for which the tracks form a circuit. The matter finally resolved itself into a question of using either long bonds to span the joint-plates or short bonds from the rail to the joint-plate, and vice versa, using the joint-plates as a part of the return circuit. The latter plan was adopted because the initial cost and the liability of the bonds being stolen was very much less, while the actual results obtained are in every way more satisfactory than could be had in the use of long bonds, excepting, possibly, the matter of maximum conductivity, which is limited to the capacity of the joint-plates. These were, however, in every case nearly equal to the cross section of the rail, so that this disadvantage, if it may be so



FIG. 2.—SOLDERED TERMINAL TYPE RAIL-BOND

termed, was very slight. The bond adopted for this work is of the Thomas soldered terminal type, made by the Lord Electric Company, of Boston, Mass., consisting of laminated strips of soft, annealed copper, each strip being tinned separately for a distance suitable to make the terminals, after which the ends of the several strips were securely clamped and soldered, and then riveted, making a solid terminal, having a contact area about ten times greater than the cross section of the bond.

As the bonds were applied in a vertical position, it was neces-

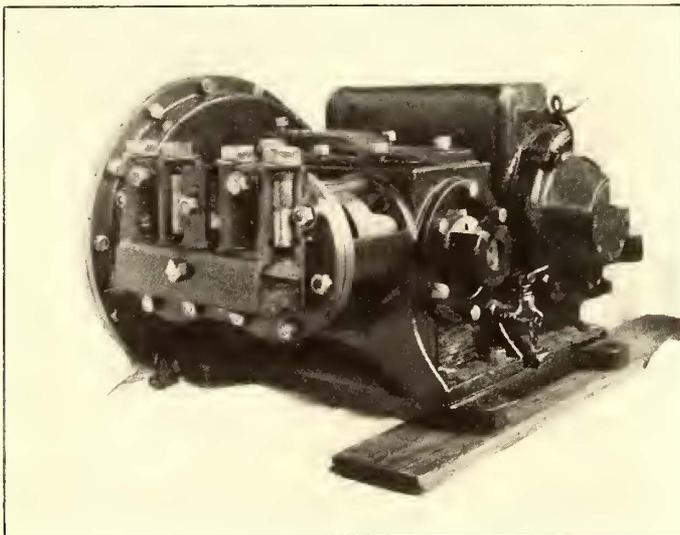
sary to slit them at frequent intervals to increase their flexibility to provide for the vertical motion of the rails, particularly at the time when the bolts and joint-plates shall have become loose.

After the bond was soldered, it was formed into the shape of a double-U to provide for expansion and contraction, or other longitudinal motion, of the rail. The result is a very short bond with abundant contact area, and a flexible portion that will readily provide for extreme requirements.

The bonds are applied from the web of the rail to the joint-plate, and from the joint-plate to the web of the rail, using both plates and four bonds per joint. The application is made by means of soldering to the rail. The surfaces are first thoroughly cleaned by means of a sand blast.

### THE OPERATIVE EXHIBITS OF THE WESTINGHOUSE TRACTION BRAKE COMPANY AT LOUISIANA PURCHASE EXPOSITION

The various brake and coupler exhibits of the Westinghouse companies in the Palace of Transportation at the St. Louis Exposition are especially noteworthy in their feature of com-

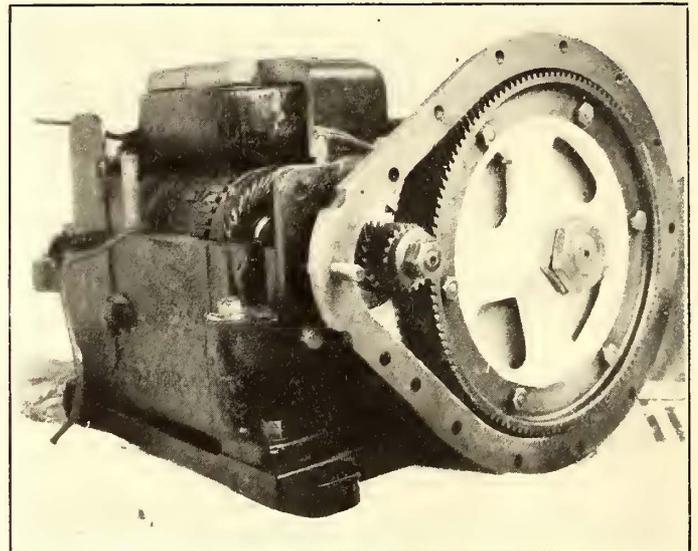


MOTOR-DRIVEN AIR COMPRESSOR

plete operative demonstration. Apparatus throughout the length of 150 ft. down the main aisle of the building is supplied with compressed air from large central reservoirs or with electric current from the Westinghouse exhibit plant in the Palace of Machinery, and attendants are ready to illustrate the efficiency of each separate device under conditions of actual practice, many important working parts being shown also in section. It is interesting as evidence of the great progress achieved in the application of power brakes in street railway service in the past three years, since the Pan-American Exposition at Buffalo, that about one-half of the entire exhibit space is devoted to the products of the Westinghouse Traction Brake Company. The display includes a Bemis electric truck of a double-truck car, equipped with the Westinghouse magnetic brake, operated on a track 50 ft. long; the arrangement of one side of a wide single truck, equipped with the combined magnetic brake and car heating apparatus, a moving track demonstrating in a novel way its operation, and a rack hung with a complete straight air brake equipment, near which are shown four motor-driven air compressors, one axle-driven air compressor, and different types of the motorman's operative valve. The automatic air equipment as applied to traction cars, which is recommended in preference to the straight air method, or in addition to it, on all cars operated wholly or occasionally in

trains of two or more cars, is illustrated in the apparatus of the Westinghouse Air Brake Company, which is exhibited in a completely connected equipment for a six-car train. The Westinghouse magnetic brake is further exhibited on a Brill No. 27-E electric truck for a double-truck car, in operation in the Westinghouse space in the Palace of Machinery, and on the St. Louis Car Company's car in operation on a track just north of the Palace of Transportation, which is equipped with Westinghouse motors, and with the combined magnetic brake and car heating apparatus. The Bemis truck in the Palace of Transportation has only a 4-ft. wheel base, and its equipment with the magnetic brake is an example of the application of the device under extreme conditions of limited space between wheels. The Brill truck in the Palace of Machinery has a 6-ft. wheel base, which permits the application of the magnetic brake most effectively, with a triple-pole magnet.

The magnetic brake proper comprises track shoes of cast steel, requiring replacement only about twice a year, combined with a powerful electromagnet, which is strongly attracted to the rail when energized by current generated in the car motors, and a simple equalizing leverage for transmitting the drag of the magnetic track shoes into lateral pressure upon brake heads and shoes of the ordinary type acting directly upon the wheels.



MOTOR-DRIVEN AIR COMPRESSOR, SHOWING GEARING

The line current is cut off, and the brake circuit is then established either through special contacts in the operating controller or through a special brake controller. For each of the exhibit trucks in operation at the Fair, a special brake controller is provided to demonstrate the adaptability of the brake equipment to cars already equipped with operating controllers, while the special car to the north of the Palace of Transportation is provided with a combined operating and braking controller. The track magnet hangs from suspension springs, which carry the shoes about  $\frac{1}{4}$  in. above the rails when the brake is not in action, and is adjusted at intervals as the track shoes wear out. The wheel brake equipment is suspended from the car frame, with suitable arrangement for adjustment, and is adapted to different styles of car trucks in as many different ways, the usual provision being made for hand brake connection. In its combined features of frictional drag of the track shoes upon the rails, together with a maximum wheel retardation, this device develops a braking power greater than is obtained from any other form of brake, and without skidding wheels.

The exhibit of a complete equipment of the Westinghouse straight air traction brake is of special interest in the display of new types of compressors and accessories and of the American Brake Company's automatic slack adjuster, which com-

pensates for the wear of brake-shoes and maintains the piston travel at the predetermined amount. This adjuster is shown in operation, with many working parts exposed, and is used also as part of the working apparatus in the equipment of the exhibit racks of both the straight air and the automatic train brakes. The operative straight air equipment consists of a two-cylinder compressor, direct connected to a 3-hp 500-volt Westinghouse series motor running at a speed of 1200 r. p. m., which supplies air to the reservoir at a pressure of 65 lbs., and of an 8-in. x 12-in. brake cylinder operated by air from the reservoir, and applying pressure to the brake-shoes through the medium of a patented modification of the well-known system of equalizing levers used in railway service. Two types of pump governors are shown in operation, the first corresponding to the well-known snap switch, the tension of a helical spring keeping the switch closed until the reservoir pressure has reached the predetermined limit, when an air piston overcomes the tension and holds the circuit open until the pressure has dropped the desired amount; a second type having a straight line action, with an electromagnet energized by the motor current operating in conjunction with the spring, the coil being demagnetized on the instant that the contact is broken, and a long quick circuit break effected by the piston.

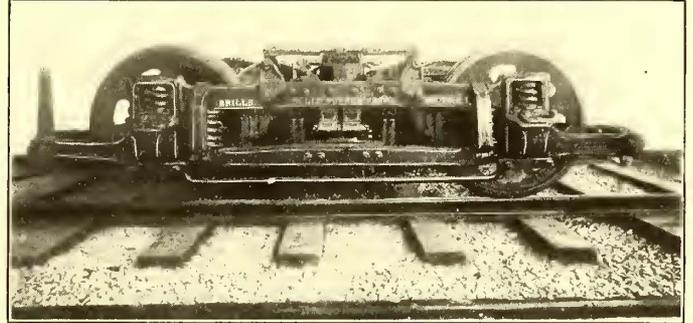
Two forms of the type of motorman's operating valve best adapted to conditions of traction service form a part of the operative exhibit. The operating head at the level of the motorman's hand consists of a duplex gage, indicating the reservoir pressure in red and the cylinder pressure in black, a revolvable casting with a horizontal cylindrical socket and latch being directly under the gage and connected to the stem of the valve below. This valve stem has a pinion engaging a rack, which is mounted on a slide valve so that the valve slides from side to side between suitable guides as the handle is moved, this reciprocating motion insuring thorough lubrication and, consequently, long continuous service. Other forms of valves are shown near the rack.

The four sizes of motor-driven compressors on exhibit are in two instances provided with gear drive, and, in the others, with the Morse silent chain, one small gear compressor, shown in section, being operated at slow speed to demonstrate the thorough system of lubrication. An axle-driven compressor is exhibited in section to show its construction, suspension and drive, together with an automatic governor which cuts the pump out of action, when the desired reservoir pressure is reached, by lifting the suction valves. Cars equipped with the axle-driven compressor are provided with a small auxiliary reservoir connected to the main reservoir, with a check valve set at 25 lbs. pressure, 500 ft. of travel being sufficient to provide this pressure in the small reservoir for the first few brake applications after leaving the car houses.

The automatic brake equipment for traction service consists of a main reservoir carrying the maximum pressure, and an auxiliary reservoir which is fed from the main reservoir and supplies the brake cylinder at the time of application. The motorman's valve in the adaptation of the automatic air equipment to electric traction service differs from the regular engineer's valve only in the omission of the "equalizing" piston utilized in steam service. To apply the brakes, the motorman reduces the pressure in the train pipes, the higher pressure in the auxiliary reservoirs thereupon operating the triple valve on each car to permit the flow of air into the brake cylinder, the brakes being released by the restoration of high pressure in the train pipes, the triple valve thereupon being shifted to its former position, the brake cylinders connected with the atmos-

phere, and the auxiliary reservoirs fed with air from the train pipes. For emergency application, the pressure in the train pipes is reduced below that of the usual application, and the triple-valve piston travels to the end of its stroke, operating a by-pass which admits air directly from the train pipes to the brake cylinder, a braking pressure of 20 per cent greater than the maximum in ordinary stops thus being obtained.

The exhibits include also the reducing valves, which, in the



MAGNETIC BRAKE APPLIED TO NO. 27-E1 TRUCK

storage system, as applied in St. Louis in the straight air equipment, are placed between the storage and the service reservoirs, air being carried at a pressure of from 250 lbs. to 300 lbs., and fed into the auxiliary reservoir for service at about 50 lbs. The air brake equipment of the cars of the Manhattan elevated and subway roads, New York City, for which a contract was recently closed, is to be of the Westinghouse automatic type, with a special valve for the very quick release of the brakes in rush service.

#### NEW EQUIPMENT FOR THE AUGUSTA & AIKEN RAILWAY

The Augusta & Aiken Railway Company (Ga.) has recently purchased from the J. G. Brill Company the type of car shown in the accompanying illustration. This includes the builders' semi-convertible window systems, and is mounted on No. 27-E high-speed trucks. The railway company operates the systems of the terminal cities, which are connected by a finely con-



EXTERIOR OF SEMI-CONVERTIBLE CAR FOR THE AUGUSTA & AIKEN RAILWAY COMPANY

structed road over a private right of way, a distance of about 25 miles. Deep cuts and fillings were made to secure easy grades and curves of large radii, permitting high-speed service. Along the route are a number of towns having large cotton mills, giving considerable freight business to the line. In the western suburbs of the city of Augusta are two successful amusement parks owned and operated by the company, and across the Savannah River in North Augusta, the company owns 7000 acres of fine property, which is being developed, and it is also interested in many industrial enterprises in the vicinity

The car shown is 33 ft. 4 ins. over the body, and 42 ft. 9 ins. over the vestibules; width over the sides, 8 ft. 4 ins., and the seating capacity is forty-eight, the builders' type of step-over back seats upholstered in cane being used. Quartered-oak in natural color constitutes the interior finish and headlining. The window sills are 24 $\frac{5}{8}$  ins. from top to floor, and have arm rests bracketed thereto, and so arranged as not to interfere with the window locks. The illustration shows a number of windows raised, and gives an idea of the openness of the car when all the sashes are raised into the pockets in the side roof. The interior illustration plainly shows the simple construction of



SEATING ARRANGEMENT OF AUGUSTA & AIKEN CAR

the post, one metal runway only being required to each. The five lock-bolt stops for holding the windows at any desired height may also be seen. The bottom framing is powerful, and includes double-trussed needle beams, heavy under trusses and 12-in. x  $\frac{3}{8}$ -in. sill plates for the full length of the car for the insides of the sills. The platform timbers are reinforced with angle iron, and the center knees are composed of angle irons brought well back of the body bolsters. The trucks are No. 27-E-1, having a 6-ft. wheel base, 33-in. sills and 5-in. axles. The motors are 50 hp each, and four per car. The total weight of car and trucks is 34,460 lbs.

#### OFFICIAL TIMEKEEPER FOR THE BROOKLYN RAPID TRANSIT COMPANY

The Brooklyn Rapid Transit Company has an official timekeeper. The office was created some time ago, and now that all the clocks of the system are in good repair, the official devotes but one day a week to the company. When the appointment was made, some of the clocks were running what often, in the vernacular, is termed "rag-time." A thorough overhauling of all the timepieces was the first work undertaken. This involved the placing in telegraph offices, terminal stations, etc., of more than 150 good timepieces. Then followed the abandonment by the company of the system of synchronized time as sent out to subscribers by the telegraph companies. Each day at noon the correct time is telegraphed to the different terminals from the office of the elevated lines in the Brooklyn Bridge terminal. Differences of time are noted, and reports are filed with the company of all clocks that have "gone wrong." All the "sick" clocks are "treated" by the timekeeper. The officials of the company say the system as now operated makes it possible for them accurately to check the operation of all cars.

Of the 704 street railway companies on record in the State Department of Pennsylvania, only a few over 200 have lines in active operation.

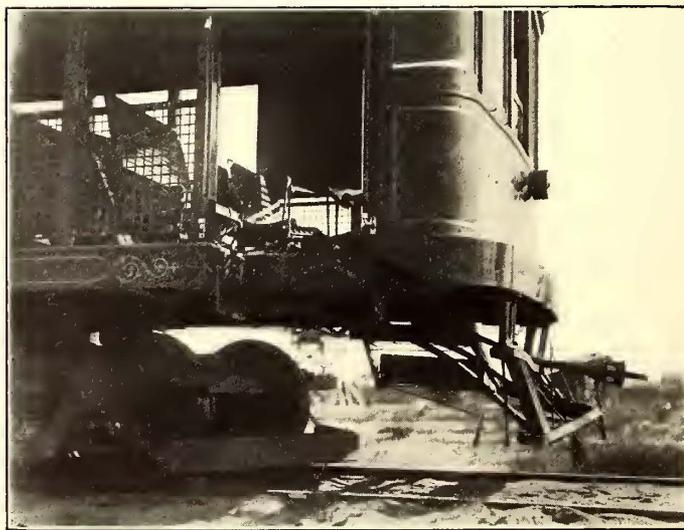
#### FOG CAUSES TWO SERIOUS ACCIDENTS ON PACIFIC ELECTRIC RAILWAY

Fifty-two men were injured, some seriously, in two rear-end collisions that occurred in the same place on the Pacific Electric Railway Company's Long Beach line, within a few minutes of each other, in the early morning of Nov. 5, during a dense fog. The wrecks were at Willowbrook, a little station 10 miles from Los Angeles. Work car No. 259, outward-bound and loaded with a construction gang, crashed into out-bound car No. 304, crowded with passengers. Within fifteen minutes after this accident, north-bound car No. 299, which had just arrived on the scene and into which the injured were being placed, was struck from the rear by the morning freight train, bound for Los Angeles and made up of a motor and one flat car. It was the biggest wreck the Huntington lines have ever had.

The first collision came without a second's warning to the crews or the passengers on either train, the fog being so dense that neither could be seen until they were within a few feet of each other. Two men were sent back to flag the freight train, but it was pounding down the slippery track at tremendous speed and the motorman was unable to bring it to a stop in time.

The king bolts of the first two cars to collide gave way, letting the trucks jumble up in one bunch beneath them. The rear platform of the passenger car was completely demolished and the passengers thrown into a heap, amid fragments of broken glass and woodwork. The second collision was not so serious and only a few were injured. That many people were not killed outright is due to the quickness with which the motormen of the two cars that were run into turned on the power, so that the cars were fairly under way when the crash came.

Car No. 304 had stopped at Willowbrook to take on two passengers, and when Motorman E. F. Poyer realized that the work train was about to collide, he turned the power on full force and jumped. After the accident, and upon the arrival of car 299, in charge of Conductor Walster, the latter set about



CAR WITH PILOT DEMOLISHED IN WRECK

helping to put the injured into his car, and before the freight train that was following appeared out of the bank of fog many of the wounded were in his car. With a leap, the brave motorman gained the front platform of his coach and threw the current full-on. Had it not been for this brave act, a second catastrophe, as serious as the first, would have occurred. As it was, only the pilot of the car on the rear end was broken away and the injured passengers badly shaken up again.

General Manager Schindler has begun a thorough investigation to fix the blame.

## LEGAL DEPARTMENT\*

### DUTY TO LOOK FOR APPROACHING CARS

With regard to steam railroads the obligation of a person approaching a track to look and listen for trains is absolute, and one will not be heard to say that he did look and listen if it is obvious that had he done so he would have been able to avoid being struck. The obligation to look for approaching street cars before crossing a city street, while to an extent existing, has always been less rigidly administered. Reasons for the distinction are that, as the public have equal rights with a street car company in the streets, it is to be supposed that greater care will be taken by drivers or motormen to avoid injury, and, second, that from the character of the locomotive power, street cars are more readily brought to a standstill than railroad trains. Two recent cases in the Second Appellate Division of the New York Supreme Court illustrate the minor degree of precaution required of persons crossing street railroad tracks. In *Lofsten vs. Brooklyn Heights Railroad Company* (89 N. Y. Supp., 1042), it was held that if a person has looked once for an approaching car before attempting to cross, failure to look a second time is not contributory negligence as a matter of law. The theory was that a car ought to be under control so that if a person looks and sees that it is at a sufficient distance for him safely to attempt to cross, he will not be held absolutely negligent if the motorman accelerates his pace or maintains a high rate of speed so that the crosser is run down. Here the reciprocal rights were recognized, and it was considered proper for the jury to be allowed to determine whether, under the actual circumstances, there was negligence on the part of either or both parties. A similar case was *Monck vs. Brooklyn Heights Railroad Company* (N. Y. Law Journal, Oct. 20, 1904). It was held that in an action to recover damages for the death of a pedestrian due to his being struck by a street surface railroad car while crossing a city street, the absence of proof that he looked to observe the approach of the car does not establish contributory negligence per se, if the approaching car was at such a distance that, had he in fact looked, he would have been warranted in assuming personal safety in crossing. A novel feature of this case was that there were numerous eye-witnesses of the accident. In several previous cases where there were no eye-witnesses, the courts have accepted very slight evidence of care on the part of the person injured because of the inherent difficulty, if not impossibility, of showing the actual facts. In the case in question, however, the court went to very considerable lengths in distinguishing a street railroad case from ordinary railroad law.

#### LIABILITY FOR NEGLIGENCE

MISSOURI.—Street Railways—Passengers—Injury in Boarding Car—Contributory Negligence—Instructions—Appeal—Conflicting Evidence.

1. Where one standing at the right place to take passage on a street car signals the motorman, telling him he wants to get on, and in obedience thereto it is stopped or slowed down to let him on, and he attempts to board it, while doing which the car is started forward quickly, injuring him, his rights are those of a passenger, though he was negligent in getting on.

2. Whether one is negligent in attempting to board a street car, slowed down for him, while it is in motion, is a question of fact, unless the speed is so great, or he is so infirm or encumbered, as to make it manifest negligence.

3. Though one injured while attempting to board a street car on the ground that the car was started too soon, it is not error to give a correct instruction as to the duty to stop a car a reasonable time to allow one to get safely on, whether the car was at an actual standstill when he attempted to get on, or was slowly moving, and started up suddenly, without coming to a full stop.

4. There being testimony which, if believed, authorized recovery by plaintiff, judgment for him cannot be reversed, though the witnesses against him were more numerous, and all could not be testifying honestly.—(*O'Mara vs. St. Louis Transit Company*, 76 S. W. Rep., 680.)

\* Conducted by Wilbur Larremore, of the New York Bar, 32 Nassau Street, New York, to whom all correspondence concerning this department should be addressed.

MISSOURI.—Damages — Special—Measure—Evidence—Harmless Error.

1. Where, in an action for injuries, it is pleaded that plaintiff's spine was permanently injured, testimony as to specified paralyzing effects upon organs of plaintiff, consequent on the injury to his spine, is admissible under the general rule that evidence may be introduced of any special damage the immediate result of the act complained of.

2. Evidence, in an action for injuries, as to plaintiff's earning capacity prior to the injury, and that since he had been compelled to employ assistance at a specified rate, was sufficient to warrant an instruction as to plaintiff's loss of earnings as an element of damage.

3. Where, in an action for injuries, a physician's testimony that his charge for medical services was reasonable was uncontroverted, though another physician testified for the opposing party, an instruction which fails to limit plaintiff's recovery for the services to their "reasonable" value is harmless error.—(*Grady vs. St. Louis Transit Company*, 76 S. W. Rep., 674.)

MISSOURI.—Street Railways—Negligence—Evidence.

1. Where, in an action against a street railway for injuries sustained by plaintiff, owing to his wagon, the wheel of which had caught in the car track, having been run into by a car, it appeared from all the evidence that the motorman, on discovering plaintiff's peril, used every means at his command to stop the car and avoid collision, but that, owing to the rails being in a wet and slippery condition, it was impossible to stop the car, an instruction for defendant should have been given.—(*Ellermann vs. St. Louis Transit Company*, 76 S. W. Rep., 661.)

MISSOURI.—Street Railroads—Negligence—Contributory Negligence—Violation of Ordinance—Building Ordinance—Proof of Acceptance—Pleadings in Justice Court—Instructions.

1. Rev. St. 1899, section 3852, enacts that no form of pleadings on the part of either plaintiff or defendant shall be required in a justice court, but that, before process issues, plaintiff shall file a statement of the cause of action. In an action instituted in justice court, the complaint was divided into two counts, each of which set up the same cause of action, but the whole complaint stated a cause of action which was sufficient to bar another suit on the same cause after judgment. Held that, under the statute, the complaint was sufficient, and it was proper to deny a motion that plaintiff elect on which count he would rely, and to overrule an objection to the reception of evidence on the second count on the ground that it was identical with the first.

2. In an action against a street railway, it is not necessary that an ordinance requiring operatives of cars to keep a vigilant watch for vehicles, etc., should be specifically pleaded, and proof made of its acceptance, before reading it in evidence.

3. Though one negligently places himself in a perilous position by driving on or near a street railway track, a motorman owes him the duty of trying to avoid accident, and the person's negligence does not bar recovery if injury results from negligence of the motorman.

4. A party cannot complain on an appeal of the giving of an instruction which contained the same error as an instruction requested by him and refused.

5. Where, in an action against a street railway for injuries, the negligence of plaintiff was conceded by his own instructions, and his right to recover based on the last-chance rule, a requested instruction to the effect that both plaintiff and defendant were guilty of negligence, and that plaintiff could not recover, was properly refused.—(*Septowsky vs. St. Louis Transit Company*, 76 S. W. Rep., 693.)

NEBRASKA.—Appeal—Review—Street Railroads—Frightening Team.

1. Questions not presented to the trial court by the motion for a new trial, and which are not mentioned in the petition in error, cannot be considered by this court.

2. In an action for personal injuries due to the frightening of plaintiff's team by the alleged negligent operation of a street car in running the same carelessly and negligently at a high rate of speed, and where it appeared from the testimony of all of the witnesses that the car was going slowly, that the motorman slowed it down and stopped it as soon as he saw that the team was becoming frightened, no inference of negligence arises, and a judgment for plaintiff will be reversed for want of evidence to sustain it.—(*Lincoln Traction Company vs. Moore*, 97 N. W. Rep., 605.)

NEBRASKA.—Street Railways—Collision With Vehicle—Right of Way—Question for Jury—Evidence.

1. Electric street railway companies and ordinary travelers upon the thoroughfares of a city are obligated to observe equal degrees of care to avoid accidents. Neither has a right of way superior

to that of the other. *Street Railway Company vs. Cameron*, 61 N. W. 606, 43 Neb. 297, followed.

2. Issues both of primary and of contributory negligence are ordinarily questions of fact for a jury.

3. When, in an action against a street railway company for damages resulting from a collision with a private vehicle, the rate of speed of a railway car is material to the controversy, and there is evidence from which it may be ascertained, a city ordinance regulating such speed is competent evidence, as bearing upon the question of negligence.

4. A non-expert, who can testify to the rate of speed of a street railway car only as the result of a mathematical calculation made after the event, is not a competent witness on the subject.—(*Mathiesen vs. Omaha Street Railway Company*, 97 N. W. Rep., 243.)

NEW HAMPSHIRE.—Evidence—Admissibility—Competency—Remoteness—Responsiveness.

1. Where a witness' answer had a tendency to support plaintiff's contention that a street railway company habitually ran its cars past the place of accident at a high rate of speed, it was not incompetent because not responsive.

2. Where no objection is raised in the trial court to evidence as too remote, that objection will be regarded in the appellate court as waived.

3. Where evidence had some tendency to establish the witness' qualification to answer an inquiry made of him, it was competent, and could not be excluded because incompetent on other issues.—(*Reagan vs. Manchester Street Railway*, 56 Atlantic Rep., 314.)

NEW HAMPSHIRE.—Street Railroads—Action for Personal Injuries—Misconduct of Counsel.

1. In an action for injuries to plaintiff by being pushed under a street car by a crowd when attempting to enter it, plaintiff's counsel, in his opening, said he wished to show the conduct of similar crowds at the place of the accident, but the court directed him to omit further reference thereto until he offered evidence. He, however, stated that the blame attached to defendant was that, with full knowledge of the conditions at the place in question, the car was run down beyond the stopping place, striking plaintiff and throwing her under the car. In the absence of the jury, the court excluded testimony as to the conduct of similar crowds; but plaintiff's counsel, notwithstanding, questioned a witness in the presence of the jury as to prior crowds, so as to suggest the testimony which he sought, and stated during cross-examination by defendant that he meant to show the conduct of the railway company as to previous crowds. Held, that the ruling of the court was the law of the case, and in failing to submit to it, by asking subsequent questions, and offering to show previous conduct of crowds, misconduct prejudicial to defendant's rights was shown, for which the verdict would be set aside, whether the ruling of the court was right or not.—(*Batchelder vs. Manchester Street Railway*, 56 Atlantic Rep., 752.)

TEXAS.—Action for Personal Injuries—Trial—Instructions as to Damages—Rulings on Evidence

1. In an action for injuries to plaintiff's wife, who had testified that two of her ribs were broken, plaintiff was asked if he objected to her submission to an X-ray examination; and it was objected that he should have an opportunity to consult with counsel, and for that purpose the court excluded the examination at that time, and the subject was not again mentioned. Held, not error. This being only a qualified ruling, if an answer was denied, the question should have been renewed, and a direct ruling sought, if the examination was refused after consultation.

2. The petition alleged that before the accident plaintiff's wife was in perfect health, and the injuries and consequent suffering were the direct result thereof, whereas the defense was that they were partially due to other independent causes, on which issue the evidence was conflicting. Some evidence tended to show that troubles incident to gestation were aggravated, but the petition did not specially allege that such was the case. Held, that the submission as an element of damages of aggravation of suffering from other causes was subject to objection as an item not supported by both the pleading and the evidence.

3. The jury were instructed, in finding for plaintiff, to compensate him for his wife's physical suffering and mental anguish, and the impairment of her health, proximately caused by defendant's negligence. Held, that this authorized an award for all the injuries shown, and a submission in a subsequent paragraph of aggravation of suffering from other causes, as an element of damages, was objectionable, as tending to confuse the jury, and cause them to double the damages for the same injury.

4. Physicians differ on the issue as to whether womb trouble from which plaintiff's wife suffered was produced by the accident in question. The one who attended her in childbirth was unable

to say whether her womb resumed its normal position during the month thereafter, but said that she complained of her back and headache. Held, that this did not indicate that such a condition was produced at childbirth as to call for an effort to replace the womb, and, in the absence of other evidence no hypothesis was presented authorizing expert testimony as to probable results of a failure to replace the same.—(*Dallas Consolidated Electric Street Railway Company vs. Rutherford*, 78 Southwestern Rep., 558.)

TEXAS.—Damages—Instructions—New Trial—Conditions of Refusal—Remission of Excessive Recovery.

1. An instruction, in an action for negligent killing, to return a verdict for such a sum "as is to the value at the present time sufficient to reasonably and fairly compensate plaintiffs for such pecuniary benefits as you may believe plaintiffs had a reasonable expectation of receiving," is not objectionable as calling for a verdict which might be more than enough to compensate them for the pecuniary loss sustained.

2. Where there is neither exception to the petition, nor objection to the testimony, a charge on negligence, enumerating acts embraced in the general language of the petition, is not erroneous, though the language of the petition is more general than that of the charge.

3. Under the direct provisions of *Sayles' Civ. St.* 1897, art. 1029a, it is proper for the trial court to require a remittitur of excessive damages as a condition to his overruling a motion for a new trial.—(*Fort Worth & D. C. Railway Company vs. Linthicum et al.*, 77 Southwestern Rep., 40.)

TEXAS.—Carriers—Injuries to Passenger—Proximate Cause—Discovered Peril—Contributory Negligence—Instructions—Antecedent Injury—Evidence—Admissibility—New Trial—When Granted—Diligence.

1. In an action against a street railway for injuries to a passenger, where the evidence raised the issue as to whether the injuries from which the passenger suffered were caused from the accident in the car or had existed previous thereto, an instruction that there could be no recovery unless the negligence of defendant was the direct and proximate cause of the injury was proper.

2. In an action against a street railway for injuries to a passenger, caused by the sudden starting of the car before she had reached her seat, evidence that the conductor had been informed when she entered the car that she was unwell and needed assistance, did not raise the issue of discovered peril.

3. In an action against a street railway for injuries to a passenger, where the only evidence of contributory negligence was of the conduct of the passenger in passing up the aisle of the car without taking the first vacant seat, it was proper for the court in its charge to single out that fact in presenting the issue of contributory negligence.

4. In an action against a street railway for injuries to a passenger, testimony that witnesses had never heard of the passenger's having hernia, and never heard her make complaint of that trouble, prior to the date of the accident, was properly excluded on the issue as to whether the passenger was ruptured prior to the accident.

5. Where plaintiff and his wife were well acquainted with parties whose evidence plaintiff alleged to be newly discovered, and all such parties resided in the same town with him, in many instances being close neighbors, a new trial for the alleged newly discovered evidence of such witnesses was properly denied for lack of diligence.

6. A new trial will not ordinarily be granted on the ground of newly discovered evidence, where such evidence is merely accumulative, or sought for the purpose of impeachment.—(*Pelly vs. Denison & S. Railway Co.*, 78 Southwestern Rep., 542.)

TEXAS.—Street Railroads—Injury to Employee—Instructions—Remarks of Counsel—Harmless Error—Jury—Return of Verdict—Right to Examine Jurors.

1. Where in an action by a street car conductor for injuries sustained by being knocked off the car by a pole supporting the trolley wire being placed in dangerous proximity to the track, defendant alleged that the conductor knew of the condition of the poles, and assumed the risk of being knocked off by them, instructions that if the conductor's injuries resulted from the risks ordinarily incident to the work, and were not due to the company's negligence, the jury should find for defendant, and that if the poles were so near the tracks that in the maintenance of the same defendant failed to exercise reasonable care, then it would not be one of the risks incident to the work, though correct propositions of law, were improper, for failing to state that if the conductor knew of the negligence of defendant, he could not recover.

2. The error in the instruction that if the poles were closer to the track than it was usual to place them, the danger arising

from it would not be a risk incident to the business, as taking from the jury the question of assumed risk on the part of the conductor with reference to the known conditions caused by defendant's negligence, was cured by instructions to the effect that if plaintiff knew of the conditions and remained in the employ of defendant, he could not recover.

3. In the absence of any assignment complaining of conflict in instructions, the court, on appeal, will not consider that question.

4. The language of counsel for plaintiff in a personal injury action against a corporation, that the jury should by their verdict compel corporations to exercise care towards their employees, though improper, was not reversible, where it did not appear that the jury was influenced thereby, and where no complaint was made of the amount of the verdict.

5. Where, in an action by a street car conductor for injuries sustained by being knocked off the car by a pole supporting the trolley wire, the evidence was overwhelming to the effect that it was customary for conductors to collect fares on both sides of the cars, only one employee of the company testifying that it was not usual to do so, the language of counsel for plaintiff, attacking the testimony of such employee, that he and everybody else knew that the custom prevailed, though improper, was not reversible error.

6. A party is not entitled to examine the jury after the return of the verdict as to what they considered in arriving at a verdict.—(Houston Electric Company vs. Robinson, 76 S. W. Rep., 209.)

VIRGINIA.—Street Railroads—Injury to Pedestrian—Instruction—Modifications—Negligence—Contributory Negligence—Discovered Peril—Concurrent Negligence.

1. In an action against a street railroad for the death of a pedestrian, it was error for the court, after instructing, at defendant's request, that plaintiff could not recover if decedent, being intoxicated, attempted to cross defendant's track in front of an approaching car, so close that he could not move from the point on the track that he first reached before the car struck him, to add to such instruction a qualification as to discovered peril, when such qualification had previously been embodied in a charge given at plaintiff's request, as the effect of such addition was to withdraw from the jury defendant's theory of the case.

2. Negligence contributing as an efficient cause of injury will defeat an action therefore, irrespective of the quantum of negligence of the respective parties.

3. As negligence, to defeat a recovery for personal injuries, must have been the proximate cause thereof, where defendant knew, or with ordinary care should have known, of plaintiff's negligence, and could have avoided the accident, but failed to do so, plaintiff can recover.

4. Negligence of a street railroad in running over a drunken pedestrian, and negligence of the pedestrian in stepping so close in front of the car that he could not move from the place on the track that he first reached before the car struck him, are so substantially concurrent that it is impossible to separate the conduct of the pedestrian from the injury itself, so as to permit a recovery therefor.—(Richmond Traction Company vs. Martin's Adm'x., 45 S. E. Rep., 886.)

#### CHARTERS, FRANCHISES AND ORDINANCES.

ILLINOIS.—Eminent Domain—Elevated Railroads—Construction—Consent of City—Fee in Streets—Damages to Abutting Owner—Additional Servitude.

1. Under Const. 1870 Art. 2, Section 13, providing that private property shall not be taken or damaged for public use without just compensation, an abutting owner, whose property has been injured by the construction of an elevated street railway in a street, the fee of which is in the city, is entitled to recover the damages sustained, though the railway was legally constructed in the streets by permission of the mayor and city council, and was not so negligently operated as to constitute a nuisance.

2. In an action by an abutting owner to recover damages to his abutting property by reason of the construction and operation of an elevated railway in a street, the fee of which was in the city, the fact that such railroad did not constitute an additional servitude on the street was immaterial.—(Aldis et al. vs. Union Elevated Railroad Company, 68 N. E. Rep., 95.)

ILLINOIS.—Supreme Court—Appellate Jurisdiction—Direct Appeals—Question of Freehold—Franchises—Constitutional Questions.

1. In mandamus by a city against a street railway to compel it to lower a tunnel authorizedly constructed by it, under a navigable river, so as to permit a deepening of the channel for purposes of navigation, where it is admitted that the company is the riparian owner on both sides of the river and of the bed where the tunnel is constructed, a question of the company's freehold

is not involved so as to confer direct appellate jurisdiction on the Supreme Court.

2. The case does not involve the freehold of the public in its easement of navigation.

3. The right of the railroad to construct its tunnel, and the fact that it was rightly constructed in the first instance, being admitted, its franchises are not involved.

4. The franchise of the city is not involved.

5. Where a street railway acquired its rights and constructed its tunnel under a navigable river upon condition that navigation should not be interrupted, mandamus to compel it to lower its tunnel, so as to permit a deepening of the channel, would not involve the determination of a constitutional question as to taking the railway's property without compensation and without due process of law.—(People ex rel. City of Chicago vs. West Chicago Street Railway Company, 68 N. E. Rep., 78.)

ILLINOIS.—Specific Performance—Street Paving—Contracts With Street Railways—Ultra Vires—Parties—Damages—Assessment.

1. Under 1 Starr & C. Ann. St. 1896 (2d Ed.) c. 24, par. 63, conferring on the city council power to grade, pave and improve streets, a contract by abutting owners with a street railway company for the pavement of a street in accordance with specifications furnished by parties having no control of the streets, and containing no provision that the company was to obtain an ordinance from the city permitting it to pave the street cannot be specifically enforced.

2. A contract with a street railway company to pave the street for a consideration inuring to the benefit of abutting owners is ultra vires, since a street railway company organized under the Illinois law has no power to engage in the business of paving streets.

3. Where abutting property owners have entered into a contract with a street railway company to pave a street, knowing that it could not be enforced without the city's consent, specific performance of it cannot be enforced in a suit to which the city is not a party.

4. Where an agreement to pave a public street is made with a street railway company having no power to control the street or improve it without the city's consent, a bill for specific performance by parties knowing such facts cannot be retained for the assessment of damages.—(Farson et al. vs. Fogg et al., 68 Northwestern Rep., 755.)

ILLINOIS.—Streets—Dedication—Acceptance—Street Railways—Use of Private Property—Injunction.

1. Where land is platted as an addition to a city, and certain portions thereof designated as streets, and the property is sold with reference to such plat, the designation of a street upon the plat does not constitute the land so designated a street until the dedication is accepted by the city.

2. Where land is platted as an addition to a city, certain portions thereof being designated as public highways, the mere acceptance of the plat by the municipal authorities, and inclusion of the territory covered thereby within the city limits, is not an acceptance of the dedication of the streets.

3. Under Hurd's Rev. St. 1899, c. 131a, section 1, providing that street railway companies shall occupy streets in such manner as not to unnecessarily obstruct the public use thereof, a municipal corporation cannot grant such company the right to the exclusive use of a street.

4. Pending a suit to enjoin the construction of a street railway on private property, which defendant street railway company claimed constituted a street, the railway company filed a bond conditioned to pay all damages that might be awarded complainant, and proceeded with the construction of the road. Held, that nevertheless, on a finding that the property was in fact private property and not a street, complainant was entitled to an injunction compelling the railroad company to remove its structure.—(Russell vs. Chicago & M. Electric Railway Company et al., 68 Northwestern Rep., 727.)

ILLINOIS.—Municipal Corporations—Street Railways—Right of Way—Estoppel.

1. A village granted a street railway company a right of way 25 ft. in width through certain streets, and, upon its appearing that the construction of a viaduct over a portion of the street would be necessary, an amendatory ordinance was granted, a certified copy of which in the hands of the railway company authorized the construction of a viaduct 25 ft. in width. The amendatory ordinance could not be found, but, as copied in the records, it authorized the use of only 20 ft. of the street, but from the beginning of the work the president of the village council and the village engineer, under whose supervision the work was done, had knowledge that the company was using more than 20 ft. of the

street. Held, that after the completion of the viaduct the village was estopped from insisting upon the removal of that portion of it which exceeded the 20 ft. limit.—(Village of Winnetka vs. Chicago & M. Electric Railway Company, 68 N. E. Rep., 407.)

ILLINOIS.—Municipal Improvements—Special Assessments—Measure of Benefits—Apportionment—Leasehold Estates.

1. In considering special assessments the general rule is that the inquiry as to benefits is to what extent the market value of the premises will be enhanced by the improvement.

2. Where special assessments are made against property for improvements the judgment against the property is an entirety, and the benefits cannot be apportioned against the estate in fee in remainder and the leasehold estate of a tenant of the property.

3. Where a street railway company occupied certain real estate for railway purposes, and thereafter leased the same to another street railway corporation with a stipulation that the property should be used for street railway purposes only, but the lessee thereafter sublet such property for other purposes, it was liable to a special assessment for improvements to the extent of the market value of the lots was increased by reason of the improvement.—(Chicago Union Traction Company vs. City of Chicago, 68 N. E. Rep., 519.)

ILLINOIS.—Municipal Corporations—Street Railways—Franchises—Mortgage of Leasehold—Nuisance—Parties—Writ of Error—Estoppel.

1. Where a defendant in error, whose interests were adverse to those of its codefendant and identical with those of plaintiff in error, did not assign cross-error on a question not raised by plaintiff's assignment of errors, but argued the question fully in its brief, such defendant could not, after an adverse decree, sue out an original writ to review the same question, though the provision in Prac. Act, section 78 (Starr & C. Ann. St. 1896 [2d Ed.] p. 3106, c. 110), that a defendant in error may assign cross-errors be constructed as merely permissive.

2. In a cross-bill by a city against a street railway and its lessee to compel the removal of the railroad tracks, the right to maintain them in the streets having expired, a mortgagee of the leasehold, who is not in possession thereof, is not a necessary party, as the suit is in substance one to abate a nuisance.—(Suburban Railway Company vs. City of Chicago et al., 68 N. E. Rep., 422.)

INDIANA.—Street and Interurban Railroads—Municipal Corporations—Transfers—Annexed Territory—Rights of Passenger—Public Contract—Construction—Jurisdiction—Supreme Court.

1. The Supreme Court has jurisdiction of causes in which the validity of a franchise is involved, regardless of the amount of the judgment.

2. A street railroad operating its lines in a city under a contract to issue transfer tickets free of charge to all passengers requesting the same, who might board its cars at any point on any of its lines in the city, and whose destination might be to any other point on any line of the company's road in the limits of the city, is bound to transport a passenger tendering such transfer to his destination on the company's line, though that be in territory annexed to the city after the contact was made, and on its interurban line, on which it had a franchise entitling it to charge an additional fare outside the city as its limits were before the annexation of territory.

3. A contract between a street railway and a city is a public contract, and should be liberally construed in favor of the public.—(Indiana Railway Company vs. Hoffman, 69 Northeastern Rep., 399.)

INDIANA.—Injunction—Grounds of Relief—Adequacy of Legal Remedy—Condemnation Proceedings—Collateral Attack.

1. The right of a corporation to exercise the power of eminent domain is a question to be determined in condemnation proceedings, and a suit to enjoin a corporation from building on land for the appropriation of which right of way proceedings had been commenced by it cannot be maintained.

2. The fact that a court in condemnation proceedings may make an erroneous ruling does not entitle the aggrieved party to an injunction, but the remedy is by appeal from the ruling if authorized by statute, or, if not, by appeal from the final judgment.—(Boyd vs. Logansport, R. & N. Traction Company, etc., et al., 69 Northeastern Rep., 398.)

IOWA.—Eminent Domain—Condemnation Proceedings—Property Involved—Separate Tracts—Recovery for Whole.

1. The fact that a railroad in condemnation proceedings described only that portion of a farm which was north of another railroad previously constructed across it from east to west could not deprive the owner of the farm, on her appeal from the award of the sheriff's jury, of her right to establish and recover damages

to her entire farm, when in fact such northern portion was part of the whole.

2. The fact that a railroad built from east to west across a farm made the part of the farm north of such railroad of less convenient use to the rest of the farm than it otherwise would be, should be considered in subsequent proceedings by another road to condemn a right of way across such northern portion of the farm, to arrive at the value of the farm immediately before the latter road appropriated its right of way, but does not constitute a severance of the northern part from the rest of the farm, when it is all occupied and used as one holding, so as to prevent a recovery for damages done to the farm as an entirety.—(Cook vs. Boone Suburban Electric Railway Company, 98 Northwestern Rep., 293.)

KENTUCKY.—Street Railways—Construction on Highway—Abutting Landowners—Rights—Injuries to Fences—Crossings—Defenses—Damages—Pleading.

1. In an action by an owner of land abutting a highway against an electric railway company for injuries to plaintiff's highway fences in the construction of its road, an answer alleging that plaintiff's fences were constructed in the highway under a license obligating plaintiff to remove the same on request, and that the maintenance of such fences in their present location was inconsistent with the use of the highway under defendant's franchise, and that it had requested plaintiff to remove them, but that he had refused, stated a valid defense.

2. Where a traction company obtained a franchise for the maintenance of a railway along a highway, and fences maintained by abutting owner in the highway obstructed the free use of the traction company's franchise, it had the right to remove them without compensation to the owner.

3. Where an owner of land on both sides of a highway was entitled to maintain certain crossings over the same, which were destroyed or injured by the construction of a street railway along the highway, such owner was entitled to recover damages sustained between the time the crossings were injured and the time they were restored.

4. An electric railway does not constitute additional servitude on a highway so as to entitle an abutting owner to compensation for the use of the highway for such purpose.—(Georgetown & Lexington Traction Company vs. Mulholland, 76 S. W. Rep., 148.)

MAINE.—Railroad Commissioners—Decree—Conclusiveness—Railroad Crossings.

1. Under our statutes the whole question of how railroad crossings shall be constructed and maintained is left, in the first instance, to the sound judgment and discretion of the railroad commissioners for determination; and their decision, when made, is final, unless an appeal is taken.

2. They have no authority to modify or change such decree once made, except upon a new application, notice, and hearing; nor can they, before appeal, make a temporary decree which does not purport to represent their sound judgment and discretion in the premises. Such temporary decree is void.—(Boston & M. R. v. Saco Valley Electric Railway, 56 Atlantic Rep., 202.)

MARYLAND.—Grade Crossing—Regulation—Injunction.

1. Act June 19, 1871 (P. L. 1360), relating to legal proceedings against corporations, and regulating crossings of railroads, will receive a literal construction, and be rigidly enforced, so as to remove the danger to life and property in grade crossings.

2. The courts in determining the practicability of an overhead crossing, will not consider the expense, nor the damages that may have to be paid owners of private property, nor that such crossing will obstruct the view of coming trains, nor that local sentiment is in favor of a grade crossing.

3. The construction of a grade crossing by a street railway company over a steam railroad company's track will be enjoined where it is in a depression, the street ascending in either direction from the tracks, and being very much traveled, and where thirty-four scheduled trains, beside extra trains, pass daily, where it was practicable to build an overhead crossing about 800 ft. in length.—(Baltimore & O. R. Company et al. vs. Butler Pass Railway Company, 56 Atlantic Rep., 960.)

MASSACHUSETTS.—Street Railways—Statutes—Construction of Tracks—Alterations—Authority of Selectmen—Evidence—Competency—Mandamus—Existence of Adequate Remedy—Costs.

1. St. 1898, c. 578 (Rev. Laws, c. 112, section 7), provides that the selectmen of a town, in granting a location to a street railway, may prescribe how the tracks may be laid, and the kind of rails, and may impose such other terms as the public interests may require. Held, that the selectmen had authority to prescribe that the railway company might use a certain rail, without granite

paving between the rails, on condition that, if the construction did not prove satisfactory to the selectmen, it should be changed within a specified time for a different rail and granite paving.

2. Rev. Laws, c. 112, section 100, gives the Superior Court jurisdiction in equity, on the petition of the selectmen of a town, to compel the observance by a street railway of all orders and regulations made in accordance with the provisions of the chapter. Held, that a suit in equity by the selectmen of a town to compel a street railway company to lay rails of a certain character, in accordance with an order previously made by the selectmen under the authority of chapter 112, could not be regarded as a suit to enforce a contract between the railway and the town, but as brought under the statute to compel the observance of the order.

3. The payment by a street railway company of the excise tax, under Rev. Laws, c. 14, sections 43-47, exempting it from making repairs on public ways, does not exempt it from the duty to comply with orders made by the selectmen of the town in granting the location, and which required the road, in case a certain character of rail, pavement, etc., does not appear satisfactory, to cause another rail, and pavement between the rails, to be substituted therefor.

4. Rev. Laws, c. 112, section 7, provides that the selectmen of a town, in granting a location to a street railway, may impose such terms and obligations as the public interest may require, as to how the tracks shall be laid, the kind of rails, etc. Held, that in a suit by the selectmen of a town to compel a street railway to lay certain rails in accordance with an order of the board of selectmen, which order had provided that such rails should be laid in case certain other rails first laid should prove unsatisfactory, it was immaterial that the owner of the street railway was financially embarrassed and unable to carry the order into effect.

5. The determination of the selectmen of a town as to the character of rail that shall be used is final, in the absence of fraud, and cannot be controlled by the judiciary.

6. In a suit by the selectmen of a town, under Rev. Laws, c. 112, section 7, to compel a street railway to lay a certain rail, in accordance with an order made when granting the location, it was not competent to vary and control the written grant of location by evidence of an oral agreement between the selectmen and defendant.

7. Rev. Laws, c. 112, section 100, provides that the Superior Court shall have jurisdiction in equity, on the petition of the selectmen of a town in which a street railway is located, to compel the observance of all orders made relative to the construction of the road in accordance with such chapter by the selectmen of a town. Held, that under the statute the selectmen are the proper parties for plaintiff to bring a bill to compel observance of an order properly made by them under the statute as to the manner of the construction of a street railway within their jurisdiction.

8. By a proper construction of Rev. Laws, c. 112, Section 100, all work of construction is to be done to the satisfaction of the Selectmen.

9. Where the Selectmen of a town file and pursue a bill in equity under the statute, they are not entitled to costs on appeal from a judgment dismissing a mandamus brought to enforce the same order as that sought to be enforced by the suit in equity.

10. An adequate remedy being provided by the statute for the enforcement of an order regulating the construction, etc., of a street railway, the inhabitants of a town in which a street railway is situated are not entitled to mandamus to compel the observance of such order.

11. Rev. Laws, c. 112, Section 7, provides that the Selectmen of a town, in granting a location to a street railway, may prescribe how the tracks shall be laid, the kind of rails, etc., and Section 100 provides that the Selectmen of a town may maintain a suit in equity to compel the observance of any order regulating a street railway. Held, in a suit by a town, under the statute, to compel the observance of an order requiring rails of a certain character to be laid, an objection that the court would not interfere to compel the performance of continuous acts was untenable.—(Selectmen of Gardner vs. Templeton Street Railway (two cases) Inhabitants of Gardner vs. same, 68 N. E. Rep., 340.)

**MICHIGAN—Railroads—Deed for Right of Way—Construction at Grade—Requirement—Embankment of Other Road—Contract with Guarantee—Guarantee's Liability—Removal of Trestle—Right to Relief—Damages—Jurisdiction of Equity.**

1. A deed granting a right of way to a suburban electric railway company authorized it to construct and operate a road "substantially as the poles and trolley wires of said company are now erected and maintained on W Street," where a surface line was built. The company was also required to operate its railway over the grant "substantially in the same manner as under the franchise granted to it by the city of K.," and this franchise ordinance required that

rails should be laid so as not to obstruct the passage of vehicles, that their upper surface should be flush with the surface of the streets, and that the tracks should conform to the street grades. Held, that the company had no right, under the deed, to build and maintain a trestle above grade.

2. A railway company which contracts with another company for a subway crossing—the State Railroad Commissioner having forbidden a grade crossing—is not liable to an adjoining landowner for damages resulting from the erection by the latter company, in pursuance of the contract, of an embankment on its own private right of way.

3. The violation of the restrictions of a deed granting a surface easement for a right of way to a railway company, by the company's erection of a trestle above grade, pursuant to the requirement of the State Railroad Commissioner, will not entitle the grantor to a decree compelling the tearing up of the track and the abandonment of the road, but will only entitle him to pecuniary damages.

4. Equity, having obtained jurisdiction of an injunction suit in which the relief sought is refused, may award pecuniary damages, rather than remit complainant to an action at law therefor.—(Lane et al. vs. Michigan Traction Company, 97 Northwestern Rep., 354.)

**MICHIGAN.—Street Railroads—Suburban Lines—Rights of Company Under Franchise—Forfeiture.**

1. A street railway company was incorporated to run a railway through the centers of population of H. county, and acquired a franchise from the village of L., on its main line. The franchise authorized an electric road, "with all necessary side tracks and switches," etc., to begin at the southwest corner of the village limits on C. Street, whose center was the boundary between the village and the adjoining village of F., thence east on such street, and thence in various other directions, on other streets, to the village limits. It also required the company to run its cars "to said village" from outside points. Held, to authorize the company to make a necessary connection on C. Street with a branch line built through F. Street to the village boundary on that street.

2. The right of a street railway company under its franchise to connect its road in a village with a branch line which it afterward built to the village boundary was not forfeited by its failure to construct the branch within the time fixed for constructing its road through the village.—(Houghton County Street Railway Company vs. Common Council of Village of Laurium, 98 Northwestern Rep., 393.)

**NEBRASKA.—Mortgage — Foreclosure—Sale — Merger— Special Assessment—Lien—Redemption—Subrogation.**

1. Where the real property is sold under a degree of foreclosure of a mortgage, and the holder of a lien junior to that of the mortgage is not concluded thereby, the mortgage lien will not be held to merge in the legal title of the purchaser for the benefit of the junior lienholder.

2. A lien for paving assessments against the property of a street railway in the city of Lincoln, which has been ascertained and fixed as a first lien in favor of the city by degree of court, may be redeemed by the purchase of the property at foreclosure sale in a former action based upon a subsequent mortgage, and upon such redemption the purchaser will be subrogated to the rights of the city under the decree against the holder of a lien junior to that of the mortgage existing prior to the sale who is not concluded thereby, and the fact that the city is the holder of the third lien does not entitle it to prevent such redemption and subrogation.

3. Where a decree of court has established all the liens upon the property involved with their ownership and priority, the holder of any lien thus established may redeem all prior liens, and on motion be awarded an order of subrogation to the rights of the holders thereof, not inconsistent with any rights fixed by the decree.

4. Decree examined, and held, to so fix the rights of appellant and appellee in their relation to the property involved and the liens thereon that appellee was, upon motion, entitled to the order complained of.—(City of Lincoln vs. Lincoln Street Railway Company et al., 97 Northwestern Rep., 255.)

**NEW JERSEY.—Constitutional Law—Incorporation of Traction Companies—Special Act.**

1. The act entitled "An act to secure companies incorporated under 'An act to provide for the incorporation of street railway companies and to regulate the same,' approved April 6, 1886, and a supplement thereto entitled 'A further supplement to an act entitled 'An act to provide for the incorporation of street railway companies and to regulate the same,' approved April 6, 1886,' which supplement was passed March 2, 1891, owning and operating street railways upon public streets, highways or avenues in this State, whose roads have been peaceably and continuously operated for two years without objection, the right to become incorporated under the act entitled 'An act to authorize the formation of trac-

tion companies for the construction and operation of street railways or railroads operated as street railways, and to regulate the same," approved March 14, 1893, and the several supplements thereto and acts amendatory thereof," approved April 14, 1903 (P. L., p. 705, is a special act conferring corporate powers, and unconstitutional, being under paragraph 11, section 7, art. 6, of the Constitution, which declares that "the Legislature shall pass no special act conferring corporate powers."—(Perrine vs. Jersey Central Traction Company, 56 Atlantic Rep., 374.)

**NEW JERSEY.—Equity—Jurisdiction—Railroads—Conflicting Easements of Way—Crossings.**

1. Jurisdiction to determine how conflicting easements of way across the same place shall be occupied and used by two or more holders of such easements is vested in the Court of Chancery.

2. That jurisdiction is one of the inherent equitable powers of the Court of Chancery, which is incapable of exercise by any other forum, and is protected by article 6, section 1, of the Constitution of this State.

It is unaffected by any legislative franchise granting to a corporation an easement of way, or by a legislative charter which empowers a community to regulate streets and railroad crossings within its bounds.

4. Where a newly organized company is authorized to lay its railroad tracks at grade across the existing tracks of another railroad, and the construction proposed involves only such a crossing, the new company should pay the expenses incident to the safe construction of its tracks across those of the senior company.—(West Jersey & S. R. Co. vs. Atlantic City & S. Traction Company et al., 56 Atlantic Rep., 890.)

**Railroad—Location—Map—Abutting Owners—Ordinance Granting Authority to Construct—Acceptance.**

1. Where a traction company has filed a description of a route in the Secretary of State's office, a judgment holding proceedings for an extension thereof invalid because proper consent was not procured for the original route, and there was no route to extend, leaves the filed map and description unaffected, with the power in the company to procure new consents and a fresh ordinance authorizing construction of the route.

2. Under Pub. Laws, 1893, p. 306, section 6, requiring a railroad corporation organized under that act, before constructing a new road, to file in the office of the Secretary of State a description and map of the route, showing its courses and distances, a map showing the termini with the route from one to another following variety of courses, but nothing to determine the courses or indicating the points of the compass is insufficient, so that, notwithstanding the filing of such map, the company may begin proceedings anew for the establishment of the route.

3. Consents of abutting property owners to the establishment of a railway route, whose only limitation is that the road be built along the highway in front of the consentor's land, are valid, though executed before the filing of the description and map of the proposed route in the Secretary of State's office.

4. No legal presumption arises that consents to the establishment of a railway route were given with reference to a map previously filed in the Secretary of State's office, when that map was defective.

5. A resolution by the board of directors of a corporation that it should construct a line of railway, and that the president and secretary were authorized to execute all papers to procure ordinances for that purpose, was sufficient to authorize the president and secretary to execute, under the corporate seal, an acceptance of an ordinance subsequently passed authorizing the construction of the road.

6. Where an ordinance was passed authorizing the construction of a railroad, and an acceptance thereof executed under the corporate seal by the president and secretary, the presumption of their authority, arising from such execution, is not rebutted by the absence of any written minutes showing that a meeting was held at which they were empowered to execute it.—(Mercer County Traction Company vs. United New Jersey R. & Canal Company, 56 Atlantic Rep., 898.)

**NEW JERSEY.—Eminent Domain—Procedure—Appeal.**

1. The practice in condemnation proceedings, as prescribed by section 14 of the Traction Act, of 1893 (P. L. 1893, p. 302; Gen. St., p. 3235), is superseded by the general condemnation act of 1900 (P. L. 1900, p. 79.).

2. The Traction Act of 1893 (P. L. 1893, p. 302; Gen. St., p. 3235) gives no appeal from the report of commissioners in the sense that the word "appeal" is used in section 9, of the Condemnation Act of 1900 (P. L. 1900, p. 79), and therefore companies organized under the former act are not entitled to an appeal under the terms of the latter.—(Paterson & State Line Traction Company vs. De Gray, 56 Atlantic Rep., 250.)

**NEW JERSEY.—Eminent Domain—Appointment of Commissioners.**

1. The Traction Act, of 1893 sections 13, 14, Gen. St. p. 3239), authorized the condemnation of land for the construction of any railway built under the provisions of this act, "either as an extension of the line of an existing railway, or of a new line not exceeding 60 ft. in width." A company, operating on leased land a railway so built, procured the appointment of commissioners to condemn a strip of land adjoining the strip on which its existing line was operated, the two together not exceeding 60 ft. in width. Held, that the proceeding so taken was within the provisions of this act.—(Middlesex & S. Traction Company vs. Metlar, 56 Atlantic Rep., 142.)

**NEW JERSEY.—Street Railroads—Construction—Consents of Abutting Property Owners—Enforcing Consent Withdrawn.**

1. Act April 21, 1896 (P. L. 329) section 1, provides, as to application for permission of the governing body of a borough or other municipality to construct a street railway, that permission shall not be granted until written consents of abutting owners shall be filed as therein prescribed. Held, that the statute was not intended to give to every abutting owner a right to consent for all future owners to future applications, but to require the consent of those who were owners at the time of the particular application; and that the only right that a traction company could enforce under such consents was the statutory right arising in connection with some application or proposed application; and hence a suit to enforce a consent claimed to have been illegally withdrawn could not be maintained where the application to which it related had been denied and no subsequent application was pending.—(Paterson & S. L. Traction Company vs. Wostbrock et al., 56 Atlantic Rep., 698.)

**NEW YORK.—Eminent Domain—Procedure—Costs to Landowner.**

1. A landowner is entitled to recover the same amount of costs that a defendant may recover under Code Civ. Proc., section 3251—\$10 for the proceedings before notice of trial, \$15 after such notice, and \$30 costs for trial of an issue of fact, and \$10 for trial exceeding two days—where the compensation awarded by the commissioners under Code Civ. Proc., section 3372, exceeds the amount offered by the corporation seeking to condemn the land, with interest from the time the offer was made, when he has prevailed in the Supreme Court after trial.—(In re Brooklyn Union Elevated Railroad Company et al., 68 N. E. Rep., 248.)

**NEW YORK.—Eminent Domain—Street Railroads—Agreement With Owners.**

1. Laws 1890, p. 1108, c. 565, section 90, as amended by Laws 1895, p. 791, c. 933, provides that nothing in the section shall authorize a street railway company to acquire real property within a city by condemnation. Held, not intended to restrict power of eminent domain given by other sections of such law to corporations subject to it.

2. That a street railroad company is not able to agree for the purchase of property required for its right of way, so as to authorize it, under Laws 1890, p. 1108, c. 565, section 90, as amended by Laws 1895, p. 791, c. 933, to condemn the land acquired, is not shown where there is no evidence of negotiations or reasonable effort to make the agreement with such owners.—(Schenectady Railway Company vs. Lyon et al., 85 New York Supplement, 40.)

**NEW YORK.—Municipal Corporations—Ordinance—Regulations of Street Railways—Destination of Car—Sign—Sufficiency—Failure to Comply—Defense—Impossibility—Proof.**

1. Under an ordinance requiring street railways to designate on their cars the destination thereof, so as to enable proposed passengers to board a car which will carry them to a place they seek, a car sign designating the destination as "F., via J. Avenue," is a compliance, F. being a particular part of the city.

2. In action by city against a street railway company for violation of an ordinance requiring such companies to designate on their cars the destination thereof, proof that traffic was delayed in consequence of an accident to another car, and that the passengers were transferred from the car they had chosen to one that did not reach their destination—the transfer being compelled because an official thought he could serve the greatest good of the greatest number of proposed passengers at the expense of those who were actual passengers, entitled to be carried to the end of their respective journeys—does not show that compliance with the ordinance was impossible by reason of any accident.—(City of New York vs. New York & Q. C. Railway Company, 85 New York Supplement, 857.)

**NEW YORK.—Street Railways—Injury to Property—Damages—Subsequent Lease—Grant to Road of Easements—Rights of Tenant—Recordation of Grant—Complaint—Relief.**

1. Where, at the time a lease is executed, an elevated railway is

in full operation in front of the premises, of which fact the lessee is aware, he cannot recover on account of the operation of the road.

2. Where an elevated railway obtains from the lessor of premises, during the existence of the lease, a grant of all the easements of light, air and access in or appurtenant to the premises, the execution of a new lease between the same parties at the expiration of the old one, at which time the elevated road is in full operation in front of the premises, to the knowledge of the lessee, bars the right of the lessee to recover from the elevated road damages for the privation of rights for the new term, though the grant to the elevated railway was not recorded.

3. A party can only recover in accordance with the allegations of his complaint as originally made or subsequently amended.—(Child vs. New York Elevated Railway Company et al., 85 New York Supplement, 604.)

NEW YORK.—Highways—Unauthorized Construction and Operation of Street Railway—Private Nuisance.

The unauthorized operation of the cars of a street railway company within a few inches of a curb, so that vehicles halting in front of the adjacent premises must stand on the track, and be in constant danger from passing cars, and so that no hitching post or horse block can be maintained at that point, constitutes an actual and peculiar damage to the premises, warranting an injunction by the abutting owner, though the company, in occupying the street without authority, is also a trespasser maintaining a public nuisance.—(Henning vs. Hudson Valley Railway Company, 85 New York Supplement and 119 New York State Reporter, 1112.)

NEW YORK.—Carrier Refusal to Give Transfer—Excuse—Statutory Regulation of Fares—Lease of Railway—Corporation Operating Railways—Railways Within City—Consolidation of Railways.

1. It is no excuse for the refusal of a street railway company to give a passenger a transfer, as required by statute, that he could travel over another route of its system for one fare.

2. It is no excuse for the refusal of a street railway company to give transfers at a certain point, as required by statute, that to give transfers there would cause undue crowding on the street and at the crossing.

3. Const. art. 8, section 1, provides that corporations may be formed under general laws. Laws 1850, p. 211, c. 140, authorized the formation of railroad corporations, which should be subject to 1 Rev. St. (1st Ed.) p. 600, pt. 1, c. 18, tit. 3, section 8, providing that the charter of every corporation shall be subject to alteration in the discretion of the Legislature. Held, that a railway corporation formed under Laws 1850, p. 211, c. 140, is subject to statutory regulation of the fares it may charge.

4. In view of the course of legislation (Laws 1839, p. 195, c. 218; Laws 1850, p. 211, c. 140; 1 Rev. St. [1st Ed.] p. 599, pt. 1, c. 18, tit. 3; Laws 1884, pp. 314, 315, c. 252, sections 15, 18; Laws 1885, pp. 525, 526, c. 305, sections 1, 4; Laws 1890, p. 1114, c. 565, art. 4, sections 103, 104) relating to the leasing of railways, Laws 1892, p. 1406, c. 676, art. 4, section 104, providing that every railway corporation entering into "such contract" shall give a transfer to each passenger, entitling him to one continuous trip to any portion of any railroad embraced in "such contract," refers to contracts of lease of railways as well as to traffic contracts for the use of roads.

5. In view of Laws 1892, p. 1399, c. 676, art. 4, section 90, as amended by Laws 1895, p. 791, c. 933, providing that the provisions of the article apply to every corporation which operates a street surface railway, section 104, art. 4, c. 676, p. 1406, Laws 1892, providing that "every such corporation" shall give a transfer to each passenger, applies to a corporation formed under the stock corporation law, which owns and operates a railway.

6. In Laws 1892, p. 1406, c. 676, art. 4, section 104, requiring corporations operating street railways to carry passengers for a single fare, and providing that its provisions shall only apply to railways wholly within the limits of any city, the proviso refers to the railroads, and not to the corporations operating them.

7. Where various street railway companies consolidate as authorized by the railway law (Laws 1890, p. 1082, c. 565, as amended by Laws 1892, p. 1382, c. 676), the consolidated company and its successors in interest, under section 90, art. 4, c. 676, p. 1399, Laws 1892, as amended by Laws 1893, p. 908, c. 434, providing that the provisions of the article shall apply to every corporation operating a street railway in a city, are subject to section 104, art. 4, c. 676, p. 1406, Laws 1892, requiring every railway corporation entering into "such contract" to give transfers to passengers.—(Topham vs. Interurban Street Railway Company, 86 New York Supplement, 296.)

NEW YORK.—Mandamus—Discretion of Court—Review on Appeal—Street Railways—Transfers.

1. An application for a peremptory writ of mandamus is ad-

mitted to the sound discretion of the court, and where it does not appear from an order denying the application that the court refused it on the ground of a want of power, or upon any other question of law, the proceeding is not reviewable by the Court of Appeals.

2. A peremptory writ of mandamus will not be granted to a private citizen, having no peculiar grievance, requiring a street railway company operating two intersecting lines of railway in the city of New York to carry, under Laws 1892, p. 1406, c. 676, section 104, any passenger desiring to make a continuous trip from any one point on one line to any other point on the other line for 5 cents, and to give such passenger at the intersection of such lines a transfer entitling him to such continuous trip; there being sufficient and adequate remedy at law.—(People ex rel. Lehmaier vs. Interurban Street Railway Company, 69 Northeastern Rep., 596.)

NEW YORK.—Street Railways—Refusal to Transfer—Penalty—Action—Action by Infant.

1. Under the Railway Law, section 104 (Laws 1890, p. 1082, c. 565, as amended by Laws 1892, p. 1406, c. 676), providing that for every refusal to comply with the act the corporation so refusing shall forfeit \$50 to the aggrieved party, the passenger to whom a transfer is refused in violation of the act is the aggrieved party.

2. A minor to whom is refused a transfer from one line of railway to another, in violation of Railway Law, section 104 (Laws 1890, p. 1082, c. 565, as amended by Laws 1892, p. 1406, c. 676), is entitled, under Code Civ. Proc. section 468, to bring an action, through a guardian ad litem, for the penalty provided in the act.—(Fox vs. Interurban Street Railway Company, 86 New York Supplement, 64.)

NEW YORK.—Municipal Corporations—Police Officers—Authority to Direct Movement of Teams and Vehicles in Streets.

Greater New York Charter, section 315 (Laws 1897, p. 113, c. 378), directing the members of the police force to "regulate the movement of teams and vehicles in streets," does not authorize a police officer to direct a street car motorman to use his car to push a coal truck blocking street car traffic, and thus render the street car company liable for injuries sustained by the officer because of the motorman's negligence in operating the car while pushing the coal truck.—(Connelly vs. Metropolitan Street Railway Company, 84 New York Supplement, 305.)

NEW YORK.—Carriers—Street Railways—Transfers—Statute—Obligation—Constitutional Law—Police Power—Deprivation of Property.

1. Railroad Law (Laws 1890, p. 1106, c. 565), section 78, provides that railway corporations or any corporation owning or operating any railway or railway routes within the State, may contract with any other corporation for the use of their respective routes or roads, or any part thereof, and thereafter use the same in such manner and for such time as may be prescribed by such contract. Section 105 (page 1114) requires every such corporation entering into such a contract to carry between any two points on the railway or portion thereof embraced within the contract any passenger desiring to make a trip between such points, for a single fare, not higher than the lawful fare charged by such corporation for one adult passenger, and to issue transfers evidencing the passenger's right to such continuous passage. Held, that such section applied to the Interurban Street Railway Company, of the city of New York, and required it to give transfers over all the lines of its system wholly within the limits of the city of New York for a single fare.

2. Such sections were a proper exercise of the State's police power, and were not unconstitutional, as tending to diminish the business of the company or impair the salability of its property.—(Blume vs. Interurban Street Railway Company, 83 New York Supplement, 989.)

NEW YORK.—Taxation—Corporations—Bank Deposits—Taxation as Capital.

1. Relator was a domestic corporation organized for the purpose of "holding securities and stocks of street railway companies and furnishing capital for construction thereof." It had a bonded indebtedness of \$7,000,000, and carried large sums of money on deposit in various banks to meet the semi-annual interest on such indebtedness, and taxes and incidental expenses. The largest part of the money on deposit in a certain month was obtained by the sale of the bonds of a certain street railway, and was intended in part to be expended by relator on the property owned by that company. The money in the various banks constituted a general balance, and no part of it was ever separated by relator as idle, uninvested or unemployed funds. Held, that the determination of the Comptroller that the money in the various banks constituted a part of relator's capital on which the franchise tax should be computed would not be disturbed.—(People ex rel. Brooklyn Rapid Transit Company vs. Miller, 83 New York Supplement, 96.)

## NEW YORK.—Taxation—Sale—Who Entitled to Redeem.

1. A purchaser at a mortgage foreclosure sale is "the holder of a mortgage," within the tax law (Laws 1896, p. 845, c. 845, c. 908, section 139, as amended by Laws 1897, p. 274, c. 373), which authorizes redemption from a tax sale to be made by "the holder of any mortgage which is duly recorded at the time of the sale."—(People ex rel. Brooklyn Union Elevated Railway Company et al vs. Morgan, 83 New York Supplement, 86.)

## NEW YORK.—Franchise Tax—Deductions—Percentage of Gross Earnings—Lamp Tax—What Payments Deducted—Assessment—Tax District—Violation of Agreement.

1. Under Laws 1884, p. 309, c. 252, requiring a street car company in a city of over 250,000 inhabitants to pay to the city a fixed percentage of its gross income, a company was organized, and purchased a franchise by bidding at public auction the highest percentage on its gross earnings in addition to that above referred to, this method of sale being expressly required by Laws 1886, p. 81, c. 65, as amended by Laws 1886, p. 919, c. 642, and Laws 1889, p. 756, c. 564. Later the city, by an agreement with the companies operating therein, accepted a fixed uniform percentage on the gross earnings of each company in lieu of the percentage formerly paid, which agreement was approved by Laws 1892, p. 311, c. 151. Held, that such percentages are in the nature of a tax, within Laws 1899, p. 1593, c. 712, section 46, deducting from the tax on a street railway franchise any percentage on gross earnings paid under any agreement or statute, which payment is in the nature of a tax.

2. Laws 1899, p. 1593, c. 712, section 46, deducting from a street railway franchise tax any sums paid under any agreement therefor, or statute requiring the same, based on a percentage of gross earnings, or any other income, or any license fee, or any sum on account of the franchise, does not authorize the deduction of the lamp tax levied under the city charter of Buffalo (Laws 1891, p. 224, c. 105, section 414), one-half paid out of the general fund and the other half levied on the taxable property of the taxing district.

3. In Laws 1899, p. 1593, c. 712, section 46, providing that if, when a street railway franchise tax is due, the company has paid to a city for its use, under any agreement therefor, or under any statute requiring the same, or any license tax, or any sum on account of the special franchise, "which payment was in the nature of a tax," all amounts so paid shall be deducted from the franchise tax, the term payment includes all the sums designated, so that the right to the deduction in each case depends on whether it is in the nature of a tax.

4. Under Laws 1899, p. 1590, c. 712, section 42, providing that the valuation of a special franchise by the State Board of Tax Commissioners shall be delivered to the officers charged with making local assessments in each tax district, and Laws 1896, p. 796, c. 908, section 2, defining a tax district, the valuation of a street railway company's franchise was properly placed on the assessment roll of the ward in which it had its principal office, as an indivisible sum, instead of apportioning it among the various wards.

5. Laws 1899, p. 1589, c. 712, imposing a tax on the value of the franchise of a street railway company payable to the city, does not violate an agreement approved by Laws 1892, p. 311, c. 151, whereby the city agreed to accept a fixed annual percentage on the gross earnings of the company, in lieu of percentages formerly paid, which had been imposed by statute.—(Heerwagen vs. Crosstown Street Railway Company et al., 86 New York Supplement, 218.)

## NEW YORK.—Street Railways—Fee in Street—Condemnation.

1. Laws 1895, p. 791, c. 933, amending section 90 of the Railway Law (Laws 1890, p. 1108, c. 565), assumes that a street surface railway corporation can state in its certificate of incorporation the streets in which its road is to be constructed, and the private property over which it is proposed to construct and operate it; provides for filing a map of the proposed route, and that all provisions of section 6 (page 1084) of the Railway Law shall apply to the route so located; and then states, "Nothing in this section shall be deemed to authorize a street railway corporation to acquire real property within a city by condemnation." Held, that such prohibition was intended to relate only to private property, and not to an abutting owner's property rights in the bed of a street.—(Schenectady Railway Company vs. Peck et al., 84 New York Supplement, 759.)

## NEW YORK.—Municipal Corporations—Tide-Water and Submerged Lands—Title—Wharfs.

1. The city of New York holds title within the tideway and submerged lands of the Hudson River, granted by the acts of the Legislature (Laws 1807, p. 125, c. 115; Laws 1826, p. 43, c. 58; Laws 1837, p. 166, c. 182), and the Dongan and Montgomerie charters, subject to the right of the public to use of the river as a water highway.

2. The city of New York holds title in the lands in its public streets in trust for the public use.

3. Where streets of the city of New York and navigable waters meet, the general public has a right to passage, and the highway is by operation of law extended over a wharf or bulkhead built at the end of a street.

4. The provision in Laws 1837, p. 166, c. 182, granting additional submerged lands to the city of New York, that such lands should be used to create an exterior street, to which the other streets of the city intersecting the Hudson River should be extended, was within the power of the Legislature.

5. Forty-Third Street, in the city of New York, was laid out under Laws 1807, p. 125, c. 115, to high-water mark on the Hudson River, and by Laws 1837, p. 166, c. 182, was extended to the exterior line of the city. In 1852 the city conveyed a pier situated in Hudson River, in Forty-Third Street. Certain described property beginning at a point formed by the intersection of Forty-Third Street with the easterly line of Twelfth Avenue, "together with the extent of the present width of the street with the right of wharfage thereon and together with all and singular the tenements, hereditaments," etc., subject to the right of the city to order the pier extended into the river at the expense of the grantee, or with the right in the city to extend the pier at its expense, or grant the right to other parties to extend the pier if the grantee should fail to extend it when directed, in which event the right of wharfage at the portion of the pier extended was to belong to the parties at whose expense the extension was made. Held, not to convey the absolute fee to the land covered by the pier, but only the right to maintain a pier and collect wharfage at the foot of Forty-Third Street, in the Hudson River, whenever that point shall be located by lawful authority; the city having no right to convey the land in contravention of the public trust under which it held it.—(Knickerbocker Ice Company vs. Forty-Second Street & Grand Street Ferry R. Company et al., 68 Northeastern Rep., 864.)

## NEW YORK.—Mandamus—To Railway Company—Relator.

1. The public right to have street railway companies comply with the law by giving transfers cannot be enforced by mandamus on the relation of a private individual, the Railway Law, Laws 1890, p. 129, c. 565, section 157, empowering the railroad commission to enforce compliance by railway companies with the provisions of their charters.—(People ex rel. Lehmaier vs. Interurban Street Railway Company, 83 New York Supplement, 622.)

## PENNSYLVANIA.—Street Railroads—Liability for Paving—Contracts.

1. By a contract between a borough and a street railway company the latter was required to pave the full width of the street where sidings were maintained whenever the rest of the street was paved by the borough. The street railway company gave notice, prior to an ordinance authorizing the paving, that it intended to remove the siding as soon as the frost was out of the ground, and thereafter removed the same. Held, that it was not liable for the paving of the full width of the street where the siding had been located.—(Shamokin Borough vs. Shamokin & Mt. C. Electric Ry. Company, 56 Atlantic Rep., 64.)

## PENNSYLVANIA.—Taxation—Railway Property—Traction Motor Company.

1. A Legislature has authority to impose a tax on the property of railway corporations, the superstructure of the road and water stations alone excepted, and to delegate its authority to do so to municipalities.

2. Act April 21, 1858 (P. L. 385), providing that depots, offices, car houses and other real property of railway corporations situated in the city of Philadelphia—the superstructure and the water stations alone excepted—shall be subject to taxation for city purposes, applies to a traction motor company which leases and operates street railways in such city.

3. The words "railroad" and "railway," as used in the statutes of Pennsylvania, are synonymous, and apply to both steam and street railways, unless the context clearly shows a different intent.

4. When a traction company operates a railway, and leases the franchise of various railway companies, and operates them on its own account, it is exercising the franchise of a street railway company, as it is authorized to do, and enjoys the privilege granted to, and becomes subject to the liabilities imposed by law on, such companies.—(City of Philadelphia vs. Philadelphia Traction Company, 55 Atlantic Rep., 762.)

## PENNSYLVANIA.—Street Railways—Paving.

1. A charter of a street railway company provided that in constructing its road it should conform to the grades used in the several streets traversed by it, and keep the same in good repair at the expense of the railway company. Held, that, where it had done so, it could not be required to pay for repaving them with a new kind of pavement adopted by the city.—(City of Williamsport vs. Williamsport Passenger Railway Company, 55 Atlantic Rep., 836.)

## FINANCIAL INTELLIGENCE

### The Money Market

WALL STREET, NOV. 16, 1904.

The money market this week reflected to a greater extent the continued heavy losses in cash sustained by the local institutions. The demand for funds was somewhat better than in the previous week, but on the other hand the offerings were considerably smaller, resulting in high rates for all classes of accommodation. One of the principal features of the week was the buying of sterling exchange in connection with the flotation of the new Japanese war loan, which caused an advance of about 50 points in prime demand sterling to 4.8680. This advance was followed by the engagements of \$3,700,000 gold bars for shipment to Paris by the mid-week steamers, but subsequently the amount was reduced to \$2,600,000, the shipment of \$1,100,000 gold having been cancelled. The movement of gold to Cuba continues upon a fairly large scale, and in all probability the local institution will show a further reduction in cash at the end of the week. Up to this time \$4,500,000 gold coin has been engaged for shipment to Cuba, which amount will complete the payment of the second instalment of the Cuban loan. Money on call was in good demand, and supply at rates ranging from 2 to 3 per cent, the average for the week being about  $2\frac{1}{4}$  per cent. In the time money department, increased activity was reported. The demand for funds was stimulated by the continued activity and strength in the local securities market. Sixty and ninety day funds were placed at  $3\frac{1}{2}$  per cent, while for the longer maturities  $3\frac{3}{4}$  per cent was obtainable on good, mixed collateral. Some exceptional transactions were reported at  $3\frac{1}{2}$  per cent, but the standing of the borrower, and the character of the collateral offered were taken into consideration. In commercial paper only a moderate volume of business was reported. Collections all over the country are fair, owing to the improvement in general trade, and merchants are not required to make much paper on that account. The demand, however, continued good, and all offerings were readily absorbed on the basis of 4 to  $4\frac{1}{2}$  per cent for the choicest names. At the principal European centers, discount rates show no decided change. At London, the open market rate is 2 15-16 to 3 per cent, at Paris  $2\frac{3}{8}$  per cent; at Berlin  $4\frac{1}{8}$  per cent, and at Amsterdam the rate is 2 15-16.

The indications at the present time point to a continued firm market, but it is not considered probable that rates will work material higher. One argument in favor of higher rates is the call upon the National Banks for a portion of the government funds on deposit. The amount to be called has not been officially announced, but it is thought that between \$25,000,000 to \$30,000,000 will be paid into the Federal Treasury. As this amount will not be paid until after the turn of the year, and as funds are being received in large amounts from the interior, it is not at all likely that rates will advance materially in the near future.

### The Stock Market

Transactions upon the Stock Exchange developed enormous proportions this week, and, although prices at times showed the effect of realizing sales, the general tone continued decidedly strong. Early in the week the market was influenced by the overwhelming Republican victory at the national election, and in many issues prices were carried to the highest point of the year. London was a heavy buyer of the internationals early in the week, but subsequently arbitrage houses sold moderately. There was also considerable selling for local account, but the readiness with which all offerings were taken prevented only slight recession in prices. On Monday the market showed renewed strength, and in spite of the unfavorable developments, such as the extremely poor showing made by the bank statement, the continued shipment of gold to Cuba, and the engagement of nearly \$3,000,000 of the yellow metal for export to Paris, prices made further substantial gains. Toward the close there was considerable speculation in the specialties, and, although many of them rose sharply, the general market closed irregularly firm.

The local traction issues were extremely active and strong. Manhattan continued to advance on reports of continued large earnings, the price advancing  $2\frac{1}{4}$  net to  $164\frac{3}{4}$ . Brooklyn Rapid Transit rose  $1\frac{3}{8}$  to  $67\frac{1}{8}$ . Metropolitan Securities and Metropolitan Street Railway moved up in sympathy, the last-named rising  $1\frac{1}{2}$  to  $123\frac{5}{8}$ , and the former  $2\frac{1}{2}$  to  $82\frac{3}{4}$ .

### Philadelphia

Increased strength characterized the market during the past week, and prices for several of the specialties established new high records. A prominent feature was the unusually heavy dealings in Philadelphia Rapid Transit, which were accompanied by a net gain of about  $1\frac{3}{4}$  points. From  $16\frac{1}{4}$  at the opening the price rose to 18, but subsequently eased off a small fraction. About 25,000 shares of the stock was traded in. The directors of the company have issued a call for the payment of an assessment amounting to \$5 per share in the 600,000 shares of stock. This is the fourth assessment, and is payable on January 20, when the stock will have \$20 paid in. It is said that a tacit agreement has been reached with certain large interests, whereby the total assessment will not exceed \$25. Consolidated Traction of New Jersey was again in demand by investors, and on purchases of about 1500 shares, mostly in odd lots, the price advanced to  $78\frac{1}{2}$ , or  $\frac{3}{4}$  above its previous high record. Philadelphia Traction was dull, but steady, at  $97\frac{5}{8}$ . Philadelphia Electric declined  $\frac{5}{8}$  to  $8\frac{3}{4}$  on the exchange of about 9000 shares, and Union Traction lost a full point to 58 on the transfer of about 700 shares. Philadelphia Company common declined to 40 on sales of 12,428 shares, while the preferred ran off to  $46\frac{1}{2}$ . United Gas & Improvement was strong, upward of 15,000 shares changing hands at prices ranging from  $106\frac{3}{4}$  to  $107\frac{3}{4}$ , the final transaction being at 107. The gross earnings of the Camden & Trenton Railway for the first week of November amounted to \$2,594, an increase of 58 per cent over the corresponding week last year. The Trenton & New Brunswick Railroad's earnings for the same period was \$1,050, an increase of 41 per cent over the same week in 1903.

### Chicago

The Metropolitan Elevated Railroad has twenty-five of its sixty-eight new cars in service, and an equal number are said to be in the shops here ready to be brought out. It is expected that the company will make a better showing this month. Last month the shortage of cars is said to have cut down traffic at the new terminal.

Within thirty months Chicago can have a ten-mile, six-loop subway street railway system at a cost of \$18,500,000, according to George W. Jackson, who has made a report on the subject to the local transportation committee. With the report were plans of routes and a general outline of the scheme of construction and the advantages claimed for the system. The committee ordered the plans published, and Engineer Jackson agreed to have them ready within thirty days, when the subway proposition will be considered.

The hunting trip of Mayor Harrison and Corporation Counsel Tolman has given the traction settlement a serious setback, according to the receivers of the Union Traction Company. Nearly everybody connected with the matter are more or less disgruntled at the way the chief officials of the city have treated the matter. Just now no one can be found who knows when the officials will return, or when the franchise negotiations will be taken up. Dealings in the Chicago tractions were extremely quiet this week, but prices generally displayed decided strength. Chicago Union Traction, which was entirely neglected last week, was dealt in to the extent of several hundred shares, the price rising several points to  $13\frac{3}{4}$  when it closed. The preferred moved up two points to 40. City Railway recovered sharply, the price scoring a gain of  $2\frac{1}{2}$  points to  $185\frac{1}{2}$ , in the exchange of about 500 shares. West Chicago advanced  $2\frac{3}{4}$  points to 50, on the purchase of an odd lot. Northwestern Elevated sold at  $23\frac{1}{2}$  for 100 shares, and an odd lot of the preferred sold at 64. Metropolitan Elevated, after selling at  $22\frac{3}{4}$  at the opening, rose to  $23\frac{1}{2}$  on the purchase of 260 shares.

### Other Traction Securities

The Boston market continued dull, but prices, as a rule, were strong, with the changes for the most part confined to the fraction. An exception to the rule was Massachusetts Electric preferred, which recovered sharply from last week's depression, the price advancing to 57 or  $1\frac{1}{2}$  above last week's final price. The common was also better, about 1000 shares selling at from 13 to  $14\frac{1}{2}$ . Boston Elevated declined  $\frac{1}{2}$  to 154 for full lots, while odd amounts sold as low as 153. West End common was a small fraction higher, at  $91\frac{1}{2}$ , while the preferred lost  $\frac{1}{2}$  to  $91\frac{1}{2}$ . Trading in both issues was confined to odd lots. In Baltimore, United

Railway stock sold at 7¾ and 8 for 600 shares, while 800 of the preferred brought 30. The 4 per cent bonds were fairly active and strong, \$20,000 worth of them selling between 91½ and 92. The incomes were extremely active, about \$40,000 changing hands at from 44½ to 45¼. Norfolk Railway & Light 5s were moderately active, \$15,000 selling between 90½ and 90. Virginia Electric Railway & Development 5s sold at from 97½ to 99 for \$15,000. In the New York curb market Interborough Rapid Transit displayed considerable activity and irregularity, but closed with a substantial net gain for the week. Opening at 153¾, it declined to 151¾, but subsequently it advanced sharply to 158½, with the final sale at 155¾. About 18,000 shares changed hands. It is reported that subway trains will run to New Rochelle in the near future, over the Harlem division of the New York, New Haven & Hartford. The statement of the Interborough Rapid Transit for the quarter ending Sept. 30, 1904, showed gross receipts of \$3,232,949, against \$2,938,753 in 1903, and \$2,495,112 in 1902. Surplus, after all charges, was \$411,311, against \$214,944 in the corresponding period in 1903, and 112,690 in 1902. The cash on hand on Sept. 30, 1904, was \$641,384, and the profit and loss surplus was \$2,184,359. Washington Railway common was extremely strong, 600 shares selling at 22 and 24. The 4 per cent bonds were strong also, transactions in them being made as high as 85.

Cincinnati, Newport & Covington preferred featured at Cincinnati, about 900 shares selling at 92½ to 92½. Several lots of the common sold at 31 to 31½. Cincinnati Street Railway was comparatively inactive with a few small sales at 144½. Detroit United gained strength and sold at 75 at the close of the week.

Northern Texas Traction was in strong demand at Cleveland, and several small lots at 41½. This stock has advanced from 30 in the last few months, and it appears to be held by buyers who are seeking a permanent investment. The property is showing remarkable gains in earnings, and a recent report indicates that a large steel plant is to be located along the line which increases the interest in the stock. Cleveland Electric declined to 74¼ on several small sales. There was a strong demand for traction bonds for investment purposes, and the sales in these issues aggregated \$118,000 worth. Aurora, Elgin & Chicago 5s receipts sold to the extent of \$61,000 worth at 84½ and 85. Northern Texas 5s sold to the extent of \$24,000 worth at 85 to 85½, Western Ohio 5s sold at 67 early in the week and advanced to 70 on sales of \$12,000 worth.

**Security Quotations**

The following table shows the present bid quotations for the leading traction stocks, and the active bonds, as compared with last week:

|  | Closing Bid |         |
|--|-------------|---------|
|  | Nov. 9      | Nov. 16 |
| American Railways                          | 50          | 50      |
| Aurora, Elgin & Chicago                    | —           | —       |
| Boston Elevated                            | 153         | 154     |
| Brooklyn Rapid Transit                     | 67½         | 68¾     |
| Chicago City                               | 180         | 180     |
| Chicago Union Traction (common)            | 9¼          | 13      |
| Chicago Union Traction (preferred)         | —           | 40      |
| Cleveland Electric                         | —           | —       |
| Consolidated Traction of New Jersey        | 77½         | 77¾     |
| Consolidated Traction of New Jersey 5s     | 110         | 110     |
| Detroit United                             | 75          | 76¾     |
| Interborough Rapid Transit                 | 152½        | 153     |
| Lake Street Elevated                       | 3¼          | 3¾      |
| Manhattan Railway                          | 162½        | 167½    |
| Massachusetts Electric Cos. (common)       | 131½        | 163¾    |
| Massachusetts Electric Cos. (preferred)    | 55          | 58      |
| Metropolitan Elevated, Chicago (common)    | 22½         | 23      |
| Metropolitan Elevated, Chicago (preferred) | 66          | 66¼     |
| Metropolitan Street                        | 122         | 124¾    |
| Metropolitan Securities                    | 80¾         | 82¼     |
| New Orleans Railways (common)              | 9¼          | 9½      |
| New Orleans Railways (preferred)           | 27          | 27      |
| New Orleans Railways, 4½s                  | 75          | 75      |
| North American                             | 96½         | 105     |
| Northern Ohio Traction & Light             | —           | —       |
| Philadelphia Company (common)              | 41          | 40¾     |
| Philadelphia Rapid Transit                 | 16¼         | 18½     |
| Philadelphia Traction                      | 97¾         | 98      |
| South Side Elevated (Chicago)              | 93½         | —       |
| Third Avenue                               | 130         | 132     |
| Twin City, Minneapolis (common)            | 106         | 106½    |
| Union Traction (Philadelphia)              | 58½         | 58½     |
| United Railways, St. Louis (preferred)     | 66          | 68¾     |
| West End (common)                          | 91¼         | 91½     |
| West End (preferred)                       | 111         | 112     |

**Iron and Steel**

The "Iron Age," in its weekly record, says there is a buoyant feeling all along the line, which expresses itself in an eagerness to buy for deliveries well into next spring whenever possible. The billet manufacturers have advanced prices \$1.50 per ton, to \$21, Pittsburg, which means that outside mills buying raw material in the open market must look to better prices for finished material, and this they have done to some extent. Prices for finished iron and steel have actually risen, or are advancing, in some respects, owing to the general fear of such an advance. Boiler tubes have been advanced \$4 per ton.

**Metals**

Quotation for the leading metals are as following: Copper 14½, tin 29.20, lead 4¾, spelter 5½.

**ST. LOUIS TRANSIT EARNINGS**

The increase in gross earnings of the St. Louis Transit Company since Jan. 1, 1904, has been most satisfactory. Last month the climax was reached when the total was recorded of \$1,095,842 gross, making the earnings for the year \$8,394,143. The earnings of October, 1904, exceeded those of October, 1903, by \$431,667. The belief is expressed that the total gross earnings for the year ending Dec. 31 will be at least \$10,000,000. The total gross earnings for 1903 were \$7,259,460, or \$1,134,683 less than the earnings for the first ten months in 1904.

In future the United Railways Company will have charge of the property, and as there will be no change in the officials, it is believed that the earnings will continue to show a healthy increase, thought a slight falling off is to be expected after the Fair closes.

The gross earnings of the company from Jan. 1 to No. 1 follow:

|   |             |
|---|-------------|
| January                                       | 565,098     |
| February                                      | 563,257     |
| March   | 645,481     |
| April   | 710,368     |
| May   | 837,872     |
| June  | 925,387     |
| July  | 984,644     |
| August  | 1,014,776   |
| September                                     | 1,051,452   |
| October                                       | 1,095,842   |
| Total   | \$8,394,143 |
| Gross earnings in 1903                        | \$7,259,460 |
| Gain of ten months in 1904 over total in 1903 | 1,134,683   |

**TOLEDO ORDINANCE REFUSED**

At the meeting of the Toledo Council on Monday evening, Nov. 14, a message from Mayor Finch was read, vetoing the seven-tickets-for-a-quarter ordinance recently passed by the Council in favor of the Toledo Railways & Light Company. A communication from President H. A. Everett, of the company, was also read, in which he stated that the company could not, and would not, accept the ordinance or any other ordinance fixing the rate of fare on any other basis than six tickets for twenty-five cents. The Council then passed by a unanimous vote a resolution to notify the company that no offer less advantageous to the city than the one refused by the company would be considered by the present body. Mayor Finch gave as his reasons for vetoing the grant, objections to clauses having reference to transfers, expenditures for betterments and other details. He stated that the rate of fare was satisfactory to him.

Henry A. Everett was interviewed by a STREET RAILWAY JOURNAL representative shortly before the communication to the Council was read. He stated that the offer made by the company some weeks ago of six tickets for a quarter with universal transfers was positively the best proposition that a company operating in Toledo could make. If this proposition had been accepted, he said, it would have meant a loss to the company of nearly ten per cent per year, or about \$113,000, as compared with the earnings at the present rates of fare. A reduction to seven tickets for a quarter, and later a further reduction to eight tickets for a quarter, would simply be ruinous, he said. He thought that such rates might be possible in some cities where the hauls are all short, but not in Toledo, where the hauls are unusually long for a city of its size. Mr. Everett stated

that at present the Toledo Company is operating under more than forty different franchises, and he said that only one of the important grants expires inside of six years, and this is for a short piece of track. The more important grants do not expire for eleven years. Of course it is well known, as Mr. Everett says, that the stockholders will not vote any appropriation for improvements with the prospect staring them in the face of an obstinate public demanding concessions that the company cannot possibly make without jeopardizing the whole investment. On the other hand, with the franchise matter settled, there would be an incentive to make permanent betterments and to maintain the system in the best possible physical condition. The company has made a liberal proposition, and this having been refused, the question will be left open until such time as it becomes necessary to take up the matter again.

**ANNUAL REPORT OF THE MONTREAL COMPANY**

The report of the Montreal Street Railway Company for the year ended Sept. 30, 1904, was presented to the stockholders by President Forget, of the company, at the annual meeting on Wednesday, Nov. 2. The report shows gross receipts of \$2,463,824, as compared with \$2,222,787 for 1903. The operating expenses, placed at \$1,510,997, increased about 15 per cent, due principally to the severe weather of last winter, and to the increase in the maintenance charges. This, of course, affected the net earnings which show at \$952,826 for 1904, as against \$905,939 for 1903. After providing for the percentage on earnings accrued to the city, and interest on bonds and loans, the directors declared four quarterly dividends amounting to \$624,500, and in view of the company having assumed its own fire insurance risk, have placed an additional sum of \$20,000 to the credit of the fire insurance fund, which now amounts to \$267,904, and the \$50,000 to the credit of the contingent account, leaving a surplus of \$821,448. The operating figures as given in the report follow:

|  |             |            |
|--|-------------|------------|
|  | 1904.       | 1903.      |
| Gross receipts .....                               | \$2,463,824 | 2,222,787  |
| Operating expenses .....                           | 1,510,997   | 1,316,848  |
| Net earnings .....                                 | 952,826     | 905,939    |
| Net income, per cent of capital .....              | 11.10       | 11.41      |
| Passengers carried .....                           | 60,281,834  | 54,592,014 |
| Transfers .....                                    | 17,915,242  | 16,774,595 |
| Operating expenses, per cent of car earnings ..... | 62.37       | 60.20      |

The balance sheet as of Sept. 30, 1904 shows:

| ASSETS                                |                     |
|---------------------------------------|---------------------|
| Cost of road and equipment .....      | \$10,342,727        |
| Stores .....                          | 187,548             |
| Accounts receivable .....             | 90,570              |
| Montreal, Park & Island Railway ..... | 168,241             |
| Cash in bank and in hand .....        | 25,288              |
| <b>Total .....</b>                    | <b>\$11,015,376</b> |

| LIABILITIES                          |                     |
|--------------------------------------|---------------------|
| Capital stock .....                  | \$9,079,367         |
| Bank of Montreal loan .....          | 318,166             |
| Accounts and mortgages payable ..... | 199,545             |
| Accrued interest on bonds .....      | 33,351              |
| Accrued tax on earnings .....        | 135,787             |
| Employees' securities .....          | 12,983              |
| Unclaimed dividends .....            | 1,956               |
| Unredeemed tickets .....             | 26,766              |
| Suspense account .....               | 125,750             |
| Dividend payable Nov. 2 .....        | 165,000             |
| Fire insurance fund .....            | 267,904             |
| Contingent account .....             | 129,231             |
| Surplus .....                        | 519,564             |
| <b>Total .....</b>                   | <b>\$11,015,376</b> |

**SENTENCED FOR GIVING AWAY TRANSFERS**

The sentencing in New York last week of a man convicted of trafficking in transfers is of interest to street railway companies in general, and especially to those companies that find this illicit use of transfers a source of continual annoyance. The offender, named Linden, a newsdealer, pleaded guilty in the Court of Special Sessions to giving away transfers, and sentence was passed giving him two days in the city prison or the alternative of a \$10 fine, which he paid.

The offense for which Linden was arraigned was committed on Nov. 1, and the complainant was an inspector of the New York City Railway Company, who charged that Linden on that date gave a Belt line transfer to Theodore Stalter, "who was not lawfully entitled to it, and with intent to have it used by Stalter in lieu of fare." Stalter did use the transfer, it is alleged, and was arrested. His case is still pending.

When Linden was held he was charged with selling the transfer, and it was alleged that he made a practice of begging transfers from passengers and selling them to other passengers for 2 cents. The law under which the prosecution was made is a new one, Section 619A of the Penal Code.

**THE STREET RAILWAY YEAR IN MASSACHUSETTS**

At this early date estimates are being made of the result of the operation of the street railway companies of Massachusetts for the fiscal year ended Sept. 30, 1904, of which returns are now being filed by the companies with the Board of Railroad Commissioners, whose report as to earnings will not be made public until early next year. The impression seems to prevail that the gross earnings of the roads will not be materially better than the previous year. The Boston Elevated Railway, the Boston Suburban Electric Companies and the Worcester Consolidate are generally cited as exceptions to this general statement, however. The Boston "Financial News," in discussing this question, says:

"The great question with respect to the returns for this year will be as to the extent the especially severe winter increased the operating expenses. Some of the lines were forced to temporarily suspend operations entirely, and while they continued to run, had to contend with an excessive cost. The percentage of operating to gross earnings of the 109 roads reporting to the Railroad Commissioners for the fiscal year ending Sept. 30, 1903, was 68.59 per cent, and the average for ten years was 68.48 per cent. In view of the conditions above described it would be safe to assume that the ratio this year will very closely approximate 70 per cent.

"A street railway authority estimates that all of the companies this year would reflect an increase in gross of about 10 per cent, taking in all of the lines favorable and unfavorable. On this basis and estimating operating expenses at 70 per cent on the gross, the combined showing for the fiscal year ending Sept. 30, 1904, would compare with 1903 as follows:

|                           |                    |                    |                       |
|---------------------------|--------------------|--------------------|-----------------------|
|                           | 1904.              | 1903.              | Changes.              |
| Total gross earnings....  | \$28,094,892       | \$25,540,811       | Inc. \$2,554,081      |
| Total operating expenses. | 19,669,424         | 17,519,367         | Inc. 2,150,057        |
| <b>Net earnings .....</b> | <b>\$8,425,868</b> | <b>\$8,021,444</b> | <b>Inc. \$404,024</b> |

"This compares with an increase for 1903 over 1902 in net earnings of \$447,822.

"There have been a number of capital increases during the year, but no very large ones, so that the total interest charges will not be materially greater, and for this reason the net divisible income should not be altered to any great extent. Dividends also should reflect a small increase, but not sufficiently so to affect the surplus showing. It is likely, therefore, that the surplus for the year will be slightly in excess of last year when the total was nominal only amounting to \$18,669, as compared with \$250,140 for 1902.

"The above comparisons indicate that while the street railways as a whole are gaining in gross earnings each year, operating expenses have reflected a more than proportionate increase, leaving the net showing but little changed from year to year.

"Just how this is to be remedied is the problem now confronting the management of the different roads. Some of them, notably the Boston Elevated, have reduced expenditures practically to the minimum, and when the Boston & Northern and Old Colony Street Railway Companies have completed power station improvements, a material saving will be effected in important essentials. But with some of the other roads, it is apparent that vigorous efforts in the nature of economy must be made, and when these have been completed, the situation in this State will be materially improved."

The Railroad Commissioners, of Massachusetts, have been awarded a gold medal for their exhibit at the St. Louis Exposition. This exhibit was a miscellaneous one, including photographs, blue prints, etc., connected with the construction of railroads and street railways.

**MR. ANDREWS ON THE ELECTRIFICATION OF THE WEST SHORE**

Horace E. Andrews, president of the Utica & Mohawk Valley Railway Company, made the statement in Utica Saturday that the work of electrifying the West Shore Railroad between Utica and Syracuse, N. Y., would begin early in the spring. Mr. Andrews says that the idea of using the third-rail has been abandoned, and that instead an overhead trolley with the wires at the sides of the track will be used. Accompanied by Vice-President John J. Stanley, General Manager C. Loomis Allen and Attorney Walter N. Kernan, Mr. Andrews made a trip of inspection over the proposed route, and said that all the plans were practically completed for the running of electric cars over the road. The company has been denied the right of way for a double track in the villages of Frankfort, Ilion and Mohawk, and because of this the promoters will build the tracks around the villages mentioned. The trustees will not consent to grant the franchise unless a certain amount is given, and this price is considered prohibitive by Mr. Andrews. Mr. Andrews says that he will spend his entire time in Utica when the line is built through the connecting villages of Frankfort, Ilion and Mohawk. It was reported on Nov. 15 from Cleveland that Mr. Stanley is to become the operating head of the West Shore electric properties.

**FIRST SINGLE-PHASE SYSTEM SOON TO OPEN**

It is very likely there will be witnessed next month the placing in operation of the first single-phase electric railway in the United States. The line so equipped is that of the Indianapolis & Cincinnati Traction Company, and the authority for the announcement of the proposed opening comes from President Henry, of the company, who gives the date as Dec. 15. Not the whole line is to be opened, but only that part of it extending from Indianapolis to Rushville. As has previously been noted in the STREET RAILWAY JOURNAL, the road is built for high speed, largely on private right of way, with excellent alignment. It is the intention ultimately to complete the line through to Hamilton, Ohio, and thus make it possible to give high-speed service between Indianapolis and Cincinnati, as the name of the company would imply. The contract for equipping the line is in the hands of the Westinghouse Electric & Manufacturing Company. The trolley voltage will be 3300 volts. This will be reduced by a transformer on each car. As the cars must operate over the 500-volt direct-current city lines in Indianapolis in order to gain entrance to the city, rheostatic control will be used instead of the induction control. The details of this equipment so far as they have been made public have already been published in the STREET RAILWAY JOURNAL, having appeared Feb. 27, 1904.

**NEW YORK & LONG ISLAND TRACTION COMPANY TO OPEN LINE FROM HEMPSTEAD AND FREEPORT TO BROOKLYN**

The managers of the New York & Long Island Traction Company announce that their south side road from Freeport to the terminus of the Kings County Elevated Railroad, at Grant Street and Liberty avenue, Brooklyn, will be completed and cars running over the line by Dec. 15. The rails are laid and poles and wires are in position from Freeport, in Nassau County, to the Rockaway Road and the line is completed from its western terminal to a point within a mile and a half of where the workmen are engaged in building from the east. This gap of a mile and a half, it is expected, will be completed in the next three weeks.

The new line is 17 miles in length, from Freeport to the Brooklyn line, and runs over a private right of way for all but 3½ miles. It is a single track road, but with numerous turnouts and double track lines through the villages of Freeport, Baldwin, Rockville Center, Lynbrook, Valley Stream and Springfield, and on Broadway, Woodhaven.

Express trains are to be run from Freeport to Brooklyn in fifty minutes, and the managers say possibly less. Stops will be made only at the villages. Way trains will make the run in about an hour. Cars will be run under thirty minutes headway, and the fare from Freeport to Brooklyn will be 20 cents. A close connection will be made between the new line and the Brooklyn Rapid Transit elevated and surface lines.

The New York & Long Island Company already has another branch running from Freeport to Mineola and branching from this

division at Hempstead there is a line extending westward over the Hempstead and Jamaica turnpike to Queens, where a connection is made with the Long Island Electric Railway to Jamaica. Next spring the company will build a branch of its own through to Jamaica along the south side of the Long Island Railroad track.

The managers are now making an effort to get a franchise as far east as Babylon. The company's ultimate intention is to carry freight and express.

**CHANGES IN THE BROOKLYN POLYTECHNIC INSTITUTE**

The Brooklyn Polytechnic Institute announces some important additions to its professorial force. W. S. Barstow, the well-known consulting engineer and former general manager of the Brooklyn Edison Company, has been elected a member of the faculty of the institute, and will serve in the department of electrical engineering as consulting professor of central station practice. Dr. Louis Duncan, the well known consulting engineer, has also become a member of the faculty of the institute, as consulting professor of electric traction. Thomas D. Lockwood, head of the patent and technical information bureau of the American Telephone & Telegraph Company, and advisory electrician for the Western Electric Company and for the Bell Telephone Company of Canada, has also joined the faculty, as consulting professor of telephony, telegraph and patent practice. Charles F. Scott, chief electrician of the Westinghouse Electric & Manufacturing Company, has become a member of the board of consulting professors of the department of electrical engineering, and will give instruction concerning engineering in a large electric company. Dr. F. A. C. Perrine, former president of the Stanley Electric Manufacturing Company, and for some years professor of electrical engineering in the Leland Stanford, Jr., University, is another new member of the faculty of the institute, and will affiliate with the department of electrical engineering as consulting professor in long distance electric power transmission.

**PLANS FOR CHICAGO SUBWAYS**

George W. Jackson has reported to the local transportation committee, of the Chicago City Council, a plan for a system of downtown street railway subways to cost about \$18,577,000.

The routes suggested for the different lines are:

1. Twelfth Street and Wabash Avenue north to Van Buren Street, east to Michigan Avenue, to Randolph Street, to State, to Washington, to Wabash Avenue, to Jackson Boulevard, south in Wabash to Van Buren. Acquire property at Wabash Avenue, Twelfth Street, and Harmon Court for subway exits and entrances.
2. Entrance at State Street and Eldredge Court, east to rear of property facing State, north to Peck Court, west to State, north to Polk Street, north then by double track in State Street to Jackson Boulevard, east to Wabash Avenue, north to Washington Street, west to State, south to Jackson Boulevard.
3. Entrance at Eighteenth Street on private property between Armour Avenue and Dearborn Street, via double track north of Seventeenth Street, west to Clark, to Jackson Boulevard, east to Dearborn Street, north to Quincy, east to State, north to Madison, west to Dearborn, south to Quincy.
4. Halsted and Van Buren Streets to Desplaines Street, to Clinton Street, to Franklin, to Jackson Boulevard, to La Salle Street, to Adams, to Dearborn, to Monroe, and return.
5. Touches the following streets: Madison and Halsted, Desplaines, Madison, Franklin, Monroe, La Salle, Dearborn, Madison, State, Washington and Madison.
6. Entrance North Clark and Ontario Streets, touches Ohio Street by way of North Clark Street, Randolph, Washington, Dearborn, on double track to State, Randolph, Clark.

The cost of these routes is figured as follows:

|                             |              |
|-----------------------------|--------------|
| 1 .....                     | \$2,776,197  |
| 2 .....                     | 1,997,473    |
| 3 .....                     | 4,071,453    |
| 4 .....                     | 2,393,546    |
| 5 .....                     | 2,476,807    |
| 6 .....                     | 1,894,721    |
| <hr/>                       |              |
| Total .....                 | \$15,610,197 |
| Property to be bought ..... | 1,250,000    |
| Engineering expenses .....  | 1,092,713    |
| Incidentals .....           | 624,403      |
| <hr/>                       |              |
| Total .....                 | \$18,577,313 |

### IMPORTANT LEGAL DECISION IN NEW YORK STATE

The decision just made by the Appellate Division of the Supreme Court overthrows the precedent established by the Court of Appeals in the case of the Auburn Interurban Electric Railway, which extended its line from Skaneateles to Marcellus, a distance of 6 miles, without having obtained permission from the State Railroad Commission.

Under that decision, which held that the Auburn Interurban Railway was within its rights, there has come to be a general understanding that any electric railway that has a certificate or franchise from the State Railroad Commission has a right to extend its lines, without further application to the Commission. Under this understanding, trunk lines have been projected through different parts of the State, having as their genesis established electric railway systems only a few miles in extent.

The matter came before the Appellate Division in the form of an appeal by the plaintiff in the case of the New York Central against the Buffalo & Williamsville Electric Railway Company. As they appeared in the papers on appeal, the facts were substantially as follows:

The Buffalo & Williamsville Company, the defendant, a street surface railway company, was incorporated in August, 1891, according to Chapter 565, of the Laws of 1890, the Railroad Law. In its certificate of incorporation its projected road was set out as extending from the north boundary of the city of Buffalo at its intersection with the Buffalo & Williamsville road to the east boundary of the village of Williamsville, a distance of 5 miles. Its termini were declared to be the north boundary of Buffalo and the east boundary line of Williamsville. The railroad was completed in 1893, and has since been in operation. In March, 1902, the Buffalo & Williamsville Electric Railway Company filed its certificate of intention to extend its railway from Williamsville to Rochester.

According to the statement of facts set forth in the papers on appeal, the company had made maps of its projected route, procured rights of way and expended money preliminary to the actual building of the road, and intended to make a continuous road to Rochester.

These further facts appeared on the appeal: The Buffalo & Williamsville Company had not obtained or applied to the Railroad Commission for a certificate "that public convenience and necessity require the construction of said railway as proposed in said articles of association." The company intended to construct and operate the road without obtaining a certificate, since it intended merely to extend its existing road. The summary of facts continues:

"The plaintiff (the New York Central) has been operating a railroad between Buffalo and Rochester for many years, and now has five distinct lines connecting the two cities, the facilities to some one of which are accessible to every part of the territory to be traversed by the road of the defendant, and to each line of which it would be a competitor. This action is commenced to restrain the defendant from constructing its road unless and until the Board of Railroad Commissioners has certified to the convenience and necessity thereof."

The Appellate Division, before which the appeal came, ordered that the judgment of the lower court from which the appeal was taken be reversed, and ordered a new trial on questions of law only, the Appellate Court having examined the facts and found no error. The opinion was written by Justice Spring, all the other members of the court concurring.

### OFFICIAL INVESTIGATION OF SUBWAY AIR IN NEW YORK

Whether or not the air in the New York subway is as bad as several physicians assert it is, will be determined by the Board of Health. Since the publication of a statement that the air was deficient in oxygen, that it was dangerous to the health of those who use the tunnel, and alarmingly so to persons with weak lungs and hearts, there has been much discussion of the reported danger. It is true that physicians fully as eminent as the doctor who first made the statement have declared that the air in the subway is no worse than that in theatres.

Professor Charles F. Chandler, of Columbia University, has been appointed to examine atmospheric conditions in the tunnel. President Darlington, of the Board of Health, said last week that he had seen many reports of physicians regarding the air in the subway, that it would not support life, and other faults. He said no complaints had been received by the board; that the air was in good circulation as far as he knew, and would support life, but he wished to satisfy public feeling. Personally, Dr. Darlington is of the opinion that the criticisms of the unsanitary condi-

tion of the subway have been exaggerations. According to his inspectors, who have been traveling over the line since the opening day, the air at all times has contained sufficient oxygen. Slight stagnation has been found at several stations, but it was not of a serious nature.

### CONTRACTS FOR MOTOR EQUIPMENTS FOR LONG ISLAND

The truth is out about the indefinite statement made in the daily press last week regarding the placing by the Long Island Railroad Company with the Westinghouse Company of a contract for motor equipments. The Long Island Company has ordered 122 motor cars of the type used in the New York subway, to be equipped with two 200 hp motors each. The multiple unit system of control will be used. This equipment is for use on the suburban lines out of Brooklyn that the company is now equipping with electricity, and has nothing whatever to do with any other portions of the line or the tunnel now being constructed by the Pennsylvania & Long Island Railroad to connect New York and Long Island. In the STREET RAILWAY JOURNAL of Feb. 7, 1903, was published a map showing the lines of the company to be equipped with electricity, and a summary was given of this work, which placed the mileage of these lines at 71.71 miles. According to Vice-President Potter, of the company, 45 miles are now undergoing a change of power. These lines are as follows: Flatbush Avenue to Jamaica and Queens; Ozone Park to Rockaway Beach; Hammels to Valley Stream; Jamaica to the Metropolitan Race Track.

### TWO PHILADELPHIA MANUFACTURERS RECEIVE HIGH HONORS AT ST. LOUIS

The Electric Storage Battery Company, of Philadelphia, Pa., has received gold and silver medals for its exhibit as follows: Gold medal, Group 68—Storage batteries, controlling and regulating apparatus, the working exhibit, showing booster system for regulation. Gold medal, Group 69.—Model central station storage battery installation, the working exhibit, showing booster system for regulation. Silver medal, Group 67—Switchboards for controlling and regulating storage batteries.

William Wharton, Jr., & Company, of Philadelphia, Pa., have been awarded a gold medal at the Louisiana Purchase Exposition for their special track work. It is the highest award given out for switches, frogs, crossings, etc., and was awarded particularly on account of the great improvement in these articles produced by the company through the introduction of manganese steel into the parts of the greatest wear in both street railway and steam railroad track work.

### RECORDS OF AIR-BRAKE TESTS

The Westinghouse Air Brake Company has recently published an extremely valuable book of 342 pages, pocket size, entitled "Air Brake Tests." This book is one which every engineer will find useful, and it is practically invaluable to all consulting engineers who have much to do with the design of high-speed electric railways. In the highest class of electric railway construction work of to-day, it is the well recognized practice of the designing engineer, before finally determining upon the lay-out of his road, to prepare a series of run sheets based upon the proposed schedule. If a series of charts of this kind, with acceleration and braking curves is laid out for each of the finally proposed routes and sets of schedules, a choice can often be made between several tentative plans be made which will have an important effect upon the first cost and the operating expenses. To do this properly, a knowledge of the principles of braking is essential, and this it is the purpose of the manual to supply. After a short introductory chapter on the development of car braking, about eighty pages are devoted to the historic Galton-Westinghouse tests, which were conducted in England in 1878 and 1879, and which have had a greater influence on the science of braking cars than any other tests before or since. Following the record of these tests are particulars of the Paris-Lyons tests of 1879; the Burlington brake tests, of 1886; the Westinghouse freight tests, of 1887; the Karner tests, of 1892; the Sang Hollow tests, of 1900; the Ship Road tests, of 1894; the Nashville tests, of 1895, and the recent Absecon and Atsion tests.

It is needless to say that these tests give practically all of the empirical data available which the railway engineer requires in his calculations. The album is elaborately illustrated with diagrams showing the test runs, retardation, etc., under different conditions as well as with a number of illustrations of the Westinghouse braking apparatus.

## NEW PUBLICATIONS

Telephony in six parts; Part V, the Sub-station, by Arthur Vaughan Abbott. 473 pages, illustrated. Published by the McGraw Publishing Company, New York. Price \$1 in set; \$1.50 when sold separately.

This is the fifth volume of the valuable treatises on telephone engineering from the pen of Mr. Abbott, the previous volumes being entitled respectively: The Location of Central Offices, the Construction of Underground Conduits, the Cable Plant, Construction of Aerial Lines. The first portion of Vol. V. is devoted to the receiver and transmitter, while later chapters are devoted to induction coils, sub-station circuits, transmission and current supply, signalling, protection, party lines, etc. For several reasons this volume is the most interesting to the electric railway engineer as well as to the layman, for to both it describes the portion of the telephone system with which he has most to do.

Poor's Manual for 1904, 1450 pages. Published by Poor's Railroad Manual Company, New York. Price, \$10.

The reliability and completeness of this annual publication have been tested by investors and others interested in railroad and industrial securities for the past thirty-seven years, and the last annual volume will be welcomed by all those to whom the previous issues are familiar. The steam railway section, as usual, comprises the greater part of the book, and a number of the properties are illustrated by maps. In addition, however, the manual has a street railway department, a miscellaneous corporation department and sections on State and municipal indebtedness, etc.

Alternating Current Engineering, by E. B. Raymond, 232 pages, illustrated. Published by D. Van Nostrand Company. Price, \$2.50.

This book discusses the theory of alternating currents, their distribution and alternating-current apparatus in a practical way. While it is not exactly the book we would recommend for beginners, it will be found very useful to those who have a slight knowledge of alternating current phenomena, and who wish to acquire a more intimate acquaintance with their general laws. The book includes a chapter on testing.

## STREET RAILWAY PATENTS

[This department is conducted by Rosenbaum & Stockbridge, patent attorneys, 140 Nassau Street, New York.]

UNITED STATES PATENTS ISSUED NOV. 8, 1904

774,373. Street Railway Switching Mechanism; Walter J. Bell, Los Angeles, Cal. App. filed May 21, 1903. The switch is actuated by fluid pressure controlled from the car by electrical means.

774,396. Retractable Car Fender; Andrew D. Pidgeon, Chicago, Ill. App. filed Aug. 10, 1904. A retractable, V-shaped fender provided with novel means for advancing and retracting the same through the actuation of a single controlling mechanism.

774,524. Trolley Guard for Electric Railways; John Kress, New Rochelle, N. Y. App. filed March 16, 1904. The trolley guard is so connected by means of a rod and pivots, with the base of the pole, that it is held in vertical relation to the wire at all times.

774,534. Trolley; John W. Rockafellow, Sergeantsville, N. J. App. filed Aug. 18, 1904. The harp is so connected to the pole as to have movement vertically and laterally with relation to the pole.

## PERSONAL MENTION

MR. CHARLES T. YERKES, of London, arrived in New York, Wednesday, Nov. 16, on the North German Lloyd liner Kaiser Wilhelm der Grosse.

MR. CHARLES F. VAEGER has resigned as manager of the Laredo Electric Light & Street Railway Company, of Laredo, Tex. Mr. J. H. Savage has been elected as his successor.

MR. JOHN F. OHMER, vice-president and general manager of the Ohmer Fare Register Company, of Dayton, Ohio, has just returned from a three months' successful business trip in Europe.

MR. CHARLES LANG, formerly with the Wheeler Condenser & Engineering Company, has joined the sales department of the A. D. Granger Company, at the New York office. Mr. Lang will make a specialty of pumps and condensers.

MR. M. C. LUDLAM, who for a number of years was connected with the Public Service Corporation, of New Jersey, has

been appointed general superintendent and assistant to General Manager J. A. Trawick, of the Little Rock Railway & Electric Company, of Little Rock, Ark.

MR. J. H. DONNELL, of Pittsburg, Pa., has been appointed superintendent of the San Bernardino Valley Traction Company, of San Bernardino, Cal., to succeed Mr. Chas. S. Putnam, resigned. Mr. Donnell is a street railway man of twelve years' experience. He has of late been a division superintendent for the Pittsburg Railways Company.

MR. R. W. CONANT, the well-known Boston engineer and inventor of railway testing apparatus, is now at Aurora, Ill., as chief engineer of the construction of the Aurora, DeKalb & Rockford Electric Traction Company's line, now building between Aurora and DeKalb. Mr. Theodore Wooster, of Aurora, is the president of the company.

MR. CYRUS ROBINSON, vice-president of the Power & Mining Machinery Company, is ill with typhoid fever at his home, at Mount Vernon, N. Y. Mr. Robinson is a well-known authority on the economical use of fuel, and his illness is probably directly traceable to overwork and activity, as he has taken an active part, during the last two years, in the development of gas generating plants.

MR. HENRY A. EVERETT, of Cleveland, with a party of twenty gentlemen, including officials of the various city and interurban systems of Cleveland, made a trip from Cleveland to Detroit and return this week in Mr. Everett's private car "The Josephine." This is the first through run between the two centers. The completion of the Detroit, Monroe & Toledo Short Line made the trip possible.

MR. MATTHEW C. BRUSH, general manager of the Boston Suburban Electric Companies, has been visiting in the West to inquire into traction methods. A special study was made by him of the Twin City Rapid Transit Company, which operates in Minneapolis and St. Paul. Like many others who have inquired into Twin City methods, Mr. Brush is of the opinion that the system is a model of completeness and conservative management.

MR. JOHN B. PARSONS, president of the Philadelphia Rapid Transit Company, accompanied by Chief Engineer Twining, has returned from a month spent in Europe, where, with Mr. John M. Mack, a director, he inspected a number of electric traction systems. A careful study was made of the roadbed construction of the elevated lines in Berlin, and Mr. Parsons is quoted as stating that the methods employed there for minimizing noise will probably be adopted in the construction of the local elevated lines in Philadelphia.

MR. S. J. DILL, superintendent of the Michigan Traction Company, of Kalamazoo, Mich., has tendered his resignation, to take effect Nov. 20. Mr. Dill resigns to become general manager of the Youngstown & Southern Railway Company, now building a third-rail line from Youngstown to East Liverpool, in the eastern part of Ohio, a distance of about 60 miles. Sixteen miles of the road are now completed and are being operated temporarily by steam. Mr. Dill came to Kalamazoo from Ypsilanti last December. At Ypsilanti he was for two years superintendent of the Detroit, Ypsilanti, Ann Arbor & Jackson Railway. His railroad career was begun in New Jersey. From New Jersey he went to New York, where he became connected with the New York City Railway Company. He resigned from this company to enter interurban railroading in Michigan. The Michigan Company has not yet decided who shall be Mr. Dill's successor.

MR. W. A. NELSON, formerly assistant superintendent of the Westinghouse Electric & Manufacturing Company, was appointed superintendent of equipment of the Allis-Chalmers Company Oct. 1, 1904, having begun his service with that company in August. During his connection of nearly five years with the Westinghouse Company, Mr. Nelson had immediate charge of the plans for the arrangement and location of machinery in the new east machine shop. Prior to his connection with the Pittsburg company, he had similar duties at the works of Pratt & Whitney Company, going to Hartford from Fitchburg, where he had been superintendent of the Simonds Rolling Machine Company for a number of years. Other recent appointments in the Allis-Chalmers Company include: Mr. R. C. Wright, for several years in charge of the design of special tools and fixtures used in the manufacture of steam turbines at the East Pittsburg works of the Westinghouse Machine Company, to a similar position at the Milwaukee works of the Allis-Chalmers Company; Mr. Charles F. Barth, formerly foreman at the East Pittsburg works of the Westinghouse Machine Company, as foreman of the steam turbine department at the West Allis works, and Mr. C. A. Derby, formerly assistant manager of the Lyon Cypress Lumber Company, a member of the selling staff of the Allis-Chalmers Company, in its saw mill department.