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Tracks Around Car Houses

Just why so many companies persist in constructing tracks around car shops and in the yards, of wornout rails and switches, which rightfully should be thrown in the scrap pile, is a puzzle. Probably the head of that department is forced to do it by the refusal of superiors to grant anything better. If so, these superiors should be appealed to and shown wherein they are causing needless delays by derailed cars, subjecting all the car house men to unnecessary worry and damaging, more or less, the equipment. But whatever may be the cause, it is a fact that on many lines the track construction about the shops is far the worst on the system. It is true bad track about the

shop does not endanger life as it would on the main line, but the delays it occasions and the amount of extra time caused by it directly are sufficient reasons why it should be avoided.

Increasing the Width of Cars

While the length of interurban cars has been gradually increased, until now they approach that of steam coaches, the width has for quite a period remained at a limit of about 8 ft. 6 ins. over side sills.

In the case of cars that are to enter cities over an already constructed road, this width is usually the maximum possible because of the proximity of the double tracks. But where cars are constructed for a new line throughout, there is very little necessity of such a limit. A car 8 ft. 6 ins. wide over sills leaves, after 5 ins. have been deducted on each side for posts and inside finish, but 92 ins. for seats and center aisle. A minimum width of aisle is about 20 ins., leaving 36 ins. for the width of each seat. The cushions, however, are necessarily an inch or two narrower than this. While two people can occupy a seat of this width, much more comfort would be experienced were the seats but a few inches longer. For short runs the seats as made are probably satisfactory, but when the passenger sits on the end of the seat or boxed up against the window for two hours or more, he above all would appreciate a steam-coach type of seat, with the 6 ins. or 8 ins. additional space.

The only way possible to get this additional length of seat is to increase the width of the car. It is most probable that on electric lines intended to compete with steam roads, the cars will soon be built more in accordance with steam-coach construction by having their width increased considerably, always excepting the cars which must pass over city double tracks with limited clearance room.

The Small Power Station

We hear so much in these days of 5000-kw units and stations generating 25,000 kw or 50,000, that it sometimes seems beneath the dignity of a street railway engineer to consider plants of which the capacity is measured by beggarly hundreds of kilowatts. Yet in actual every-day work, it is a fact that most roads even now are of rather small extent, and the individual stations needed for supplying them are by no means of record-breaking size. How about generating units of merely a few hundred kilowatts, and their economical use? Such small stations form really a special department of study, and are conspicuously difficult to operate at any decent economy, but as the mainstays of many actual enterprises they are eminently worth considering. As a class, they suffer not only from small capacity, but from low and very variable load factors. Recent experience has made it increasingly evident that the control of load factor is of even greater importance in economy than has generally been supposed. It is certainly a fact that a small station well loaded can perform wonderfully well in turning out cheap power, and much recent practice has been based on transmission to small sub-stations of which the efficiency can be fairly well held up even at moderate loads, and by grouping which, as parts of a transmission system, the

load factor at the real generating station may be held up. But this is not enough, for many electric roads must still rely upon small stations in which there is great room for improvement.

The first thing that strikes one in considering the subject in its later aspects is the acute need for working out the direct-current turbo-generator to a thoroughly successful result. Something has been done in this direction already, but still there is some hesitancy in putting out machines of this character. The one most noteworthy feature of economy in the steam turbine is its very admirable showing at low loads, due to the very small constant losses in all parts of the generating set. This property would be of extreme value in small stations for railway working, if the usual alternating current could be directly utilized, or if the machines could be made to give direct current. The alternating-current railway motors, although we hear much of contracts taken and orders being about to be filled, are still, in a measure, upon waiting orders. If they fulfil the hopes of their inventors the small station problem will be much easier of solution. But however the alternating-current railway motor may turn out, the possession of a direct-current turbo-generator is of immediate importance. We hear of such machines in successful work abroad, and it is well known that American makers have been experimenting with them. There is, of course, no doubt that the question of commutation is a very serious one in this case, on account of the very high peripheral speed. Nevertheless, much has been learned about commutation in the last ten years, and the task is clearly one which must be undertaken. It is strictly "up to" the manufacturers to produce a turbine set to give direct current at railway voltages, and they should promptly settle down to business and do it. The art needs small turbo-generators really more than it does big ones, for in working on a large scale the load factor can be kept well up, and big modern engines with superheated steam can give the turbines a very hard rub indeed. On a small scale the latter has by all means the best of the situation, but cannot fully utilize its advantage until it can grind out direct current.

The other horn of the dilemma in small stations appears to be the gas engine. From the standpoint of pure thermodynamics, this has altogether the advantage of its competitors, but as a matter of practice it loses from rather high losses at moderate output. Recent gas engines make a far better showing in this particular, and also govern much better than the earlier forms. In fact, their partial load performance is relatively not much worse than that of steam engines. But at present the working combination is rather apt to be gas engine and storage battery. Of course, batteries are often used to steady the load factor, and often do so effectively, but at some considerable cost. The equation of competition before us is the small turbo-generator as against the gas engine and its battery, and data are not yet full enough to settle the matter. As a steady load proposition, the gas engine in moderate sizes has the best of the game, but can it hold its place when, or if, it must be coupled with a battery which necessarily loses some energy and adds to the costs of installation and of repairs? Right here is where data are needed on both gas engines and direct-current turbo-generator sets, and they are not yet forthcoming. Either equipment can probably do much better in a small station than can that usually employed. And as to the facts required, they should be not carefully arranged test runs, but every-day results, running over a considerable time. When the total power bills of a year are footed up and reduced to an average for the output metered, one can get a really definite idea of what energy costs. Tests are all well enough in their

way, and certainly give useful information, but where irregular loads and repair costs are to be properly taken into the reckoning, the results of a year or two should be taken. We hope that the experience of the near future will bring out the facts of the case and put them on record.

The Rolling Stock Improvements Upon the Brooklyn Elevated Lines

The extensive improvements to elevated rolling stock which have been instituted by the Brooklyn Rapid Transit Company, involving the reconstruction and re-equipment of all its elevated motor and trailer cars, as described in this issue, involve one of the most important and interesting mechanical problems that has ever, up to this time, occurred in the transportation field. This work involves in its inception a most interesting history of a change from steam to electric traction, and of the development of traffic conditions in this important borough of Greater New York. Electricity as a motive power was resorted to in 1898 upon the Brooklyn elevated lines, in the hope of relieving the traffic conditions which were even then becoming congested under conditions of steam operation, and the result has been a remarkable demonstration of the wonderful value of rapid transit in building up suburban properties and in developing urban traffic, as well as also in strengthening the financial condition of the operating company.

This company has been a pioneer in the introduction of electric traction for both elevated and surface transportation, and has figured prominently in the determination of service requirements. Little was known in 1898 of the requirements, either as to electrical equipment or the rolling stock, of the heavy and exacting operating conditions that were to come. It is safe to say that, at the time, the best equipment available was installed. Experts in the electric railway field were employed and the plans for the new motive power were laid with the greatest possible care. The efficiency of their work was attested by the remarkable development of traffic in this borough of New York City, thousands of home-seekers flocking from the crowded Manhattan Island to the suburban homes that were rendered accessible by this means of rapid transit. In fact, the elevated lines electrically operated were found to be overcrowded, from the new traffic created, almost before they were completely changed over. This rapid growth has subjected the company to the most trying conditions of operation that may be imagined.

Shortly after the electrical operation was initiated a serious set-back came in the form of a disastrous fire in one of the power plants of the company, which necessitated the return to steam motive power temporarily upon most of the elevated lines. Not until the large new central power plant of the system was completed last year has the company been in position to resume electrical operation in full; at that time however the new motive power was again resorted to, and active steps were taken to the further equipment of the remaining elevated lines not previously changed over. The steam passenger coaches have mostly been re-equipped for the electrical service, the heavier and stronger cars of the group being equipped as motor cars and the others as electric trail cars. Owing, however, to the different dates of application of the electrical equipments and resultant non-uniformity of details, much trouble was experienced in the maintenance of the new electrical system. These conditions were made even more difficult by the lack of adequate repair shop facilities in which to properly care for the equipment, and a period of financial stringency prohibiting the building of additional shops for the purpose.

The situation has been commendably dealt with by the company. The new administration readily appreciated the state of affairs and the requirements to put the equipment in condition for reliable and satisfactory service. A careful study of the subject was instituted, which resulted in a complete reorganization of the mechanical department and in decisions authorizing the expenditure of large sums of money, not only for the entire reconstruction and re-equipping of the motor and trail cars, but also for the provision of greatly increased shop facilities. Large numbers of new cars have also been ordered and the greatly desired additional service facilities have been made available. Under the able management of R. C. Taylor, mechanical engineer, and W. G. Gove, assistant mechanical engineer, changes have been made and reforms instituted which are of great importance and warrant careful study. The more important of the reconstruction changes to the rolling stock are discussed in the accompanying article in this issue, while the details of the new system of the fireproofing of wiring, and other interesting changes of car detail, will be described in a later article.

The changes in car construction are numerous, and some of them very radical. The most important are to be noted in the changes in wiring and its most thorough fireproofing to prevent fire catching in the car under-framing from possible short-circuits or other wire troubles. The introduction of many standard features of equipment, by which repair work is simplified, is a commendable innovation; for instance, it will be made possible to interchange motor trucks on cars of similar designs. Safety features have been adopted, among which should be noted the brake cord extending through the cars by which emergency applications may be instantly made by any one in case of impending danger. Of no little importance are the provisions that are being made for the comfort of passengers; the larger platforms, new seat construction and profuse lighting equipment will all tend to make the service more satisfactory and attractive to the passengers.

Locomotive Improvements in Germany

Ever since the Zossen tests of electric high-speed traction, German steam engineers have been spurred to unusual efforts, and our readers may remember a recent series of trial runs with various engines over the Zossen-Marienfelde tracks, a trial remarkable in nothing from the American point of view, save the mediocre speed results. Nevertheless, German railway engineers have been driving steadily along in many lines, and a recent consular report (No. 2016) gives an interesting resumé of the experiments conducted during the past half dozen years on the Prussian State railways to determine the usefulness of superheated steam. Of course, the value of superheating in general is well recognized, and although the subject has been much neglected here, the growing use of turbines is driving it into practical prominence. But superheating on locomotives is a different matter, for it implies working without condensation, and generally in simple engines. The common view here has been that superheating is a sort of scientific refinement, resulting in dubious savings and leading to all sorts of practical difficulties with the lubrication, and on a locomotive such troubles would be especially serious. It is therefore interesting to know that not only have the German experiments shown excellent results in economy, but that the locomotives have given entirely satisfactory results in every-day work on the railways.

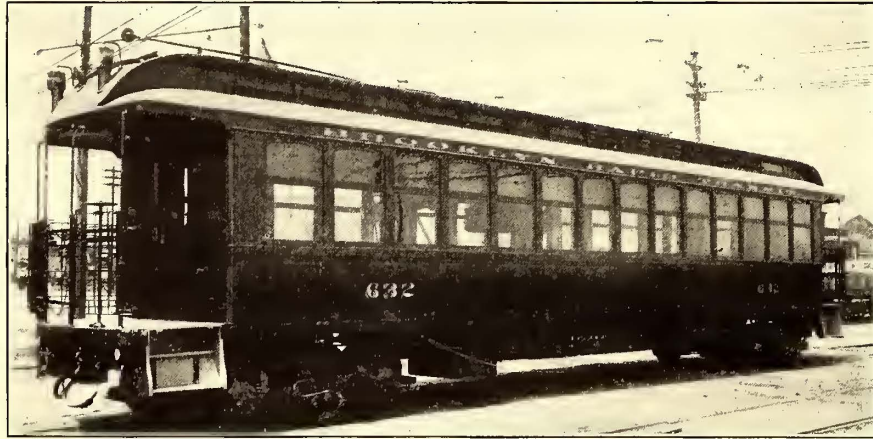
The facts are briefly as follows: Six years ago the Prussian Government caused to be initiated a study of superheating in locomotives. It was begun on a small scale with two engines

fitted with Schmidt superheaters, which are still in use, giving excellent service. More engines were soon ordered, and at present about fifty are in regular service. The Schmidt superheater is located in the smoke box, and the furnace gases enter it through a special flue, and are brought directly against the superheating pipes through which the steam is led. As compared with ordinary engines, those thus equipped have been found to use 15 per cent to 20 per cent less water, and materially less coal, the saving in this latter particular being variously estimated at from 5 per cent to 15 per cent. Superheating also renders it somewhat easier to force the output of the engine, which is of some importance in dealing with orders. A more interesting comparison is with the four-cylinder compound engines, used to some extent on the Prussian lines. It is well known that compound locomotives have shown good results in economy of fuel, saving something like 10 per cent to 15 per cent, and sometimes more, but the added complication of the compound type has been feared and has prevented its more general introduction. As a result of the tests with superheaters, it appears that simple engines so operated compare favorably with compound engines without superheaters. In one series of tests lasting a year, two superheater engines and two compound engines were used on the same runs on alternate days, with the result that one of the superheaters showed a fuel saving of 6 per cent over its rival, and the other of 10 per cent, besides enabling an auxiliary engine used to help the compound over some stiff grades to be dispensed with. The superheater locomotives had beside the advantage of being cheaper and simpler. The superheating in these cases was considerable, giving the steam a final temperature of 300 degs. C. to 350 degs. C.

Several other forms of superheater have been tried in course of the tests, and some of them have done excellently well, but the results from that already described are typical. Another series of tests, not yet concluded, was directed at the use of superheated steam in the compound engines. The upshot of the whole matter is that the results of these practical trials of superheating have been highly satisfactory. Apparently the difficulties of lubrication have been overcome. All these facts tend to give the steam locomotive a better record for economy than it has had in the past. What, if any, will be the bearing of these various improvements on the adoption of electric locomotives on a large scale remains to be seen. We hardly think that they will alter the situation materially. The question in its essence is the use of a stationary prime mover as against a moving one compelled to carry its coal and water, and where very high output is required the former has a manifest advantage. For that matter, the use of superheating in power stations is important if the highest economy is to be reached, and it is at least as easy as superheating on a locomotive. It will unquestionably come into use in this country now that the steam turbines have set the pace. The central power station has a vast advantage in cost of power production, and in numerous cases the electric locomotive would be chosen even without reference to saving in cost of power. Near terminals, in suburban service, and in special work, as in tunnels and the like, the electric locomotive can well afford to stand upon its obvious merits. For extreme high-speed service where very high output is required, it has already demonstrated its value, but there is no reason to suppose that it will be pushed rapidly into the rough and tumble of miscellaneous railway work. The steam locomotive is a remarkably effective machine, even now, and its improvement is highly desirable as part of the general advance of transportation.

EXTENSIVE IMPROVEMENTS IN ELEVATED CAR EQUIPMENTS—BROOKLYN RAPID TRANSIT COMPANY

In line with the general policy of improvement now in force upon the Brooklyn Rapid Transit Company's lines, important changes are being made in the equipment of cars for their elevated lines, in order to bring them up to a standard commensurate with the present state of the traffic handled. This company has, like so many of the other railroads which have changed from steam to electric traction, experienced the abnormally rapid growth of traffic which has resulted from this efficient and desirable system of transportation, and it has been almost impossible to keep the standards of car equipment up



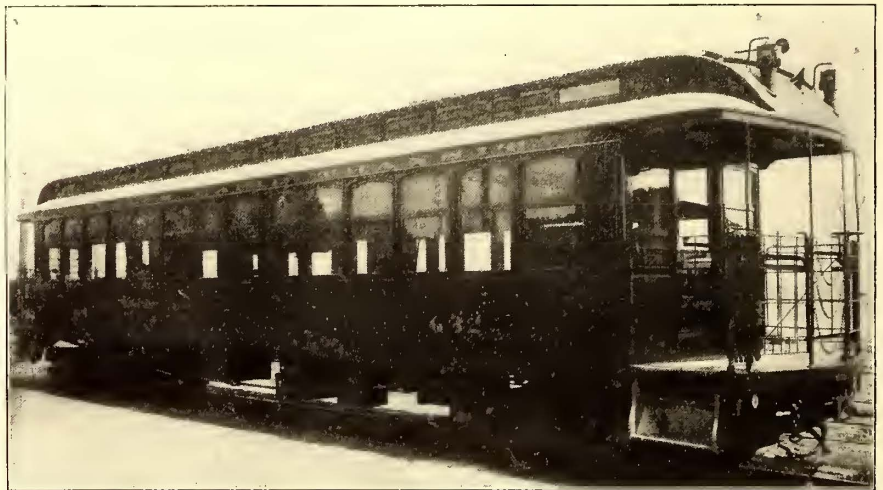
TYPICAL VIEW OF ONE OF THE RECONSTRUCTED ELEVATED MOTOR CARS, SHOWING DETAILS OF STANDARD PLATFORMS, ETC.—BROOKLYN RAPID TRANSIT COMPANY

to the high grade which is required by the ever increasing conditions imposed by the enormous traffic now handled. As electric railroading has grown in importance and its efficiency and reliability have become established, heavier cars, longer trains and more rapid schedules have been placed in force, with the inevitable result that the operating conditions have grown away from the former standards of car equipment.

The mechanical department of the Brooklyn Rapid Transit Company has been greatly hampered for some time past in the operation of its elevated service, owing to the large number of different classes of rolling stock which were bequeathed to it by the former companies, of which the present company is a combination. The elevated lines of the company comprise a union of the old Kings County Elevated and the Brooklyn Union Elevated Railroads; together with them are associated several surface lines, including the Brighton Beach Railroad, the Sea Beach Railroad, the Culver line, etc. These systems were all formerly operated by steam, and in the change to electric traction practically all of the steam-line passenger coaches have been retained, either as trailers or re-equipped with motors for electric operation, the result of which has been to bring a conglomerate mass of equipment of a number of different types, requiring unusually heavy work of maintenance and imposing the greatest possible difficulty in repairs. The former rolling-stock equipment of the elevated lines, which is under reconstruction, involves fifteen different types of cars, including cars from the Bradley, Gilbert, Jewett, Brill and Pullman shops for the old Brooklyn Union Elevated, and from the Harlan & Hollingsworth, the Wason and Pullman shops for the Kings County line. These cars are dated upon various different orders, as far back as 1884.

The mechanical department has for some time past had extensive changes under consideration, and more than a year ago equipped the old Thirty-Ninth Street depot of the defunct South Brooklyn Railroad & Terminal Company for the repair and rebuilding of this equipment. Careful plans have been prepared for the handling of this work, which comprises the strengthening and standardizing of all possible features of the car equipment, and this work has now been under way for sufficient time for the remarkable benefits to become thoroughly appreciated. Over 100 cars have now been put through the shop and turned out re-equipped according to the new standards. This shop, which is at Thirty-Ninth Street and Second Avenue, Brooklyn (having been described upon page 954 of the issue for Dec. 13, 1902), has eight longitudinal tracks, each 475 ft. long, which gives a capacity for working upon seventy cars at one time. Two tracks are equipped with pits for access to the running gear and under parts of the cars. This new shop installation embraces also a large and well-appointed wood-working shop, a blacksmith shop and a machine shop. At the present time over 500 men are employed at this shop.

It has been planned in the work of reconstruction to standardize all parts of the equipment of cars as is possible without too seriously changing the construction of any car. The interior finish of various cars differ widely, and it is not intended to carry the work of reconstruction so as to remodel features of this nature, but the details and arrangements of platform equipments,



OPPOSITE SIDE OF CAR, SHOWING ADDITIONAL INTERESTING DETAILS OF THE RECONSTRUCTION WORK

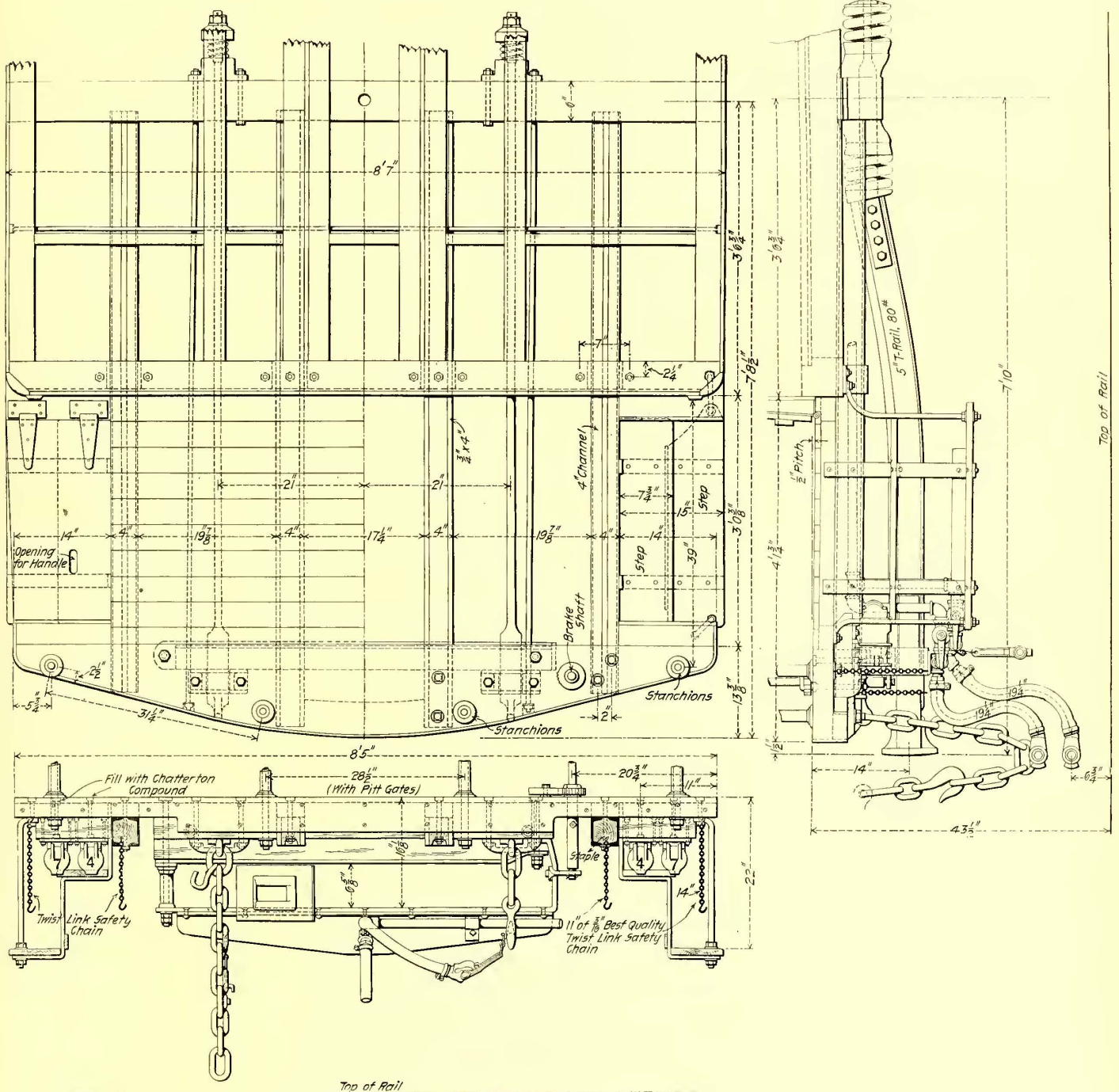
brake apparatus, motor, heater and lighting wiring, air piping, cab equipment, and other features of car equipment, which are distinct from the actual construction of the car, are to be standardized very carefully. The location of apparatus is being provided for with the utmost care for ease of access for the repair men, and many new provisions are being made for the comfort and safety of passengers.

CAR BODY REPAIRS

The first work that is done to a car, after stripping out all of the former equipment, is to strengthen the under-framing and body-framing in all parts which have become weakened, or upon which heavy strains are brought by the character of the service operated under. Many of the coaches were of very light construction, having been intended only for trail work in connection with the former steam locomotive service, and were entirely unsuited to withstand the shocks and strains due

to electric traction. These cars are being carefully strengthened, and in some the under-framing is being practically rebuilt; upon others undergoing heavy reconstruction, the side doors, which are no longer in regular use, are being removed and replaced by standard window construction, which has served to greatly strengthen the car body. The principal change in body construction, however, may be noted by reference to the accompanying drawings, showing new platform

particular platform illustrated is for one of the reconstructed elevated trail cars, but the general features, such as the arrangement of draft rigging, air piping, safety chains, jumpers, steps, etc., conform to the new standard arrangement which will be adhered to in all new work. In all cars upon which new platforms are built, a novel and interesting system of reinforced framing will be used, as shown. The extension sills, extending from the body bolster out to carry the weight of the



DETAIL DRAWING OF THE FRAMING AND GENERAL FEATURES OF CONSTRUCTION OF THE NEW STANDARD PLATFORM DESIGN ADOPTED FOR RECONSTRUCTED ELEVATED CARS—BROOKLYN RAPID TRANSIT COMPANY

arrangements. Practically all of the cars have been refitted with new draft rigging and larger and stronger platforms, and this very interesting work may be studied by reference to the numerous detail drawings.

NEW PLATFORM EQUIPMENTS

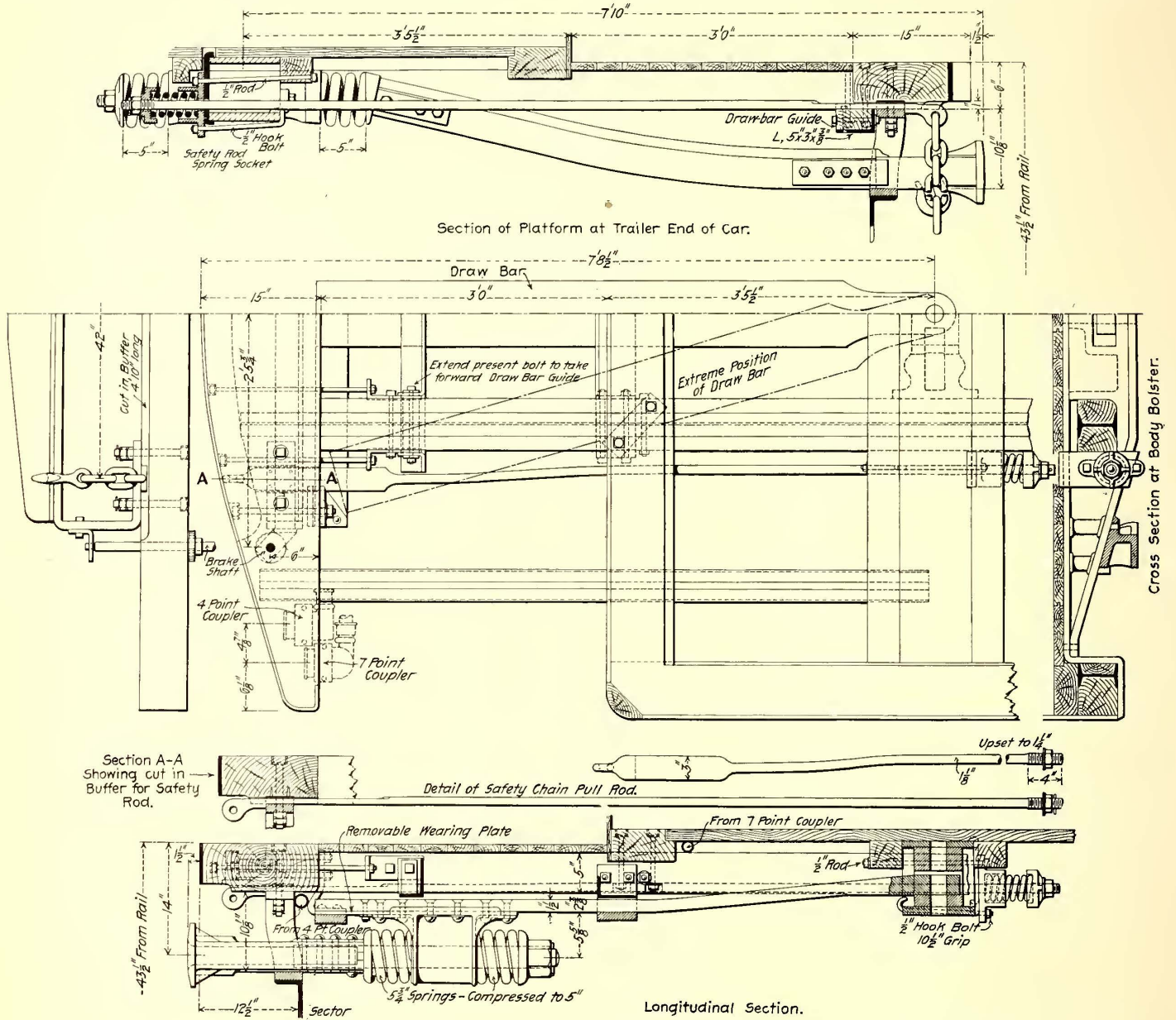
A standard platform arrangement has been designed for all of the cars of the system, and this will be conformed to as closely as possible in all of the reconstructed cars. The first drawing presented herewith illustrates the construction of the platform and framing used in this standard arrangement. This

platform, are built of oak reinforced by heavy channels, one upon each side of the beam, as shown in the end view. There are four of these sills embodying this construction, which provide a very solid and strong platform framing. The details of this construction as related to the car under-framing and also the new buffer beam are well shown in the drawing.

An interesting feature of the elevated ear construction upon the Brooklyn lines is the use of steps and folding sections of platform over them, this arrangement being necessary to provide for passengers not only at the regular elevated line sta-

tions, but also at the numerous surface stations upon the suburban divisions, with which nearly all of the elevated lines connect in the suburbs; all of the elevated lines operating to the ocean resorts are run upon the surface over private rights of way in the suburbs, where passengers are received at depots of the usual type met in steam railroad practice, so that steps upon car platforms are necessary. An important improvement in the new step construction is that of enclosing the steps at the rear of the treads by risers which enclose them and serve to prevent slipping; this is clearly shown in the accompanying

end; the type 18-Van Dorn automatic coupler is also being applied on all trailing cars. Details of this draft rigging are very clearly shown in the standard drawing of platform arrangement for trail cars, as well as also the additional drawings of motor-car platforms. It will be noticed that the distance of projection of the coupler head beyond the buffer beam has been reduced to $1\frac{1}{2}$ ins., which thus results in reducing the total distance between platforms of cars, when coupled up, to 3 ins. The principle of the new Van Dorn automatic coupler is believed to be generally very well understood, their standard



DETAILS OF STANDARD PLATFORM CONSTRUCTION FOR AT MOTOR-TRUCK END, AND ALSO DETAIL OF DRAFT-RIGGING AT TRAIL-TRUCK END

photographs of reconstructed cars. The folding section of the platform above the steps is heavily hinged by strap hinges, as shown, and provided with hand holes for facility in lifting to the folded position. A spring catch is provided in the form of a latch in order to hold the platform up against the end of the car, out of the way, when operating upon the surface.

Probably the most important change in the platform equipment lies in the new type of automatic couplers and draft rigging which is being applied. The new type of automatic couplers and draw-bar attachments of the W. T. Van Dorn Company, Chicago, Ill., have been adopted as standard for the entire elevated equipment in Brooklyn. Upon all the motor cars the No. 4-A type of the Van Dorn coupler is used on the motor-truck end, while the No. 18 type is used upon the trailer

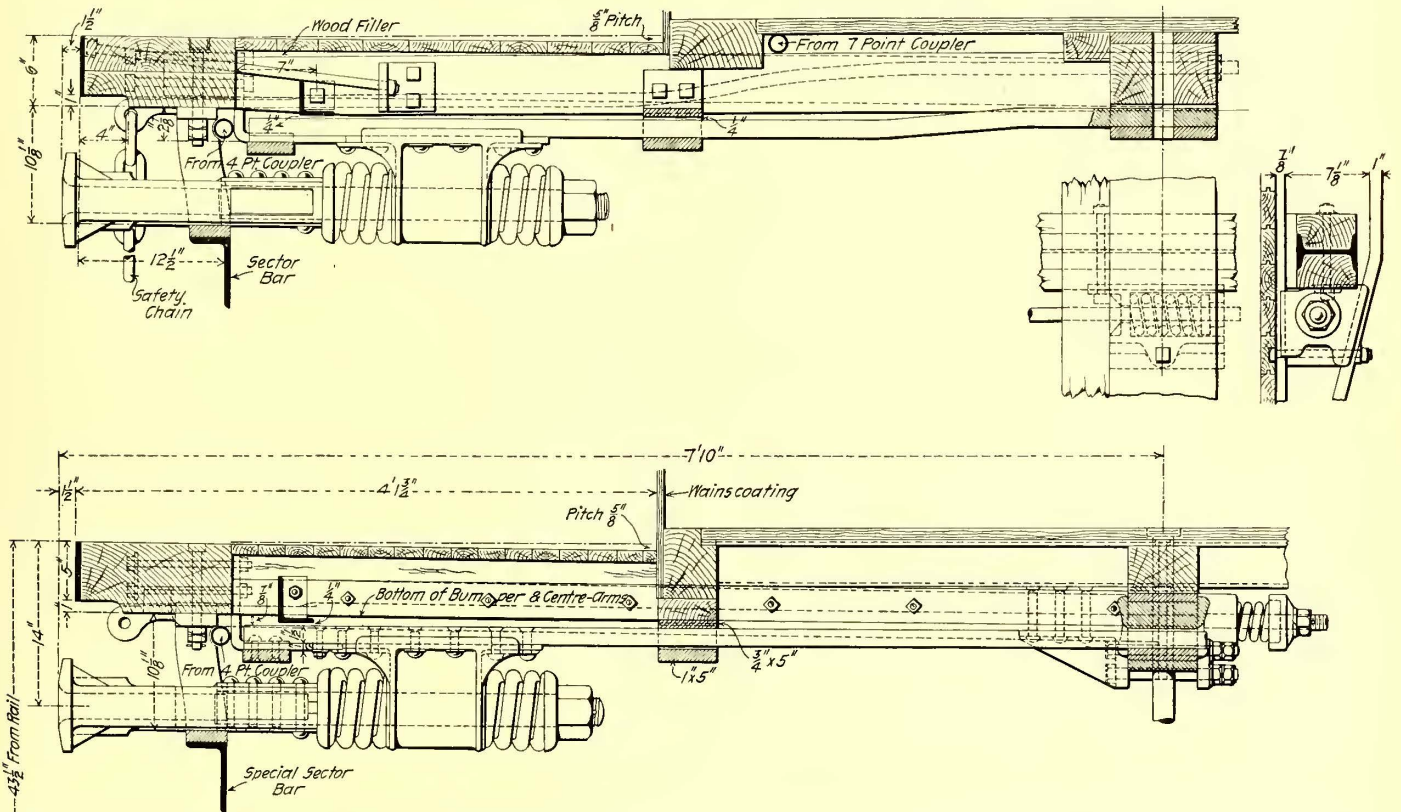
type of head being used, embracing the use of the spring latch and special solid link.

Another new feature which is worthy of special attention is the arrangement of safety chains and their connections to the car under-framing. The style and size of chains now in use are shown upon the end view. Upon the left hand side of each car end is located the hook of the chain, which consists of a heavy drop-forged steel hook fastened to the pull-rod by means of two chain links. The loose portion of the chain is always located upon the right hand side of the car end, this chain consisting of eleven links fastened to the pull-rod, as shown. An important improvement is introduced in this connection in the fastening of all pull-rods to the body bolster of the car instead of merely clamping the safety chains to the buffer-beam as

was formerly done, and which may be said to be very common practice. With this new construction, the pull-rod extends through the body bolster, and is bolted thereto at the opposite side by means of a special spring block, as shown in the drawings. This spring block consists of a pocket casting, bolted to the body bolster, and a cap, between which is located a heavy helical spring. In case of a pull coming upon the safety chains the strain is transmitted to the body bolster easily and without shock through this spring block, which serves to greatly modify the shock and relieve the car body of the jar.

Among other features, a new standard arrangement of air-hose connections may be noted upon the drawings. Instead of locating the air hose side by side, below the sector bar, as was formerly the practice, they are now arranged one above the other, the reservoir line being located above and the train line below. This serves to reduce the tendency toward pulling

involves a combination of the scheme illustrated in the previous drawing with the heavier draft-rigging construction, shown here. This is a result of a new standard which has been adopted by this company, which provides for equipping each motor car with two motors only, both of which are located upon the same truck, at one end of the car; this makes one end of each motor car a trailer in effect, while the truck at the other end furnishes the motive power. This drawing shows the standard platform arrangement and the arrangement of the draft rigging adopted for the motor end of the elevated motor cars, and also shows a detail of the draft rigging for the trailer end of the motor car. As may be noted from the latter detail drawing, the draft rigging is of the same general type as used upon the trail cars before illustrated, a special curved draw-bar, adapted from an 80-lb. T-rail, being used here, together with the usual spring buffer connection at the body bolster.



LONGITUDINAL SECTIONS THROUGH MOTOREND PLATFORMS OF RECONSTRUCTED BRILL AND BRADLEY ELEVATED CARS, SHOWING DIFFERENCES OF DETAIL OF DRAFT RIGGING, PULL-ROD CONNECTIONS, ETC.

the hose in two upon sharp curves and upon double reverse curves, of which some very severe cases are met upon the elevated lines in Brooklyn; a separation of platform center lines of over 35 ins. is permitted, and without increase of length of the air hose, thus providing for the most extreme conditions to be met upon reverse curves. The jumper connections are arranged in new standard locations, a 4-point and a 7-point coupling being arranged at either side of the car, as shown. An interesting feature has also been incorporated in the new design of these jumper boxes. The covers are being replaced by new ones, upon which the figure 4 or 7, as the case may be, is molded upon the cover, so as to project and be readily distinguishable by feeling with the hand at night time. This, while not a factor of great magnitude, is one which it is thought will add materially to the convenience of the workman for making these connections at night. The jumpers will be held in position by special twist-link safety chains of a small size, one of which is provided alongside of each jumper coupling, as shown.

PLATFORM STANDARDS

The following drawings illustrate the standard platform arrangement which is being applied to all motor cars. This in-

The other details at the trail end of the car correspond with those to be noticed upon the motor ends.

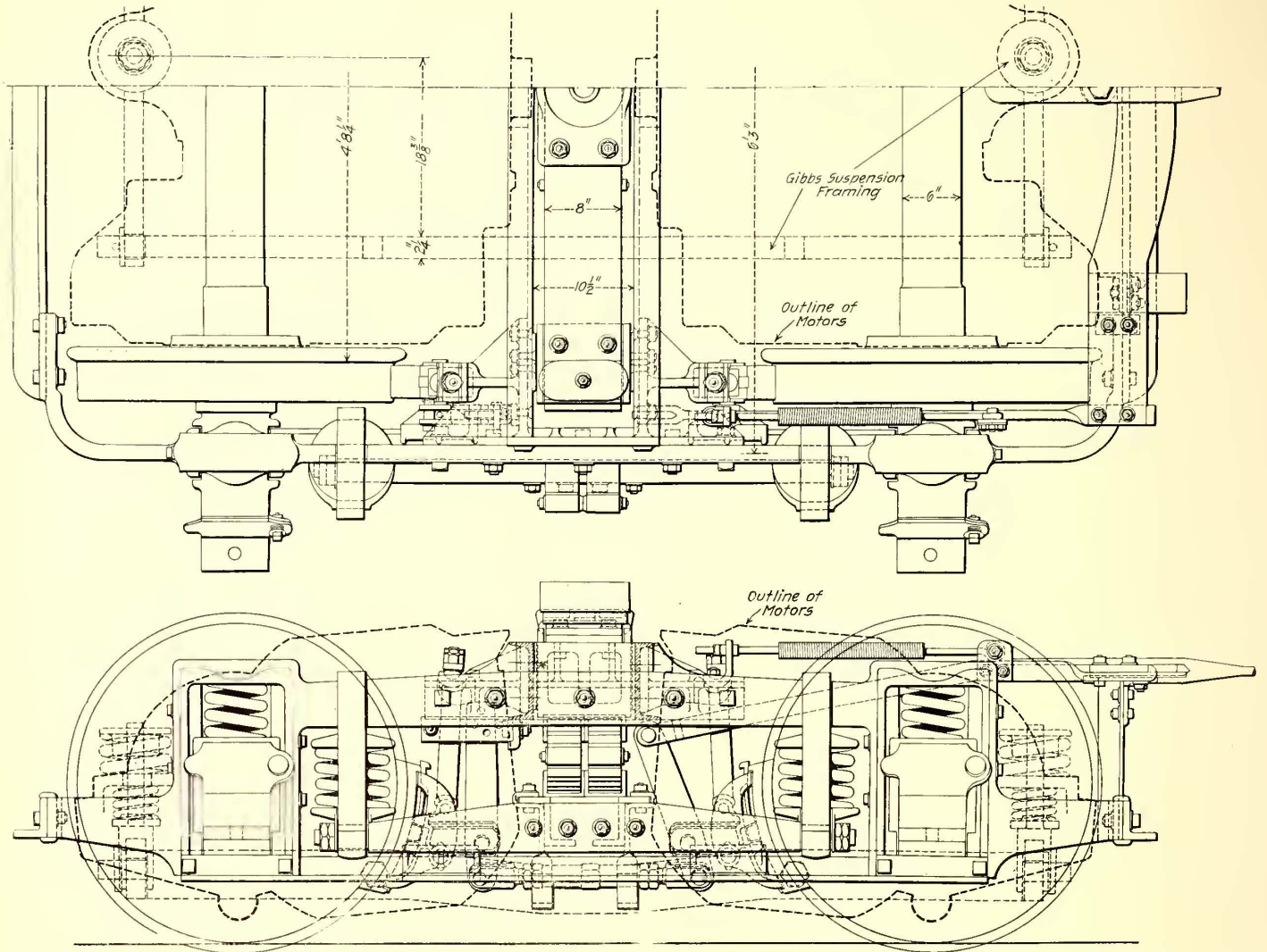
The principal feature of the draft rigging at the motor end of the elevated motor cars is to be noted in the new form of draft rigging used, consisting of a heavy draw-bar of flat iron 8-in. x 1½-in. in section, which extends from the king-bolt at the body bolster forward nearly to the buffer beam, where, upon the underside, is bolted the spring buffer casting; this casting carries the Van Dorn automatic coupler direct through the spring draft connections, as shown. A special feature of construction is to be noted here, in that in addition to the special sector bar below the buffer beam for supporting the coupler, two draw-bar supports are also provided, one immediately above the coupler casting and the other just below the end sill of the car body, the latter serving specially to prevent buckling of the main draw-bar in case of the heavy pressure due to shocks in coupling.

An interesting feature will be noted in this drawing also in the splicing of the center sills of the car carrying the platform. The platforms of all of these cars are being considerably extended, and in most cases call for splicing out the sills; this is being done in a very interesting manner, as shown. The con-

nections of the buffer beam to the end sills are also here shown ; this is a comparatively simple matter upon the reconstruction, however, as the buffer beams are not called upon to receive any pull strains, as would be the case if the safety chains were attached directly to them. They are strengthened, however, for the compression shocks due to buffing. The other features of construction conform to the standards as illustrated in the

not be used on account of lack of space, and a special type of spring block was designed, and has been applied as here illustrated.

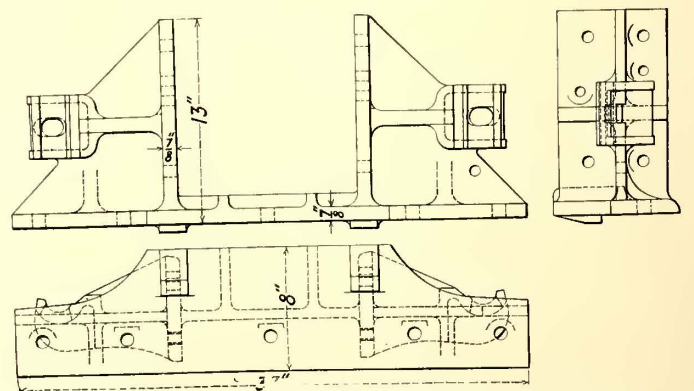
An interesting feature is to be noted in this connection in all of these drawings in the methods of reinforcing the center and side sills of the reconstructed cars. On all new sills installed, or the projecting sills required to carry the new plat-



DETAIL DRAWING OF ONE OF THE REBUILT MOTOR TRUCKS, SHOWING CHANGES IN MOTOR SUSPENSION, TRUCK-FRAME BRACING, BRAKE-SHOE SUSPENSION, BRAKE RIGGING, ETC.

standard platform drawing of the trail cars, namely, the 4-point and 7-point couplers, the safety chain pull-rod connections and all other details.

In another drawing is shown longitudinal section details of the draft-rigging connections upon the reconstructed Bradley and Brill cars. These differ considerably from the motor-end draft rigging shown in the above drawing, especial provision being required for strengthening the body bolster and other parts. The draft-bar, its supports and the spring-draft connection for the coupler are all of the standard type, but the style of connection with the king bolt at the body bolster varies in each case. In the Bradley car a heavy bracket has been bolted in between the front side of the body bolster and the center sills to strengthen this portion of the under-framing against the shocks transmitted to the car body in starting the motors; this has been found a very wise precaution, and is being extended to all cars where it can be used to advantage. In the detail of the Brill car may be seen a somewhat different arrangement of platform details, and also of the safety chain pull-rod, although the general features of the draft rigging are of the standard type. In this car the standard form of spring block used for securing the pull-rods to the body bolster could



DETAILS OF THE CAST-STEEL REINFORCING BRACKET INSERTED TO STRENGTHEN THE UPPER MEMBERS OF THE TRUCK FRAME

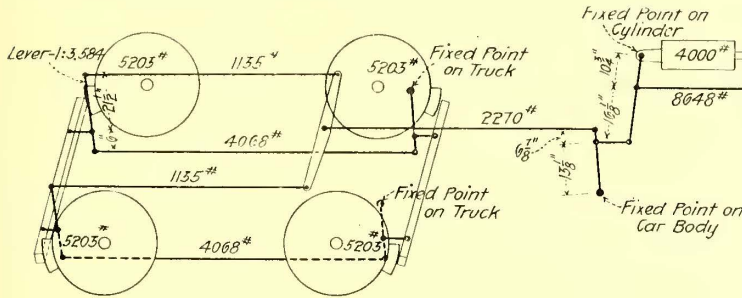
forms, reinforced wood construction is made use of, as shown. In some instances I-beams are used, with wood plates fitted in on each side, while in others wooden beams are reinforced by a channel on either side, or in other cases, where space is limited, by two angles, one on either side, so as to entirely enclose

the wooden beam. This construction conforms to the very latest practice in heavy railroad car construction, and serves to very greatly strengthen the car construction.

TRUCK RECONSTRUCTION

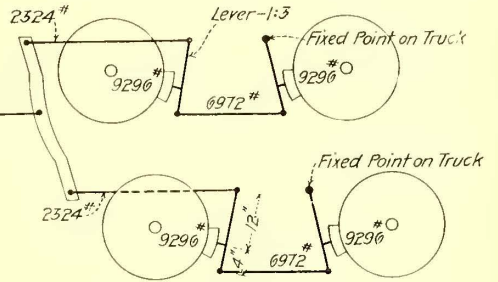
Changes of equal importance have also been made on the various types of trucks which were in use upon the system, in order to fit them to withstand the severe service imposed by the exacting schedules now in force; as the schedules have been cut down and the speeds operated under increased, the lighter trucks formerly used have proven less and less able

was much lighter; they have given excellent satisfaction in service, but with the heavier motors that are now being applied, it has been found advisable to strengthen them for the heavier weights and tractive forces in starting. In this particular truck, the body bolster was formerly carried upon the spring plank support between two 8-in. channel guides, which channel irons were merely bolted to the side frames by angle plates. This construction proved inadequate to withstand the severe strains in accelerating, and it was strengthened by the insertion of cast-steel reinforcing brackets, as shown. These



Trail Truck.

Total shoe pressure on trail truck = 20,812 lbs. or 89.98 % of total weight of No. 2 end.
Total weight of No. 2 end = 23,130 lbs.



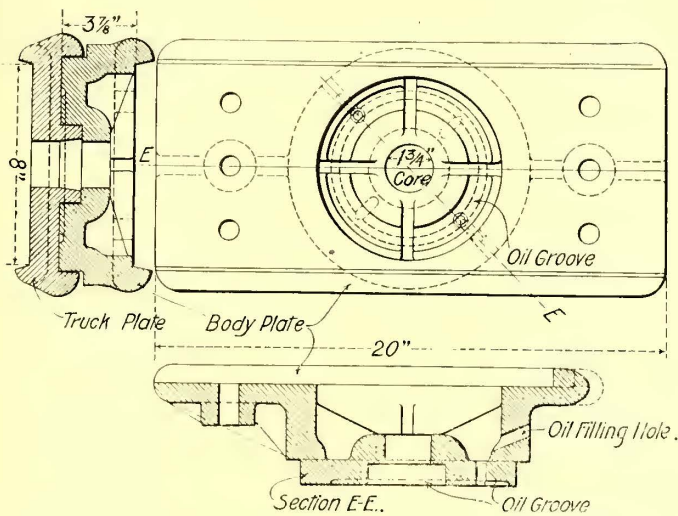
Motor Truck.

Total shoe pressure on motor truck = 37,184 lbs or 100.04 % of total weight of No. 1 end.
Total weight of No. 1 end = 37,170 lbs.

DIAGRAM OF BRAKE-SHOE PRESSURES AND TENSIONS IMPOSED UPON MEMBERS OF BRAKE-RIGGING, UPON ONE OF THE STANDARD RECONSTRUCTED MOTOR CARS

to withstand the heavy service. The best of the trucks in use have been retained, however, and are being strengthened in all of the weaker points, so as to withstand the shocks of starting the motors, etc. Many of the odd trucks that came into use upon the system have been discarded, and replaced by new and stronger ones. The "Brooklyn Heights standard" truck, built by the Peckham Manufacturing Company, which was applied a year or so ago to the 120 Kings County and Brooklyn

brackets are shown in heavy lines to indicate the construction and relative locations. The channels are now bolted to massive lugs, which extend 12 ins. out from the bracket casting, the bracket castings being secured to the side frame of the truck by five 7/8-in. bolts. The bracket castings are heavily ribbed, to provide ample stiffness, and, by virtue of their extremely heavy construction and rigid connections to the side frame and the channels, render the top members of the truck practically as rigid as if forged solid in one piece.



DETAILS OF THE NEW STANDARD SELF-LUBRICATING CENTER-PLATE (BODY HALF), ADOPTED TO PERMIT INTERCHANGEABILITY OF TRUCKS

Union Elevated steam coaches in equipping them as motor cars, have been retained in that service with very few changes. The old steam coach trucks, which they replaced, are being re-equipped for use under trail cars, and have, fortunately, enabled, by their uniformity of design, a standard type of trailer truck to be worked out and adhered to.

The accompanying drawing is typical of this truck reconstruction work, this one illustrating the changes that were made upon a type of truck built by J. G. Brill & Company, which was placed in service upon the road in 1901. These trucks were designed for a much lighter service and slower speed than is now in force, as at that time the traffic handled upon the elevated

Another important feature of the truck reconstruction work lies in the equipping of all the Brill and Peckham motor and Peckham trailer trucks of the elevated cars with the Taylor "non-chattering" brake-rigging system, by means of which the disagreeable vibration in heavy braking is averted. This system was patented by R. C. Taylor, mechanical engineer of the Brooklyn Rapid Transit Company, some time before his connection with this road. As applied to the reconstructed Brill trucks, it consists of the provision of lugs extending out from the steel reinforcing bracket, over the wheels from which the brake shoes are swung flexibly, yet rigid against vertical motion; this serves to bring the pull upon the brake shoe directly upon the upper members of the truck frame, and cannot result in torsion or buckling of the side frames, while the vertical rigidity prevents the chattering.

The brake rigging has also been considerably changed, guides being provided to hold the brake shoes upon the wheel faces; this will prevent the shoes from tending to slip off of the wheel under heavy braking strains, unless flange brake shoes are used, when guides will be unnecessary. An important change has also been made in the releasing spring for pulling the brake shoes off of the wheels when the brakes are released. Spring pressure is provided by a spring attached to the brake pull-rod over the forward wheel, the other end of which is secured to a bracket near the bolster; by means of an adjusting bolt the tension upon the spring may be regulated at will, and by virtue of the strength of the springs there is no possibility of the brake shoes dragging upon the wheels, as so often is the case.

The brake-shoe pressure and the various tensions brought upon the various portions of the braking system, as applied to the reconstructed cars, is indicated in the accompanying diagram of brake leverages. One truck of each car is a motor truck, the other being a trail truck. As may be noted from the

diagram, the trail trucks are equipped for a total brake-shoe pressure of practically 90 per cent of the total weight of the half of the car coming over it, while the motor truck is equipped for total shoe pressures of 100 per cent of the total weight which it will carry. The various brake-lever pressures and lever ratios are indicated upon the drawing.

The Gibbs type of motor suspension is being applied to all of the reconstructed motor trucks. The outlines of this construction is shown in the truck drawing. The side bars of the Gibbs suspension frame could not be installed without depressing slightly at the middle, in order to clear the lower cross frame of the truck; for this reason the side bars are offset $1\frac{1}{2}$ ins. at the middle, in order to clear the truck. The details of this suspension do not differ otherwise, however, from the well-known construction which it embodies. An important safety precaution is provided in this connection to prevent the motor from dropping in case the suspension should for any reason fail; this consists of a projecting plate or bracket bolted to the 8-in. cross channels and bent up so as to come under the lug upon the top of the motor frame. In this way, if the suspension should fail, the motor would merely drop $1\frac{1}{2}$ ins. or 2 ins., and thereafter ride rigidly upon the truck frame. In this way such an accident would not prevent the car from being operated to a considerable extent under its own power, although this device is not intended for regular operation.

A commendable step has been taken, in connection with the reconstruction of the trucks, toward their interchangeability by the provision of standard center-plate bearings. All center plates will be of the same dimensions, and will be exactly interchangeable, which will make it possible for the motor truck of any motor car to be removed and placed under any other motor car. This is a valuable provision, as it will enable cars to be kept in service, where they otherwise might be held in the shop by work required upon the motor truck; in case of a car being in running order with the exception of its motor truck, any truck having suitable motors for this car that may be available can be placed beneath it, connected up and the car placed in commission again in the shortest possible time. An important feature of this standard center plate, which is being introduced upon all the cars, is the provision of an adequate oil well in connection with the lower or truck side of the bearing, which may be filled after the upper plate is in place, and will, by means of the oil grooves provided, keep the bearing lubricated for an indefinite time. This is an important feature, and one to which too little attention is generally given.

FIREPROOFING AND ELECTRICAL EQUIPMENT

The interesting details of the fireproofing of all wiring and electrical apparatus, as well as also the important changes in arrangement of apparatus, motorman's-cab details, interior details of car, etc., will be referred to in full in an article which will appear in the following issue of this journal.

HOT WATER VERSUS ELECTRIC HEATERS

BY R. P. GORHAM

The silent contention between hot water and electric heat for electric cars continues without either system gaining a marked advantage over its opponent. It cannot be said that there is a distinct field for either of the two, except that the smaller city cars are, as a matter of fact, more likely to be found equipped with electric heaters than interurban cars, while on the latter hot-water heating is frequently found. In view of this difference in practice, it may be well to point out some of the advantages and disadvantages of each system.

The questions of weight, space, attention required to operate and attending dirt are much against the hot-water system. The heater itself, with the expansion drum, necessary pipes and the water in them, adds, approximately, 2 per cent to 5 per

cent to the weight of the car. Except when the heater is placed in the vestibule, it usually takes up the space of at least two persons. With a car seating forty-eight passengers the heater will under these circumstances occupy 4 per cent of the total useful space in the car, or, to state it another way, were the heater removed this space could be utilized and the passenger capacity of the car increased 4 per cent with the same current consumption, not considering the decrease of weight of the car when the heater is removed. Were the heater and accompanying apparatus removed, however, the car would be lightened say 3 per cent. This should cause a corresponding decrease in the current used.

Considering the 4 per cent increase in the carrying capacity of the car, together with the 3 per cent reduction of current that would take place were the heater removed, it is readily seen that the weight and space taken by the heater are directly responsible for 7 per cent of the total consumption of current. It might be argued by some that the possible lightening of a car and trucks by the removal of the heater might not be as much as 4 per cent. However, it is only fair in an argument of this kind to assume that the weight of car is proportional to the space available in the car, and for that matter, if we are to come down to fine points of argument, the heater weighs more than the passengers it displaces, and therefore the weight of car to a given amount of interior space might reasonably be less without the heater than with it. A heavier car body and truck is needed to carry a heater than to carry the two passengers, which we are assuming take the same room as the heater.

The labor required in building the fires and watching them in the car house is by no means a small item, and when on the road the care of the heater, usually delegated to the conductor, causes him much inconvenience. In addition, the occasional burning out of the coils or the freezing up, with the accompanying bursting of pipes, increases considerably the cost of maintenance.

But the electric heater has its drawbacks, too. When properly installed with all wires in metal conduits, as is required by the new rules for car wiring, published in the *STREET RAILWAY JOURNAL* of July 16, danger of fire is almost eliminated. But the methods most commonly used in wiring heaters are far from what they should be, and always carry with them more or less danger of fire. Then, too, when the car is in the storage barn the heaters are often negligently left on, adding another element of danger. Electric heaters may or may not be the direct cause of the numerous mysterious fires for which they are blamed, but the fact remains that with many master mechanics danger of fire is all that prevents their adoption.

The cost of the current consumed, however, is the argument commonly made against them. On long interurban lines this applies less to the operating power house expenses than to the additional expense of increasing the capacity of generating plants and transmission lines. But it is a question worthy at least of some consideration whether or not the 7 per cent increase of current used throughout the year to carry the hot-water heater around would not, if applied directly, be sufficient to heat the car for the six months of the year during which heat is desirable.

The heater is most needed in wet weather. With some forms of electric heaters it is in such weather that they are most unreliable. Water dripping from shoes or clothing coming in contact with the hot wires may cause them to break, necessitating the help of the repair man before the heater can again be put in service. On interurban cars where many heaters are wired in parallel, the breaking of one or two circuits does not materially affect the temperature of the car. With small city cars, however, having probably but two circuits, the inconvenience is very noticeable.

In the selection of heaters for interurban lines with long runs, a point in favor of the hot-water heater is that it is in-

dependent of current. If for some reason current be shut off in cold weather, the car may lie on an isolated section of the track for a considerable length of time. It is needless to say that with a hot-water system the occupants of the car will not suffer as they would if the car were heated electrically.

In what has been said it is not intended to draw any final conclusions one way or another as to the two classes of heater, but to point to some of the advantages and disadvantages of both. Some of the points mentioned are frequently overlooked in considering the question.

NEW STORAGE-BATTERY PLANT OF THE NORTHWESTERN ELEVATED RAILROAD, CHICAGO

The Northwestern Elevated Railroad Company, of Chicago, has recently completed a storage-battery plant at the present northern terminus of its line in the terminal yards at Wilson Avenue. This plant is interesting, because it is an example of good substantial construction for a storage-battery station rather than because of any remarkable features.

BUILDING

Fig. 1 is from a photograph of the street side of the plant, and Fig. 2 is a cross section of the battery room. It will be noticed that the windows on the south or street side are placed high. In the construction of the company's buildings and yards it has been the policy to guard against intruders as far as possible by the use of a high board fence. The high windows on the street side of the battery room carry out this general policy. The entire plant is one story, but the booster and switchboard room is higher than the battery room. The battery room, Fig. 4, has a floor of brick laid in asphalt, which is 4 ins. thick, and has a foundation of 8 ins. of concrete. The roof and posts supporting it are of wood. At both ends of the plant are double doors for use in moving machinery or battery tanks in and out. The building is heated by hot-water radiators, the hot-water heater being located in one corner of the booster room. All iron work in the building is coated with Barber Asphalt Com-

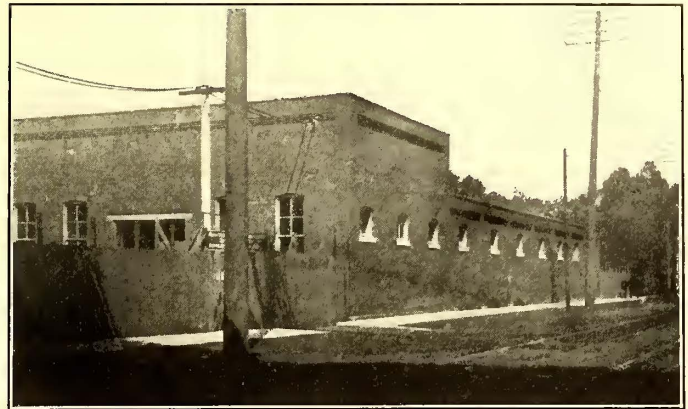


FIG. 1.—STORAGE BATTERY SUB-STATION FROM STREET

at full load is 90, and the speed of the motor and booster 500 r. p. m.

Besides the two switchboard panels for controlling the battery, booster and booster motor, there are two feeder panels. These two feeder panels are used because there are two distinct feeders running from the power station to this portion of the road. One of these feeders is for supplying trains on the express tracks on this section of the road. The other is for supplying trains on the local tracks. The battery can be connected to one or both of these feeders during charge or discharge. It is customary during the charge of the battery to connect it to the feeder supplying the express tracks only. As express trains are not in operation during the time that the battery is being charged, this gives the battery a feeder running directly from

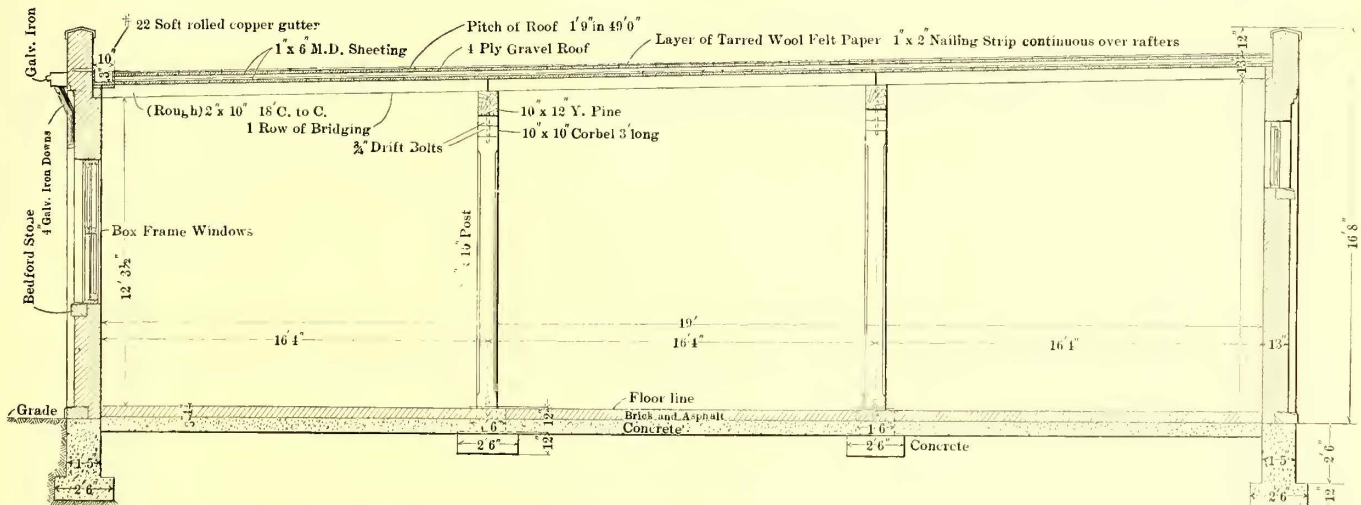


FIG. 2.—LONGITUDINAL SECTION OF BATTERY HOUSE

pany's "Tite Kote" paint. Other details of the building can be seen from the plans before mentioned.

ELECTRICAL APPARATUS

The battery consists of 258 chloride cells, rated for a maximum discharge of 2720 amps. at the one-hour rate. They are connected to the line through a compound-wound booster, Fig. 3. The switchboard connections of the plant are shown in Fig. 5. In this diagram it will be seen that the battery can be connected directly to the bus-bars which lead directly to the line, or it can be connected to the bus-bars through the armature and series coils of the booster. The circuit breaker in the

power station which is free from fluctuations in voltage, due to a varying load. During the rush hours the battery discharges into both local and express track feeders, thus helping to carry the maximum peak load of the northern section of the line, which reaches as far south on the Belmont Avenue, making this section extend over about 1 1/2 miles of four-track road. The power station is at Fullerton and Southport Avenues, about 2 1/2 miles from this sub-station. Although this battery plant is at what is now the northern terminus of the road, it probably will not be so long, as an extension is contemplated to Ravenswood, and it is also expected to operate trains

over the tracks of the Chicago, Milwaukee & St. Paul Railroad from this point to Evanston.

WATER SUPPLY

It was at first intended to get a supply of distilled water for replenishing the electrolyte of the battery from a still located on the premises and heated by gas. A number of tests were

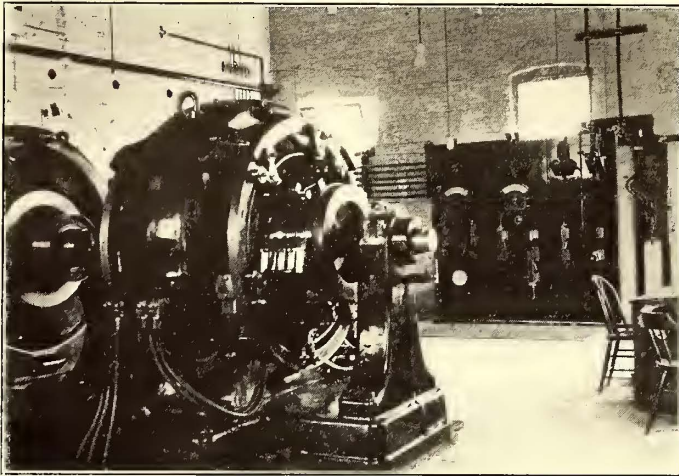


FIG. 3.—COMPOUND WOUND BOOSTER

made on the cost of operating this still. In one of these tests, which is a fair average of all, the gas burner took 60.2 cu. ft. of gas per hour. The city water required for condensing was 60 gals. per hour. It yielded $3\frac{3}{4}$ gals. distilled water per hour. This, at the price paid for gas of 90 cents per 1000 cu. ft., and with city water for condensing at 1 cent per 100 gals., would bring the cost to 1.6 cents per gallon. This was so high that the still was moved to the power station, where steam from the boilers could be used at a cost for production of distilled water of about $\frac{1}{2}$ cent a gallon. This is a sufficient saving, so that it pays to haul the water in barrels from the power station to the battery plant rather than maintain the still at the battery plant and operate it by gas.

ROUTINE BATTERY OPERATING INSTRUCTIONS

The following instructions, which are given to those in charge of the battery plant, give a good idea of the way in which the battery is cared for and what the company considers the best practice in this respect:

RATING	Amps.
Maximum discharge rate	2720
Normal discharge rate	680
Maximum charge rate	950
Normal charge rate	680

Floating.—When floating, the voltage should be so adjusted that the specific gravity of the pilot cell will remain in the neighborhood of 5 points below the maximum reached at the last weekly overcharge, as noted in chalk on the outside of the pilot cell tank (see paragraph on pilot cell readings). The battery must not be allowed to gas or "boil," either of which is an indication of too high a voltage. Except on the weekly overcharge, the specific gravity should never get above this point, and should it show a tendency to do so, decrease the voltage across the battery. The proper adjustment can also be checked by the voltage across the battery. This should average 540 volts—that is, on discharge the voltage will go below this point, and on charge it will go above, but the average should be kept at this point, being checked on the Bristol recording voltmeter chart. This adjustment is made by means of the booster rheostat.

Discharge.—The discharge current must not be allowed to exceed 2720 amps. in regular service. The circuit breaker, however, may be set at 4080 amps. in order to take care of such very infrequent discharges as may be only momentarily in ex-

cess of this figure. The voltage across the battery must never be allowed to fall below 440 volts, and must only go that low when there is a discharge of at least 680 amps. If the discharge is less the voltage must not go so low. The specific gravity of the pilot cell should never be allowed to fall more than 30 points during discharge, and in general 25 points is recommended as a safer figure.

Ordinary Charge.—Where a regular discharge is taken out of the battery, charge up as soon as practical, preferably at the normal rate. The charge should be continued until the gravity of the pilot cell reaches a point 5 points below the maximum reached on the last preceding weekly overcharge.

Weekly Overcharge.—On Sunday morning the battery must be given an overcharge, this being similar to the ordinary charge, except that it is continued longer. When the battery begins to "gas" take specific gravity readings of the pilot cell at fifteen-minute intervals; continue the charge until those readings show no increase in gravity for three-quarters of an hour, when the current should be cut off, the battery being full.

Thunder Storms.—On account of danger from lightning and burning out, it is advisable during severe thunder storms to keep the Weston voltmeter cut out of circuit by keeping its switch on the off point, except when readings are being taken. If it is possible to adjust the bus to the battery floating voltage—that is, 540 volts, the battery should be floated directly on the system without the booster, and in case it is advisable, as far as practical, to keep the booster out of service at such times.

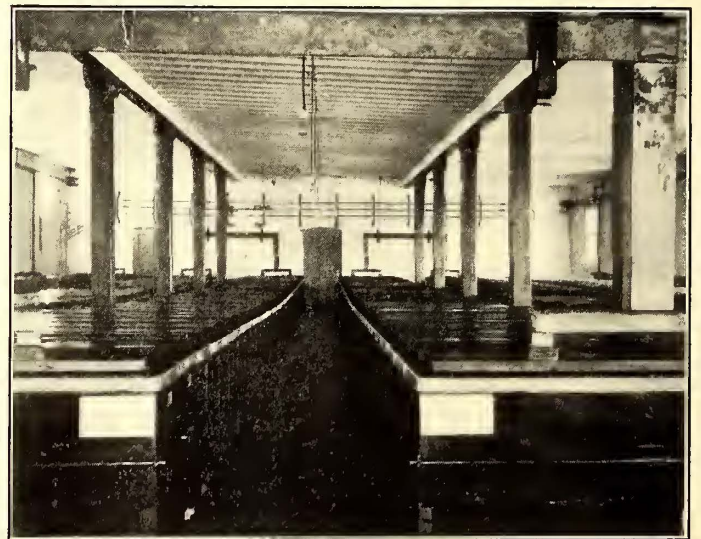


FIG. 4.—INTERIOR OF BATTERY ROOM.

Pilot Cell Readings.—While the battery is on the system, read and record once every hour the specific gravity of cell No. 169. Read and record once every day the average electrolyte temperature of this cell, and also the temperature of the room. It is of assistance to chalk on the outside of the pilot cell tank each week the maximum gravity reached after the weekly overcharge, this reading being used as a standard for operating the battery during the following week. Read and record at the end of each charge and the end of each discharge the pilot cell gravity. The proper height of the electrolyte of the pilot cell should be marked in any convenient manner, and then enough water put into this cell each day in order to keep the electrolyte at this constant height.

Weekly Readings.—A complete individual cell specific gravity reading of the entire battery should be taken at noon on Sunday. A second complete individual cell specific gravity reading should be taken after the weekly overcharge is completed and before any discharge is taken out.

Bristol Voltmeter.—The Bristol voltmeter should be checked and, if necessary, adjusted once a week. This is done as fol-

lows: With the battery off the circuit, read the battery voltage on the Weston voltmeter; then by means of the slide in the meter resistance box adjust the latter so that it agrees with the Weston,

Responsibility.—The senior operator will be held responsible for the condition of cells No. 1 to No. 130. The junior operator will be held responsible for cells No. 130 to No. 258.

Replacing Evaporation.—Keep the plates covered with electrolyte and use only approved water in filling up. Do not use acid.

Inspection.—At the end of the weekly overcharge, when the cells begin to gas, look over all the cells for gassing, and note any which are behind the rest of the battery. As soon as convenient, inspect these cells for trouble. Once a week inspect

cells. In case of trouble being shown by any of the above indications, look at once for short circuits and remove the same if found. In case of any trouble that you cannot discover and remedy, report at once to R. B. Stearns, superintendent.

Forms are provided upon which the battery attendants make regular reports from the charge and discharge at the battery.

The foregoing particulars are given through the courtesy of E. C. Noe, general superintendent, and R. B. Stearns, superintendent, of the Northwestern Elevated Railroad Company.

Indiana interurban railroads have reached the point of carrying pianos when occasion requires. The Roberts Park M. E. Church Choral Society chartered a special car over the Indianapolis & Northwestern Traction Line for Lafayette and

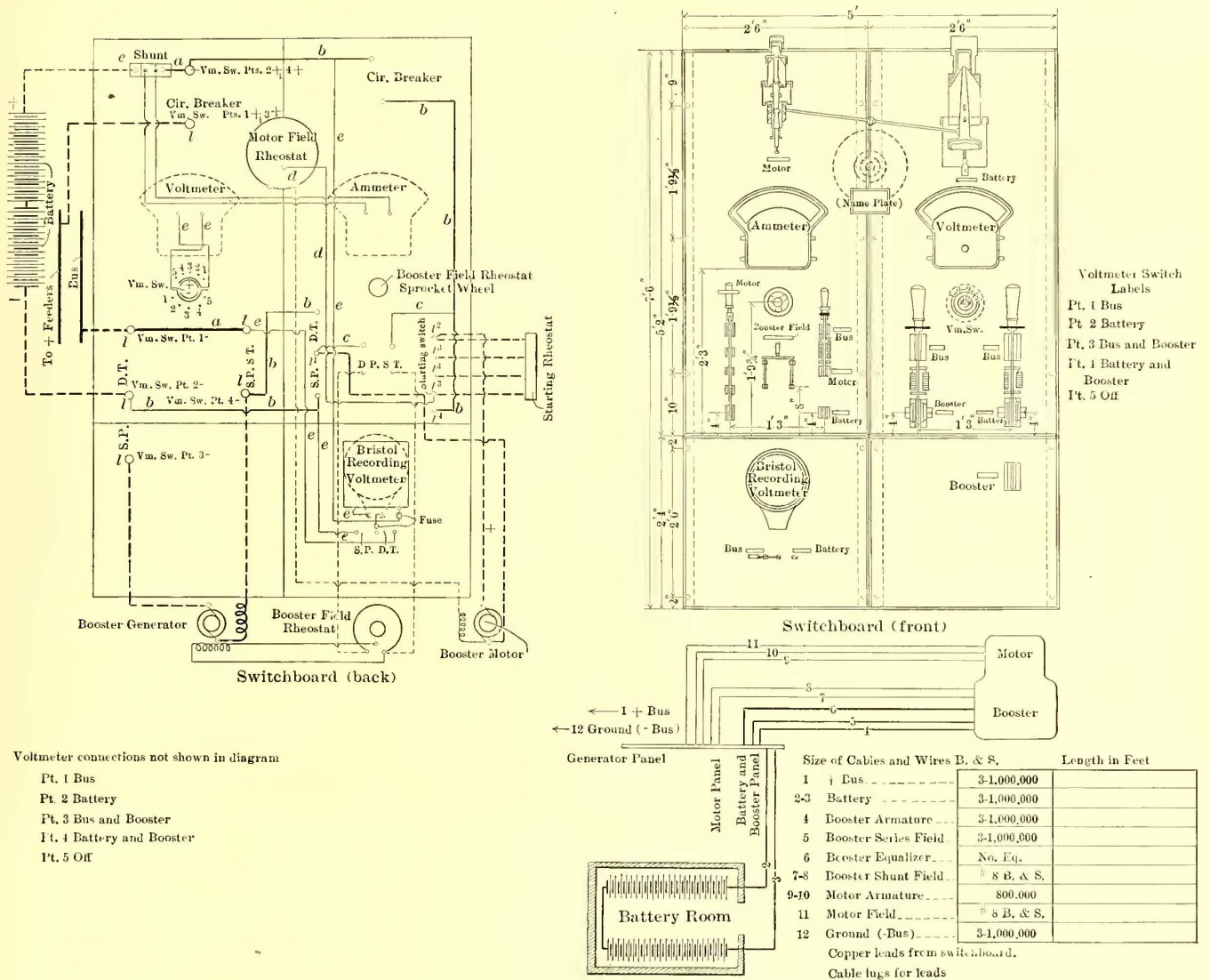


FIG. 5.—DIAGRAM SHOWING BOOSTER AND BATTERY CONNECTIONS

all cells for color or for short circuits between the lugs. Cells giving indications of trouble should be attended to at once. Until board separators are installed, in addition to the above, all the cells should be inspected with a submerged inspection lamp once a week. Look between the plates and remove anything collecting between them with a thin stick or probe. Do not use metal for this probe.

Indications of Trouble.—The following are the chief indications of trouble in cells:

1. Lack of gassing on weekly overcharge.
2. Drop in the specific gravity reading relative to the rest of the cells.
3. Lower charging voltage than the rest of the cells.
4. The color of the positives markedly lighter, or of the negatives markedly whiter or darker than the neighboring

return. Among the special features of the equipment was a piano. As the party of seventy voices went through the country it made music. Stops were made at the stations and great crowds assembled to hear the singing.

That electric railway companies throughout the country are gradually recognizing the advantage of calling the public's attention to attractive localities reached by their lines, is evidenced by the beautiful guide book on the Great Blue Hill and Reservation, which has been prepared by the Blue Hill Street Railway Company, of Canton Junction, Mass. This booklet is sold at the nominal price of 10 cents, contains an extended description, with panoramic views of these famous public grounds, historical sketches of the district, car schedules and other valuable data to the traveler.

BODY FRAMING OF MODERN INTERURBAN CARS

BY EDWARD C. BOYNTON

The general design of the frame of an interurban car of today is very unlike that of a car built four or five years ago. The changes in the design have been many, and, though spread out, as they were, over the above length of time, have been

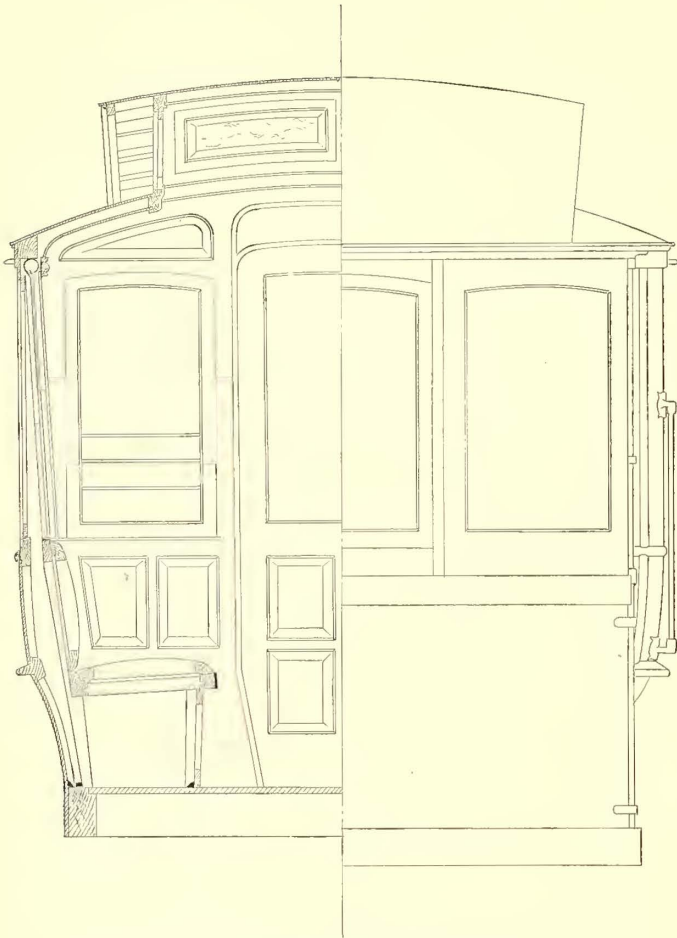


FIG. 1.—HALF SECTION AND END ELEVATION OF OLD-STYLE CAR

very rapid. They have all been in one direction—toward the design of the standard steam railway coach.

If the specifications covering the body-framing of a Pullman car, a steam railway coach and an interurban car of to-day were placed side by side almost the only difference to be seen is found in detail dimensions, the Pullman being the heaviest and the others in the order given. The general design is the same.

For the purpose of comparison, Fig. 1 is given, showing a half section and end view of an old style car. It will be noticed that the sides of the car contain pockets into which the window drops. There are light posts between the windows, extending from side sill to side plate, and formed to fit the pocket and the outside curve of the "sinker" panel. Little or no framing is to be seen, there being only a single longitudinal rib between the sill and the belt rail or sash rest.

It is unnecessary to go further into the frame details of this type of car, for all are more or less familiar with it.

In all modern frame design the strictest attention is given to the strength of the side frame from the sill to the belt rail. The object is to give the frame great strength to withstand vertical strain and end blows, and, in fact, it has become a part of the side sill. It stiffens the car and gives a solid foundation to carry the upper sides and the roof, and in collisions will effectually prevent the car from turning into kindling wood.

There are several designs in use for side framing which differ slightly, one of which is shown in Fig. 2.

In one design more commonly used, the $\frac{3}{4}$ -in. iron rod just below the belt rail is replaced by a flat steel truss $\frac{1}{2}$ in. x $2\frac{1}{2}$ ins., which is bent downward from the bolster center and passes through the side sill near its end, and is secured by a nut and a suitable forged iron anchor beneath the sill. Another difference is in the diagonal bracing. Letter X bracing is frequently used instead of single braces, leaning toward the center from each end, as shown. The blocking or filling between braces is not shown, but is now generally used. It consists of blocks or pieces of yellow pine the same thickness as the braces and cut carefully to fit the spaces between braces. These blocks are screwed and glued to ribs and posts, and both blocks and trusses are gained around posts. The whole side frame of the car practically becomes one large plank on edge, but is stronger.

All corner, side and door posts are made of white ash. Every second side post from the corner is made double, with a small panel between both inside and outside. Every alternate post is single, and run up back of the top sash of the side windows. The reason for this is that the windows are in pairs. The top sash is stationary, usually glazed with cathedral glass, and covers both lower sash. Each post has a $\frac{1}{2}$ -in. iron rod running full length from sill to side plate, with a nut and washer on each end.

The upper ends of all braces, and also the truss plank, are secured by bolts passing down through the side sill, with nut and washer beneath, as shown in

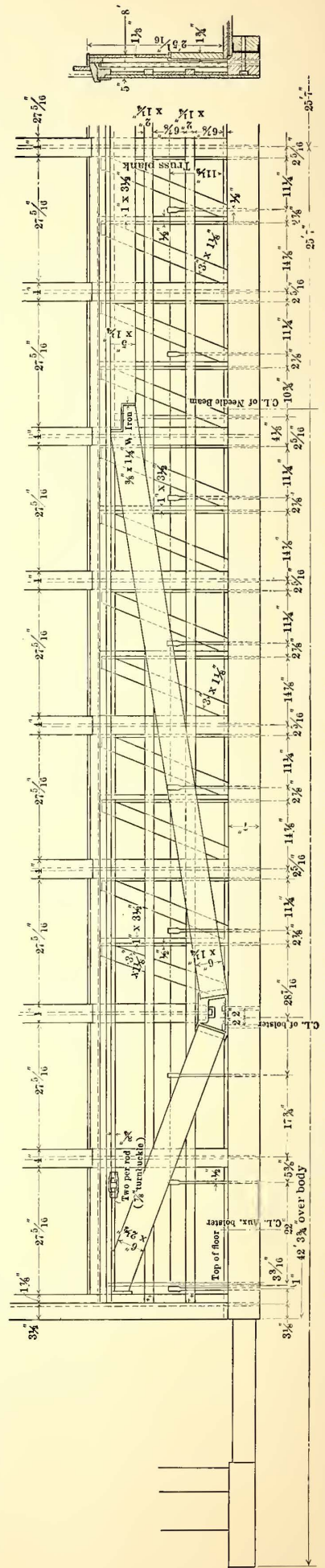


FIG. 2.—SIDE FRAMING OF MODERN HIGH-SPEED INTERURBAN CAR, BLOCKING AND SHEATHING NOT SHOWN

Fig 2. All side ribs, belt rails and plates are made of long-leaf yellow pine in one piece. The outside sheathing is 1/2-in. x 2-in. poplar, matched and molded.

This type of car usually has the steam railway coach type of roof, with the hood covering the vestibules at both ends. It is a monitor deck type, with the monitor roof projecting over the deck lights. Fig. 3 shows the roof and side frame in cross section. Carlines and roof framing are made of ash, the former spaced about 10 ins. apart. At every side post is a steel carline 1/2 in x 1 1/2 ins., forged in one continuous piece, to conform to shape of car roof, from side plate to side plate, with a foot on each end securely bolted to plates. Side plates are yellow pine, 2 1/2 ins. x 5 ins., laid flat, strengthened by a letter board of white ash, 1 1/2 ins. x 7 ins., gained over posts and side plates, and securely screwed to the same. Side posts are 2 1/4-in. x 4-in. ash; corner posts, 4-in. x 4 1/2-in. ash. Deck

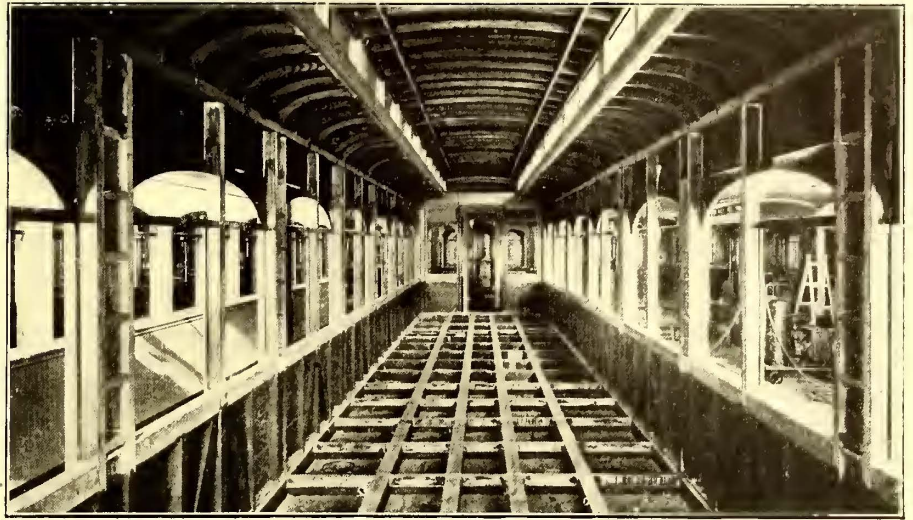


FIG. 4.—FRAMING OF MODERN CAR

sills are 2 1/4-in. x 4 1/8-in. yellow pine, and deck plates are 2-in. x 3 1/2-in. of the same material. The roof sheathing is 1/2-in. x 3-in. matched yellow poplar.

Fig. 4 is a photo-engraving of the framing of one of the latest types of these cars built during the present year.

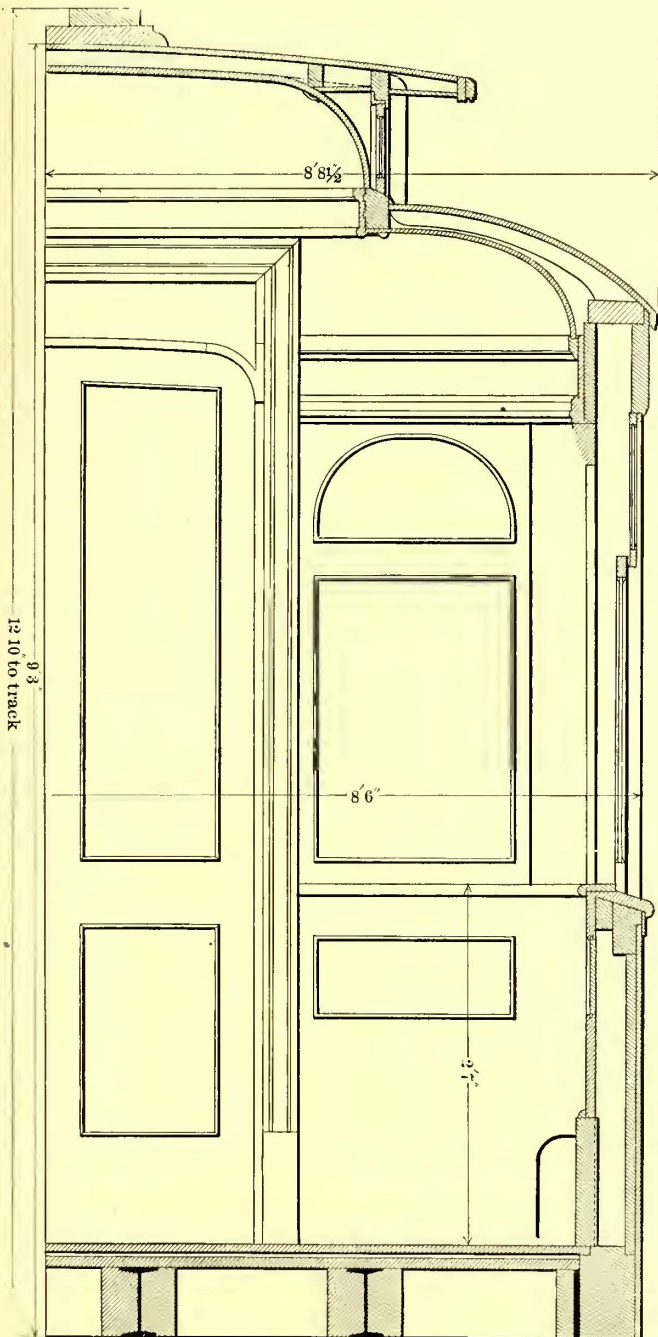


FIG. 3.—SECTIONAL VIEW

THE CLEVELAND TOURING-CAR SERVICE

The success of the "sight-seeing" or touring-car service, which has for the past few seasons been operated upon the lines of the Cleveland Electric Railway Company, has led to its development upon an extended scale. This season the service has been considerably extended, and it is being very thoroughly and extensively advertised. One large car is operated for this purpose daily throughout the week, and extra cars are added for Sundays and holidays, the intention being to provide adequate service for the demand at all times; the car operating daily makes five trips per day, each of which trips passes over different lines and through partially, if not wholly, distinct territory. The service is giving the best of satisfaction and is being very liberally patronized.

The advertising methods consist of issuing locally of descriptive pamphlets, advertising blotters, placards, etc. The pamphlets are neatly arranged, describing the service from the times of trips and places of starting to details of each of the five trips, and the fact that points of interest are called en route. The pamphlet refers to service in general as follows: "Delightful two-hour 25-cent trips about Cleveland, metropolis of Ohio. Best and cheapest way of seeing the 'Forest City.' Passing and showing magnificent parks, boulevards, business centers, beautiful residence and manufacturing districts, world-famous Euclid Avenue, the Garfield tomb, Euclid Heights and Governor Herrick's home, 'Forest Hill.' Summer palace of John D. Rockefeller, East End, West and South Sides, 'Glenmere,' home of late Senator Hanna; suburbs, Lakewood, South Brooklyn, Windermere, Glenville, East Cleveland and Collinwood."

Blotters are issued in six different colors and styles of printing, which refer briefly to the service, and also small cardboard placards, 1 1/4 ins. x 2 1/4 ins. in size, which are striped in various ways with green and pink, so as to resemble railroad tickets; these are distributed in quantities from 15,000 to 25,000 per month, and have proven very effective. In addition, placards 11 ins. x 21 ins. in size are placed in the racks of the city and suburban cars of the company. This new department is in the charge of J. W. Butler, manager of the touring car service, and from whom this information was obtained.

THE NEW YORK CENTRAL PLANS IN THE CENTER OF NEW YORK

There is every indication that a new era for electric railroading in the United States has been started by the recent purchases of electric lines in Central New York by the Vanderbilt interests controlling the New York Central Railroad. It has become evident that this most important trunk line has arrived at a point where the superior economy of the electric system of propulsion for short-haul passenger and express business has become recognized, and it seems extremely probable that within the next two or three years a considerable part of the short-haul passenger business of the New York Central, between New York and Buffalo, will be turned over to electric lines controlled and operated by these interests.

As has already been announced in these columns, the Vanderbilts have acquired a controlling interest in the electric railway properties heretofore owned by the Andrews-Stanley syndicate, of Cleveland, and it is understood on the best of authority that negotiations are on for the purchase of other lines now operating in the district traversed by the Central system.

In an interview with Horace E. Andrews, of Cleveland, who is now actively engaged with the Vanderbilt interests in furthering these plans, the STREET RAILWAY JOURNAL obtained



H. E. ANDREWS

a number of interesting statements relative to the situation. As has been generally known, the Andrews-Stanley interests some time ago bought and consolidated several roads in Central New York, and by extending these roads formed the Utica & Mohawk Valley Railway, operating about 118 miles of road in Utica and Rome, and between Little Falls and Rome. It also owned the Oneida Street Railway, operating a short line west from

Oneida, midway between Rome and Syracuse. Recently the syndicate entered into negotiations with the owners of the Syracuse Rapid Transit Company for the control of the city system in that city, and it was generally understood that the syndicate intended extending its interurban line from Rome to Syracuse. In connection with lines operating between Rochester and Buffalo and between Fonda and Albany, and other lines contemplated, it was apparent to the Vanderbilt interests that there would soon be a chain of electrics paralleling its entire main line, and it was here that it decided to take a hand in the traction game. By the purchase of 51 per cent of the stock of the Andrews-Stanley properties, including the Syracuse Rapid Transit Company, the Vanderbilt interests secured control of the key to the traction situation in Central New York, and at the same time the co-operation of these aggressive traction operators. Now it appears to be the intention of the New York Central interests to extend the traction system entirely across New York State. This will be done by acquiring existing traction properties where it is deemed desirable, and by electrifying portions of the West Shore Railroad, which parallels the New York Central across New York, and which is also owned by the Vanderbilt interests. The first step in this work will be to electrify that portion of the West Shore between Utica and Syracuse, and this will be done immediately. It is also the intention to electrify the Auburn branch of the New York Central, operating between Syracuse and Rochester, over a longer route than that of the main lines of the New York Central and West Shore roads between these points. From Rochester to Buffalo will be filled either by purchasing existing

lines covering portions of this distance or by electrifying the branch of the New York Central from Rochester to Niagara Falls and Buffalo. Mr. Andrews states that this point has not been decided upon. Mr. Andrews also denies that the Central interests have obtained control of the International Traction Company of Buffalo, with its suburban lines, as has been stated in press reports. As to the situation east from Little Falls, Mr. Andrews declined to make any statement. It is understood from the best of authority, however, that the negotiations of the New York Central and Delaware & Hudson roads for a joint ownership of the Schenectady Railway Company's system will be consummated in the near future. This would give the syndicate lines connecting Schenectady with Saratoga, Troy and Albany, and an entrance to Albany, which is important. From Albany south to Hudson is the Albany & Hudson third-rail line, which is controlled by A. M. Young, of New York, who is associated with Mr. Andrews in other properties. Thus it will be seen that the Central's plans for a trans-State electric line are well advanced. There have been rumors that other New York Central branch lines, including the line from Syracuse to Oswego and the branch from Rome to Ogdensburg and Massena Springs, are to be electrified, but Mr. Andrews declined to make any statement on these points. Judging from the general policy of using the electric lines as feeders, this may be carried out.

As to the present plans for operation, the present line from Little Falls to Utica will be utilized for the through line, and the through electric cars will then take the tracks of the West Shore to Syracuse, and the Auburn branch from Syracuse to Rochester. The system to be used in the electrification of the steam lines has not been decided upon, and there are many points to be considered before it can be settled. At the present time engineers of both the Westinghouse and General Electric companies are at work on the problem. It has been practically decided that the steam tracks will not be equipped with overhead trolley, because it is the intention to continue the use of steam locomotives for freight traffic, and it is pointed out that the trolley would endanger the lives of brakemen on the tops of cars. It is also claimed that the sulphuric fumes from the locomotives would injure, if not destroy, the overhead line. A form of side contact trolley is being considered, as is also the third-rail system. The advantages of the alternating-current system of motors and transmission are being considered on account of the superior economies claimed for it, but it is feared that the adoption of this system might render it difficult to enter the centers of cities. The work of electrification is to start as soon as the problems can be worked out, and it is safe to say that the equipment will be a step in advance of anything yet brought out in this country. Both tracks of the West Shore are to be equipped, and the short-haul passenger and package express will be taken care of on the electric division of the system, leaving the four tracks of the New York Central for fast passenger and freight traffic.

The financial end of the scheme will provide for the consolidation of the three existing traction properties into a single company, or it is possible that one of the companies may absorb the others. The new company will operate its own property and will utilize the tracks of the West Shore under a traffic arrangement. What the capital of the new company will be has not been determined.

Relative to the question of obtaining power, Mr. Andrews admits that the syndicate is interested in securing large quantities of power, but he declined to admit that the syndicate was interested in the Niagara, Lockport & Ontario Power Company, as has been repeatedly stated. He said that the present plant at Trenton Falls would be utilized to operate the West Shore as far west as Syracuse, and that the power supply for the section from Syracuse to Buffalo would be obtained from another source.

The Niagara, Lockport & Ontario Power Company referred to has recently voted to mortgage its property for \$24,000,000, and will issue long-term, low-rate bonds for that amount. A modified certificate of incorporation has been filed at Albany, covering the execution of the mortgage, the issuance of the bonds and asking for authority to enable it to transmit electric power to the various cities of the State as far east as Utica.

Mr. Andrews denies that any steps are being taken by the Vanderbilt interests to absorb electric lines along the routes of their lines through Northern Ohio. There have been numerous reports that negotiations were on for the purchase of the Cleveland, Painesville & Ashtabula Railway, the Cleveland, Painesville & Eastern, Lake Shore Electric and other roads in this district, but such statements have also been denied by the officials of these companies. This district is not as thickly settled as is Central New York, and the business which these roads have acquired has been very largely new business, which has been developed through their own efforts, hence they have not cut into the business of the steam roads as have the Central New York lines.

Mr. Andrews has long figured as a great street railway operator through his connection with the street railway systems in Cleveland. In the early 70's Samuel Andrews, Mr. Andrews' father, and Joseph Stanley, father of John Stanley, Mr. Andrews' present associate in business, built the Broadway & Newburg Street Railway, a horse-car line from the center of Cleveland to the neighboring village of Newburg. After leaving school both young men entered the employ of the company. In 1891 Joseph Stanley died and Samuel Andrews retired, at which time Mr. Andrews became president and John J. Stanley general manager of the company. In February, 1893, the Broadway & Newburg Company was consolidated with the East Cleveland Railway, and in April, 1893, the two properties were consolidated with the Brooklyn Street Railway and the South Side Street Railway, of which Tom L. Johnson was the head, forming the Cleveland Electric Railway. For a year Mr. Andrews was vice-president of the company, and then, in 1894, his friends assumed control and he was elected president, with J. J. Stanley as general manager. In 1899 Henry Everett and his friends regained control and Mr. Andrews continued as a director. In 1902 Mr. Andrews headed the syndicate which purchased the control from the embarrassed Everett-Moore syndicate, and Mr. Andrews again became president, with Mr. Stanley general manager. In July, 1903, Mr. Andrews effected the merger of the Cleveland City Railway Company with the Cleveland Electric Railway, and at present he is at the head of the consolidated company which owns and operates all the lines in Cleveland.

In the spring of 1901 Messrs. Andrews and Stanley became interested in properties at Utica, N. Y., buying the control of the Utica & Mohawk Railway, the Utica Belt Line, the Deerfield & Utica and the Utica Suburban Railway. Later the syndicate formed the Little Falls & Herkimer Railway, the Herkimer, Mohawk, Illion & Frankfort Electric Railway and the Frankfort & Utica Railway. By building connecting links and consolidating the various properties, they formed, in November, 1901, the Utica & Mohawk Valley Railway Company, which embraces the city lines in Rome and Utica and a magnificent double-track interurban line from Rome to Little Falls, Mr. Andrews being president of the company. The syndicate also owns the Onida Railway, of Onida, and the Rome City Street Railway, of Rome. Recently the Andrews-Stanley interests obtained control of the Syracuse Rapid Transit Company, operating 70 miles of city and interurban road in and around Syracuse, and at a recent meeting of the stockholders Mr. Andrews was elected president of the company. Mr. Andrews is a director of the Albany & Hudson Railway, of Albany, and of the Lake Shore Electric Railway Company, of Cleveland,

and he was largely instrumental in refinancing this property after the Everett-Moore embarrassment. It is generally understood that Mr. Andrews will be the active head of the work which is to be carried on by the New York Central interests, and it has been reported that he will be elected a vice-president of the New York Central Railroad.

MAKING A ROAD ATTRACTIVE

The Dayton & Troy Electric Railway Company, of Dayton, Ohio, has started on an interesting campaign to improve the appearance of its right of way. Harrie P. Clegg, general manager of the company, has established a Welfare Department, whose duty it is to stimulate interest in this direction among farmers and property-owners along the line of the company's private right of way. The owners of unsightly sheds, rubbish piles, etc., are appealed to to clean up, and where this is impossible the company proposes to screen the places by planting quick-growing trees and shrubbery. The company encourages this work by setting an example in beautifying its stations, of which there is one in each town. Prizes are offered to the employees who have the cleanest and best appearing stations. The interest of school children has been enlisted in the work of beautifying their homes and the school yards, and the company furnishes all materials, plants, trees, shrubs, etc., to people located directly on the road. A spirit of rivalry has been started in the schools along the line through the offer of a free picnic to the school whose yard and building presents the best appearance—cleanliness, beauty and practicability being the points considered. The picnics are held at Midway Park, the company's outing resort, and the company furnishes transportation, refreshments and an entertainment. The company started this work only a short time ago, and already many beneficial results have been noted. While it is likely to prove somewhat expensive at the start off, the improvements are of a permanent nature and will add greatly to the attractiveness of the road, and its receipts from pleasure seekers will increase proportionately.

CURTIS TRUCKS FOR BOSTON ELEVATED RAILWAY

The twenty-four new elevated cars recently ordered by the Boston Elevated Railway Company, and described in the last issue of the STREET RAILWAY JOURNAL, are to be mounted on Curtis trucks, furnished by the F. B. Tait Manufacturing Company, and not on Taylor trucks, as stated in that article. The error occurred from the fact that a number of Taylor trucks have recently been purchased by the Boston Elevated Railway Company for its surface cars, but the new elevated cars are to be mounted on Curtis trucks.

TEST OF ARNOLD SINGLE-PHASE MOTOR

A trial run was made Aug. 3 on the Lansing, St. Johns & St. Louis Railroad in Michigan with the Arnold electro-pneumatic motor. This system was described in the issue of this paper for Jan. 4, 1904, and, as stated in that article, the motor was destroyed by fire on Dec. 18, 1903. Since that time Mr. Arnold has rebuilt the machine. The run Aug. 3 was made between DeWitt and Lansing, a distance of 8 miles, and at one time a speed of 25 miles an hour was obtained. The trolley voltage was about 6000, and was carried the entire length of the line, a distance of 20 miles.

With the completion of the lines to Newport Beach and Glendale, official statistics have just been compiled showing that the Huntington interurban railways in Southern California now comprise a total of 307.28 miles of single track, nearly all being constructed and equipped in less than two years.

STREET RAILWAY ADVERTISING

BY R. T. GUNN

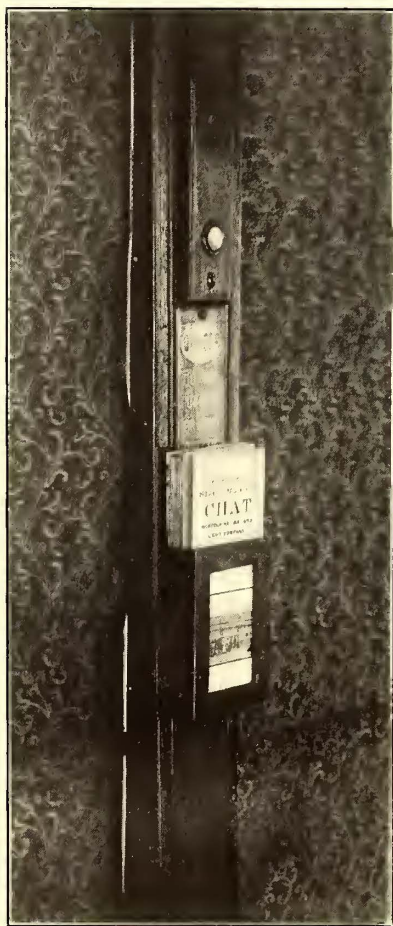
To strike the "medium" and not spend too much, but yet enough, is often a matter of fine calculation for the street railway company.

It is a fact that those companies operating amusement resorts or parks have to "put up" more than is just. The resorts, as a rule, have the concessions leased by the railway company, and the advertising of the resort naturally should be done by the lessee and not by the railway company. It actually works out that if the railway company gets the business it should, it

on account of the summer resorts and winter lighting, the system is working out satisfactorily and the expenditure is justified. The manager has pursued the policy of keeping in good humor with the daily papers, letting them know that in cases of accident or matters which are legitimate news, they could procure the facts by simply asking for them. And while the public is apparently slow to recognize anything but the worst possible side of all questions, where corporations are concerned, still it is easy to discern a much better feeling and attitude toward the company than formerly existed. And in the long run public opinion is exceedingly reliable.

The best method of advertising we have is a publication of our own. This is a little folder called "Street Railway Chat," named by the public, the company offering a prize for the best name offered by one of its passengers. This publication is issued semi-weekly, and folds so that it fits a holder 3 ins. wide. This holder is screwed to the posts of car and is placed so that it is only a few inches above the seat, and cannot fail to attract the passenger's attention. The value of this publication lies largely in the method of distribution. It is placed directly in the hands of the street railway passengers, the very persons we wish to reach. We issue it on Wednesday and Sunday mornings, the publication being placed in the boxes the night before while all cars are in the barns.

The cost of getting out this publication is



SIDE POST OF OPEN CAR WITH CURTAINS DRAWN DOWN, SHOWING DISTRIBUTING BOX



"OCEAN VIEW"—TYPICAL CUT FROM CIRCULAR

THINGS HUMOROUS.

Unlucky Interruption.

Leaving back in his chair, he went to sleep. Presently he began pounding the air with demoniac energy. His whole frame shook and he veered back and forth, his hands moving up and down, and to and fro, and his features working convulsively. In great alarm his wife ran to his side, grasped him by the shoulder and shook him. "What is the matter dear?" she asked. "What did you want to disturb me for?" crossly replied Signor Filliwilwuski, the eminent pianist, opening his eyes. "I was right in the middle of a difficult concerto!"

The Difference.

"Don't you think that Shakespeare moralizes a great deal?" said the prolific playwright. "Yes," answered Mr Stormington Barnes. "the difference is that Shakespeare moralizes and the modern dramatist demoralizes."

Time to Poy

Ida—And has the young man been coming to see you long enough to wear out your patience? Bell—Patience? Why he has been coming to see me long enough to wear out three sofas.

An Indication.

"What's become of Miss Tingletoe, used to be a nonbracket?" "She's in the chorus now." "Pshaw—is she as old as that?"

CASINO

Week of July 18.

Matinees, Wednesday and Friday.

The Tomkin's Comedy Co.

In the funny little comedy, "WHAT AILED PORTER?"

Interpersed with numerous vaudeville features. And as a special attraction the popular "Koko" will be retained. Reserved seats on sale in the city at Petard's Confectionery, Grand Theatre Building.

BASE BALL.

Thursday, Friday and Saturday, July 21st, 22nd and 23rd.

Norfolk vs. Orange Athletic Club

LAFAYETTE FIELD.

Game called 4:30 p. m. Admission 25c.

\$1 To Elizabeth City and Return. \$1

Children, - - - 50 Cents

Excursion leaves Norfolk & Western depot Thursday, July 21, at 8 a. m. Hundreds will revisit "Gretchen Green" and go back "down home" for a delightful day.

Don't Think

that because we have had but weather for several days that summer is over, and that there are no more hot days coming. There are nearly three months more of fan weather, and now is the time you can least afford to be without this "life saving" device.

The fever days are near at hand, and it is cheaper to buy an electric fan than to take a trip to the mountains or go to the hospital.



Are You Cooking

your dinner on a coal stove? Needless to say you are warm, and no doubt you suppose everybody else is warm. There you are mistaken! There are thousands of women right here in Norfolk that are cooking their dinners and are just as cool as need be. You wonder how it is possible. It is the easiest thing in the world. They cook with

GAS!

That is the whole secret.

FOUR SAMPLE PAGES FROM TRAFFIC CIRCULAR

must "go after" it, as it is apparent to the lessee that when the street railway company enjoys a good traffic the lessee will have good results, and when the road hauls few passengers he will lose money. Under these conditions the lessee naturally takes a waiting position, and does just what he is compelled to do by contract and no more, and advertises only when he sees direct results.

The problem of finding out the best methods of spending money for advertising is a difficult one, for usually the direct result is not apparent at all, and it is impossible to determine just what the indirect result really is.

I have been struck by the fact that in the large cities little or no advertising is done by the street railway companies, as they depend on regular travel. In Norfolk, while the daily travel is exceptionally good for a city of its size, the travel has been augmented very materially by systematic advertising. Favorable and complimentary notices in the local papers on the way crowds are handled on all and special occasions tend to bring the road into good repute with its patrons, and while considerable money is being spent for newspaper advertising

divided between the railway, lighting and gas departments, the railway using the major part in summer time, the lighting department using more in winter time.

A cut is used on the front page, the folder being placed in the box in such a manner that the brass holder makes a frame for the picture. Theater cuts are used in winter time and cuts of summer resort or features to which particular attention is called in summer time.

While it costs a considerable amount to equip the cars with sufficient holders, the results have been exceedingly gratifying. To show the popularity of this publication it may be well to state that numerous offers have been made for advertising space by local business houses. These offers have been refused in every instance, as it has been deemed best to keep it strictly a street railway publication. As a means of keeping in touch with its patrons, the company finds this a good medium. The reading matter is gotten up with a view to calling especial attention to advertisements, and is really an advertisement in itself. Announcements and attention to changes in schedule or service, and anything in the nature of improvements to car

equipment, or any part of the business, are also exploited.

Illustrating the fact that the patrons appreciate the little publication since its advent, passengers are frequently noticed to take the folder from the rack, peruse it and carefully return it. Few, if any, are thrown upon the floor of the cars. Such as are carried away are taken in the pockets of the passengers.

STREET RAILWAY EXHIBITS AT THE WORLD'S FAIR

The large number of exhibits of street railway interest at the Louisiana Purchase Exposition has prevented the inclusion

and the "insulating" joint. This latter is used in connection with electric signaling apparatus to effectually insulate a section of the track. Fibre and wood blocks form the insulating material. On the rear wall of the exhibit space are shown framed drawings of the products of the company.

EXHIBIT OF THE MCGUIRE-CUMMINGS MANUFACTURING COMPANY

Occupying a space 150 ft. in length, centrally located in the Transportation Building, are the several exhibits of the McGuire-Cummings Manufacturing Company. One of these that attracts immediate attention is the new double-truck pneumatic sprinkler. The peculiar feature of this is that it is constructed



MCGUIRE-CUMMINGS MANUFACTURING COMPANY'S EXHIBIT

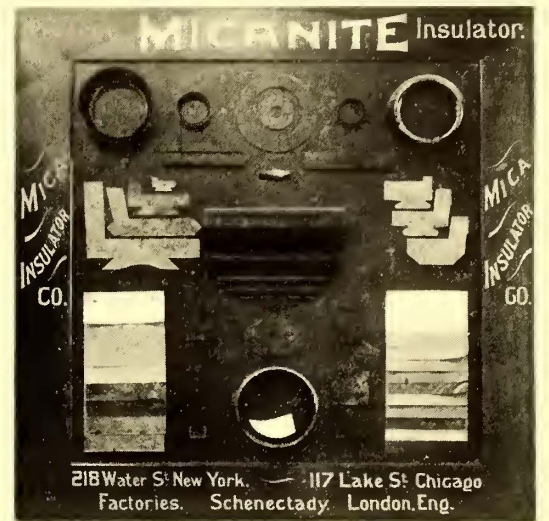


EXHIBIT OF THE MICA INSULATING COMPANY

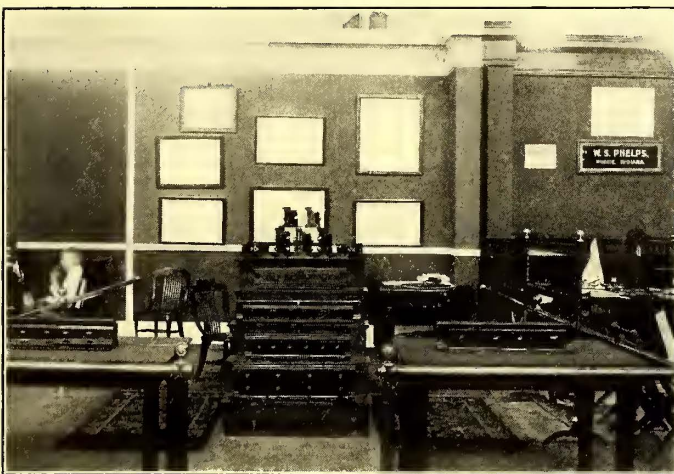
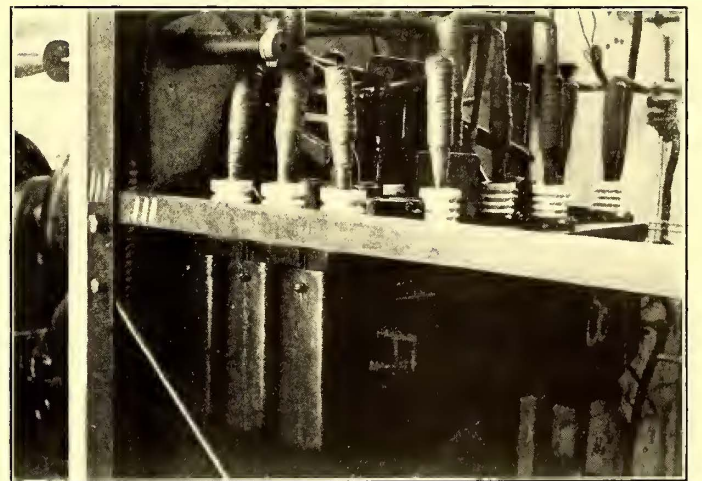


EXHIBIT OF WEBER RAIL JOINTS



HARTMAN HIGH-POTENTIAL OIL CIRCUIT BREAKERS

of descriptions of all of them in any one or several issues of this paper. In this issue particulars are given of four exhibits which have not been previously mentioned.

EXHIBIT OF WEBER RAIL JOINTS

This exhibit is located in section 4 of the Transportation Building. Surrounded by a neat brass railing are shown the several rail joints manufactured by this company. Neatly plated small sections aid materially in giving a clear idea of their structure. A feature of all these joints is the underlying plate, which gives a flat surface on the tie and prevents the ends of the rails battering them. Another desirable feature is the wood filler, which, it is claimed, absorbs the vibration and lessens the liability of the nut working loose.

Four different types of joints are shown: the "standard" joint, taking the place of the ordinary angle bar; the "step" joint, connecting rails of different sizes; the "girder" joint,

with four sprinkling heads, two on each end of the car. As all of these can be used independently, the regulation of flow may be varied considerably. Each head, moreover, is provided with a device for governing the amount and direction of flow. By means of this device the water may be so thrown as to flush out the car tracks. A portion of the cylindrical tank serves as an air reservoir, in which pressure is maintained automatically by means of a Christensen compressor at approximately 80 lbs. This, however, is reduced considerably before passing into the water reservoir.

The snow sweeper, forming part of the exhibit, has, in addition to the revolving brooms, heavy side plows, by means of which the width of the swept area may be varied at will.

The two types of car fender put on the market by this company are also shown. One of these, the "Royal Flush" fender,

used extensively in Chicago, may, when not in use, be folded up against the dash. The other style, known as the "Cushion Sliding Fender," may, when not in service, be pushed under the car with little trouble.

Several styles of trucks are shown. These include type 39-A, for interurban and heavy city service; type 35, an extra heavy truck for interurban, elevated and underground service; and their solid steel Columbian single truck.

EXHIBIT OF THE MICA INSULATOR COMPANY

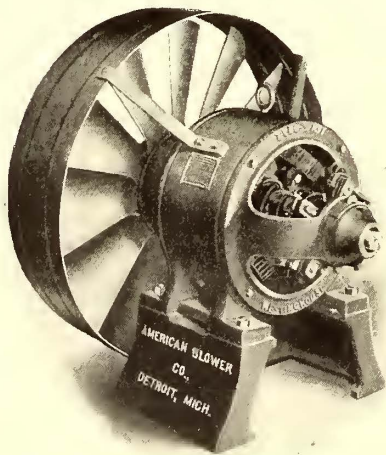
Forming a portion of the display made by the State of North Carolina in the eastern section of the Mines and Metallurgy Building is the exhibit of the Mica Insulator Company. Placed as it is, surrounded by the various grades of mica in its natural form, this exhibit shows well the uses to which the raw products can be adapted. The micanite samples displayed include almost all forms of insulators used in the electrical industry. Insulators for brush holders, armature slots, bushings, commutator cones and tubing molded of micanite are shown. Samples of the various grades of "Empire" insulating cloth are also included in the exhibit.

HARTMAN CIRCUIT BREAKERS

The Hartman circuit breakers, while not forming an exhibit by themselves, are incorporated as a part of several switchboard equipments. Two breakers are found on the switchboard controlling the apparatus of the Wesco Supply Company exhibit. One of these, rated at 3300 volts and 40 amps., has the automatic feature, and is used to control a 90-kw 220-volt synchronous motor. Installed between the Exposition high-tension mains and the step-down transformers of the Bullock Electric & Manufacturing Company exhibit is a 6600-volt Hartman circuit breaker. This is of the style known as type 3-B, having a 100-amp. capacity.

MOTOR-DRIVEN DISC FAN

A very striking illustration of progress made in the line of direct-connected disc fans and motors is illustrated in the accompanying cut, showing the American Blower Company's



MOTOR-DRIVEN DISC FAN

modification of its "A B C" fan, which has been in such general use for a long time. Previous to the working out of this design, the custom has been to attach a motor to the arms of a disc fan, but the excessive weight of the motor, overhung in this way, has often been an objectionable feature. In this combination the motor is placed on a substantial base, there being no bearings except those in the motor. This makes by far the most rigid form of construction and, at the same time, most compact, the total width of the outfit being no greater than with the overhung type.

Before shipment the motor is run under load and tested for temperature, commutation and regulation, each and every part having previously been submitted to a thorough and rigid system of tests and inspection while under construction. The series wound multipolar form is used, except for the very small machines, which are made bipolar.

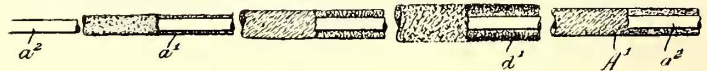
Free ventilation is made possible by the general design, insuring cool running under heavy load, long life and low cost of maintenance. The bearings are self-oiling and run for weeks without renewal of the lubricant. The machine requires a minimum of care and attention during operation. Each motor is furnished with an automatic release switch and a fireproof rheostat with marble front and carefully finished and fitted working parts.

The high efficiency of both the "A B C" fan and the Westinghouse motor makes these outfits unusually desirable for cooling and ventilating, and many of them have already been shipped from the works of the American Blower Company, Detroit, Mich.

FIREPROOF INSULATED WIRE

In the general trend of modern engineering toward fireproofing, electrical insulators, especially for wires, have been to a great extent neglected, not so much because of lack of effort in this direction as on account of the difficulties that surround the subject. Asbestos is an excellent though not the only material for this purpose, but its thickness, frailness, unevenness and cost has precluded its general use.

It is to supply this gap that the Teter-Heany Developing Company, of York, Pa., has devised its fireproof insulated wire. By an ingenious device, asbestos, in its fibrous form, is applied directly to the wire, and then is treated with a special cement that, on pressure and heat, yields a firm, hard, even, thin in-



FIREPROOF INSULATED WIRE

sulation that is efficient in every respect. The accompanying cut illustrates the structure of this insulation. This shows first the application of an adhesive substance, then the fibres of asbestos, then the cement, and finally shows the insulation formed into a homogeneous whole by means of heat and pressure.

This is said to form an insulation that is hard, firm and durable; that weathering cannot harm; that will not crack, peel off or break under bending or twisting; and that will withstand temperatures above red heat without being destroyed. The advantages claimed over ordinary asbestos covering are the following: The total thickness of insulation is but .011 in., and .009 in. may be obtained if desired. This is the same as double cotton-covered insulation, and in its use old forms can be employed without alteration. While asbestos insulation is ordinarily very uneven, this insulation varies on the average about .003 in. Asbestos, while it will not burn, will crumble under heat, and so become useless for insulating purposes. This insulation protects the asbestos so that it will stand much higher temperatures without crumbling. A coil in possession of Mr. Heany has been heated red-hot several hundred times, at times for hours, yet the coil retains its insulation unimpaired. Temperatures of this degree are rarely met with in practice, and no effect whatever is observed at temperatures that usually cause coils to burn out.

This means that coils wound with this wire, armatures, fields, arc lamp and transformer coils, etc., are practically indestructible. There is a wide field for this wire for use in motors and

generator coils, especially for electric apparatus subjected to heavy overloads, and in fact wherever a high degree of heat is met with and must be resisted.

The insulation has been thoroughly tested, both in the laboratory and in practice, with very satisfactory results. Other forms of fireproof wire for house, line and telephone work are also manufactured by the company.

A FINE PRIVATE CAR FOR THE UNITED TRACTION COMPANY, READING, PA.

The United Traction Company, of Reading, has recently received the handsome parlor car shown in the accompanying illustrations, from the J. G. Brill Company. The car is intended to be used by the directors during inspection tours over the various branches of the extensive system owned and controlled by the company. The window arrangement is the builder's well-known semi-convertible system, having pockets in the side roofs for the sashes, which allow the walls between the posts to be but 2 ins. thick, increasing the interior width 7½ ins. There are many semi-convertible cars of this type in use on the company's lines, and it is highly complimentary to the builders that the directors in choosing a car for their own use should wish one of the same type.

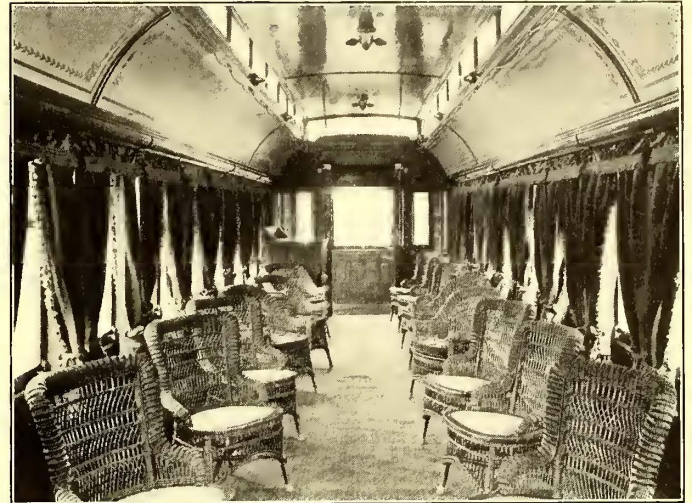
The car is provided with twenty-one wicker chairs and has a movable sideboard in one corner. Mahogany rubbed to an egg-shell gloss and richly ornamented with inlaid marquetry constitutes the finish. The ceilings are tinted light green and decorated with gold. The Royal Wilton carpet which covers the floor and the silk window draperies of Louis XVI. design, are of dark green and harmonize with the woodwork and ceiling, and, all in all, the car presents a most attractive appearance.

The illustration of the exterior of the car shows that the windows may be held at various heights, five window stops

belt, 8 ft. 6 ins.; sweep of posts, 1¾ ins. The distance from center to center of the side posts is 2¾ ins.; thickness of the corner posts, 3¾ ins., and of the side posts, 3¼ ins. The side sills are 4 ins. x 7¾ ins., with 12-in. x ¾-in. sill plates on the inside. The end sills are 5¼ ins. x 6⅞ ins.

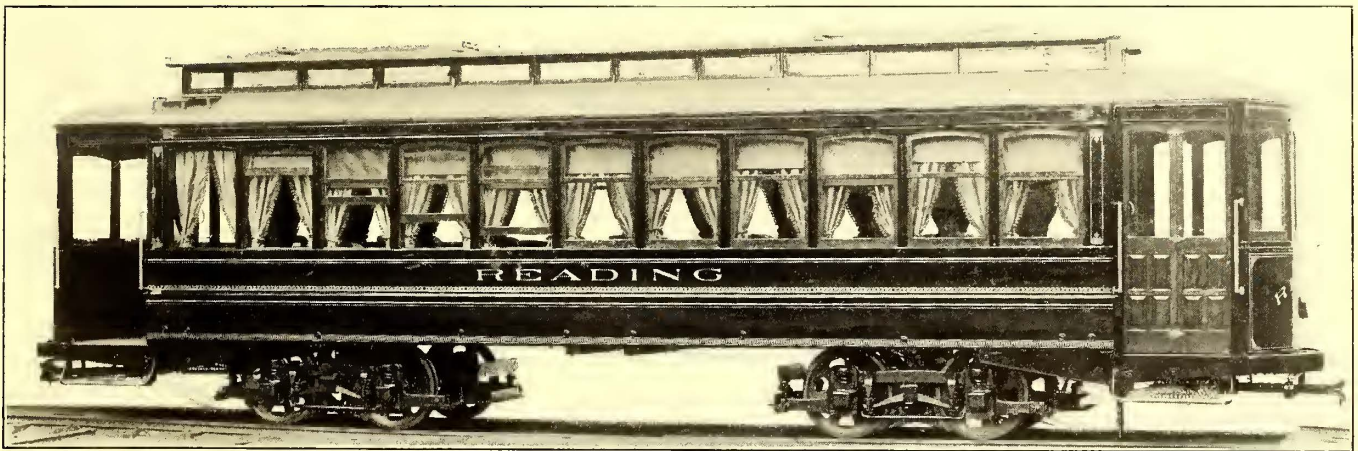
GAS ENGINE FOR ELMIRA

The Elmira Water, Light & Railroad Company, of Elmira, N. Y., has ordered a 1400-hp Crossley gas engine from the



INTERIOR OF PARLOR CAR

manufacturers, the Power & Mining Machinery Company, of Cudahy, Wis. The engine will operate by natural gas from a supply which the Elmira Water, Light & Railroad Company owns, and will be direct connected to a 750-kw General Electric



SEMI-CONVERTIBLE PRIVATE CAR FOR READING

being provided in the sash runways for that purpose. For summer service the draperies will be removed, and with the sashes all raised into the roof pockets, the car will be made as open and airy as desirable for the speed of which the trucks are capable.

The trucks are Brill No. 27-G, riding steadily at 35 miles an hour, although the motors are outside hung. The windows in the vestibules are arranged to drop into pockets in the wainscoating. The lining of the vestibules and the doors and sashes of the car are of solid mahogany. The bumpers, channel iron draw-bars, brake handles, gongs and other furnishings are of the builder's manufacture. The length of the car over end panels is 30 ft. 8 ins., and over the vestibules, 40 ft. 8 ins. The platforms are 5 ft. from the end panels over the vestibules. The width over the sills is 8 ft. 2½ ins., and over the posts at the

60-cycle, three-phase alternator. This alternator will be run in parallel with other alternators. The engine will be tested next week at the works of the manufacturing company at Cudahy, and will probably be installed and in operation in Elmira by next October. It is of the four-cylinder type, with cylinders 32 ins. in diameter by 36-in. stroke. The trial of this engine in operating alternators in parallel will be watched with a great deal of interest, but no trouble is anticipated by the manufacturers. About three months ago a plant of four 750-hp engines of similar type and direct connected to 25-cycle alternators was put in operation in the power station of the Velardena Mining & Smelting Company in Mexico. This plant is used to distribute power at high voltage to six miles, and no trouble has been experienced in operating these machines in parallel.

A NEW FIELD TESTING INSTRUMENT

While there are a number of instruments at present on the market that are used for testing and locating defective field windings and armature faults, the need has been strongly felt for a simple instrument especially designed and adapted for this purpose, that is quick and accurate and so simple that any unskilled person can use it properly. To meet this condition F. M. DuBois and J. B. West, both of Syracuse, N. Y., have designed and perfected an instrument that is said to give per-

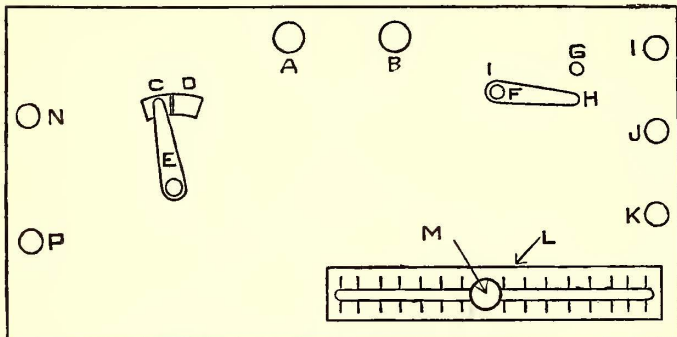
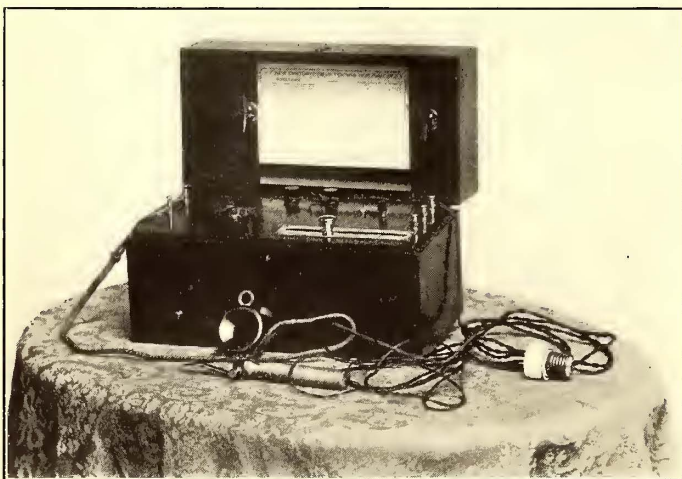


DIAGRAM OF TESTING INSTRUMENT

fect satisfaction and quick results. The instrument will withstand rough usage and is not influenced by stray magnetic fields, is self-contained and does not require another field winding for comparison. The reading attained on the scale of this instrument is direct and not in any technical term, but is simply a means for identification.

The instrument may be connected into a regulation five-light 550-volt lamp circuit in car or shop by a flexible cord and a lamp plug. If no light circuit is available, two dry batteries will do. When the receiver is placed to the ear a loud pulsating sound will be heard, but upon connecting a field winding to the binding posts J and K and the switch E on the contact D, the



FIELD TESTING INSTRUMENT

sound will moderate to a certain intensity and remain constant. The pointer is now moved along the scale until a point is reached where the sound will perfectly balance—that is, there will be no variation in intensity when the switch E is alternately shifted into connection with the contacts C and D.

If the field winding is new and in standard condition, the reading attained will be the value of this type of field winding. Readings may be obtained in this manner of any number of different types of fields. If, when testing other field windings, the sound in the receiver is not as loud on contact D as on C, when the pointer is set to standard reading on the scale, the field is short-circuited. To find the degree of short circuit the pointer is moved down the scale until the sound again balances on both sides of the switch C and D. The reading thus ob-

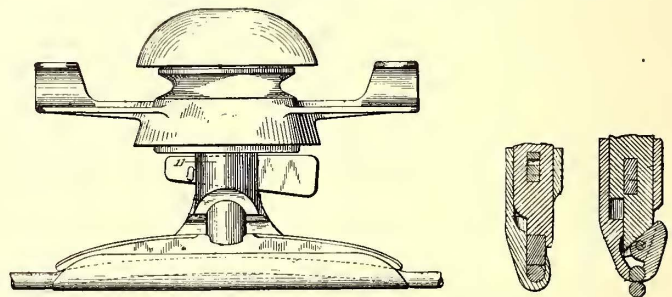
tained will be the proportion of short circuit in the field winding. To test coils of higher resistance the range of the scale is increased by pushing the switch blade F onto the contact G.

In connection with this instrument there is a device for testing commutators for open or short circuits. Its value can be readily appreciated by electric railway men, as it is a well-known fact that many armatures have become burned out from the solder short-circuiting the bars in the back of the commutator or from copper being drawn across the mica when the commutator is being trued up in the lathe.

THE LYNCHBURG TROLLEY EAR

For the last eight months the Lynchburg (Va.) Traction & Light Company has been using, with very satisfactory results, the new type of trolley ear shown in the accompanying illustration. This ear is adapted for both round and grooved wire, and can be employed with any of the hangers now in use. This device is the joint invention of S. H. Cochran and A. E. Anderson, both of Lynchburg, Va.

The cap of this ear is provided with a depending post having a wedge-shaped slot cut through it near its lower end. As shown in Fig. 2, the lower end of this post is cut away and pro-



FIGS. 1, 2 AND 3.—NEW TROLLEY EAR

vided with a rounded shoulder, and the extreme lower end is also cut away to provide a shoulder and a downwardly projecting lip. The ear is substantially U-shaped in cross-section, and upon its lower face is straight from end to end, but the inner bottom face of the ear is convex, as indicated by the dotted lines in Fig. 1. The ear is provided with an arm extending upward and terminating in a tubular-shaped portion, which is provided with a beveled bearing face. The bottom of the bore of the tubular division is rounded to form the seat shown in the sectional view, Fig. 2. Both the tubular extension and the post are furnished with slots arranged to coincide and permit the insertion of the key shown in Fig. 1. This key is provided with a set of perforations, through any of which the key can be locked by the insertion of a cotter-pin. Fig. 2 also shows a wedging piece formed in substantially the same arc as the convex face of the ear. This wedging piece is provided in its upper edge with a notch in which the shoulder of the post is adapted to be seated when the parts are assembled for locking.

In using the construction shown in Fig. 1, the trolley wire is deflected and placed within the ear. After the wire is in the ear, the wedging piece is placed therein, with its curved face resting upon the upper face of the wire. The ear is then pushed upward and the tubular extension passes over the post until the shoulder of the latter engages with the notch in the wedging piece, the lip of the post bearing upon the outer face of the wedging piece, and thereby holding it firmly in position. The key is then inserted and locked as described. Should the key, for any reason, come out of the post, the ear would fall to the ground and leave the trolley wire free from any obstruction. Actual tests have shown that the ear can be removed from and replaced on the wire in two minutes.

Fig. 3 is a modified form of construction adapted for grooved or figure 8 wire.

FINANCIAL INTELLIGENCE

WALL STREET, AUG. 10, 1904.

The Money Market

A sharp advance in sterling exchange has been the only important incident of the past two weeks. From $4.87\frac{1}{4}$ demand bills rose to $4.88\frac{1}{8}$, the highest figure reached during the present year. At this price it was thought in some quarters that houses having special facilities for quick transportation and profitable employment for the metal abroad might be able to ship gold to London. On this supposition \$2,500,000 was actually taken by the City Bank last Friday. But it turned out afterward, apparently, that the intending shippers had misjudged the probable extent of the rise in the market, and the export order was accordingly cancelled. Whether exchange will eventually go high enough on this movement to make gold withdrawals profitable, is a matter about which expert opinion is divided. A million and a half gold was taken last week for Cuba, and more will probably follow, the reason being the credits which lie here at the disposal of the Cuban government from the recent sale of their bonds. These gold enlistments, actual and possible, form the only important demand upon present money market resources. Loans have ceased to expand, owing to the quieting down of speculation and the absence of any new syndicate undertakings. So far from these being any of the customary signs that currency is about to be called away to the crop sections, the movement toward this city continues in scarcely diminished quantity. It was estimated that last week alone the local banks gained over \$4,000,000 from this source. Surplus reserve has reached the \$56,000,000 mark—by far the highest point of recent years. That with this enormous stock of idle capital, there will be much of a change in the market conditions for a long while ahead, is not expected. Call money is offered and lending freely at 1 per cent and even lower. For sixty-day advances 2 per cent is the ruling rate, for four months 3 per cent, and for periods of from five to eight months $3\frac{1}{2}$ per cent.

The Stock Market

The local traction shares, or, it may be said with more truth, the Metropolitan issues, have been the center of interest in the market of the past week. Metropolitan Street Railway advanced from $118\frac{1}{4}$ to $125\frac{3}{4}$, and Metropolitan Securities from $87\frac{3}{4}$ to $94\frac{3}{4}$, on heavy transactions, and this at a time when the general trading was rather quiet and prices were moving very little. It is evident, of course, that these stocks have been accumulated for something more than speculative reasons; what the real purpose is, remains at this writing in the dark. The view most generally entertained is that the rise in the Metropolitan issues and in Interborough Rapid Transit on the curb foreshadows the announcement of closer relations between the two properties. That there will be an actual amalgamation of the companies is something which Wall Street doubts, because the idea is too big. It is more within bounds to believe that the companies will be operated under some harmonious arrangement, which will benefit the Metropolitan earnings enough to make the 7 per cent dividend guarantee surer than it is at present. This has been the main opinion behind the advance in Metropolitan Street Railway stock this week. If there is something more in the "deal" than this, it is a difficult subject for the imagination. Some active speculative buying has been attracted to Brooklyn Rapid Transit on the notion that this property will sooner or later be taken into the fold, but the stock has hardly responded as much as might be expected. Manhattan has been inactive.

The stock market generally has displayed a decidedly stronger inclination to advance than to decline. While the severe wheat damage in the Northwest, causing a violent advance in the price of wheat options, has been a check to active operations for the rise, the behavior of the market in the face of the bad news has been of a sort to materially increase confidence in the strength of the underlying market position. The government report on cotton, showing the largest acreage and almost the highest condition on record for the season of the year, has brought the Southern and the Southwestern shares more prominently before speculative attention, and it is here that the chief gains of the last ten days have occurred. Except for some of the industrial specialties, the rest of the list has been quiet and not greatly disposed to move higher.

Philadelphia

Business has been very dull on the Philadelphia Exchange during the last two weeks. Prices have changed very little; where they have moved it has been downward. Philadelphia Company common has been particularly heavy, at a decline from 39 to $38\frac{1}{2}$, the preferred selling at $45\frac{1}{4}$. Union Traction reacted from $54\frac{1}{4}$ to $53\frac{3}{4}$, then hardened to 54. Philadelphia Traction eased off from $98\frac{7}{8}$ to $98\frac{1}{2}$. Philadelphia Rapid Transit sold at 13 for 100 shares, $12\frac{3}{4}$ for 175, and $12\frac{7}{8}$ for 50. Railways General appeared to be under liquidation, 200 shares going at $1\frac{1}{8}$ and 500 later at 1. On the other hand, Philadelphia Electric was firm, stiffening up from 63-16 to 65-16. Consolidated Traction of New Jersey held its own at $67\frac{1}{4}$. American Railways moved up from 47 to $47\frac{1}{2}$, 100 shares changing hands at the higher figure. Afterward an odd lot sold at $47\frac{1}{4}$.

Chicago

In a statement made by Judge Grosscup, the attorneys of the Union Traction Company were told that he could not accept that part of the decree on the ninety-nine-year decision prepared by them, which would give the company ninety-nine-year rights on extensions of street railway lines made after the adoption of the cities and villages act of 1875. The city's lawyers were elated at this statement, which disposes, so far as the United States Circuit Court is concerned, of the sweeping claims made by the company as regards the effect of the decision. "We shall get at the decree by a process of exclusion," said Judge Grosscup. "We have no doubt but as much of this decree as it intended to include grants made after 1875, that have no relation whatever, that are not overlapping or anything of that nature, cannot be sustained. When you take into consideration that in a majority of these ordinances a twenty-year limitation is in terms inserted, it would take a good deal of judicial imagination to find that the City Council intentionally extended the right of occupancy under the old charter."

The corporation attorneys claim that Judge Grosscup's oral ruling removes 80 per cent of the Union Traction lines from the operations of the ninety-nine-year act. The market for the city surface line securities has paid little attention to this controversy, unless the utter unwillingness to trade in any of the shares concerned be considered a mark of attention. There have been no sales of either City Railway or Union Traction during the fortnight. Odd lots of North Chicago went at 71 and 72, and 250 shares of West Chicago at $43\frac{1}{4}$. Liquidations commonly associated with the recent issue of new securities, forced South Side Elevated shares down from $90\frac{1}{2}$ to 89. In all, 600 shares changed hands. Metropolitan common sold in twenty-share lots between 20 and $20\frac{1}{2}$, odd lots of Northwestern common at $15\frac{5}{8}$ and $16\frac{1}{2}$, the preferred at 49, and 50 Lake Street receipts at $3\frac{1}{2}$.

Other Traction Securities

Boston Elevated, ex-dividend, sold as low as $148\frac{1}{2}$ ten days ago, but recovered, subsequently, to 150. The demand for this stock from investors continues to be very constant. West End issues were steady, the common at 91 to $91\frac{1}{2}$, and the preferred at 111 to $111\frac{1}{4}$. On the other hand, the Massachusetts Electric seemed to be pressed for sale at every favorable opportunity. The common sold as low as $17\frac{1}{4}$ and as high as $17\frac{3}{4}$, ending at $17\frac{1}{2}$. The preferred lost a point from 70 to 69. One hundred shares of Georgia Electric common sold from $42\frac{1}{2}$ to 43, and an odd lot of the preferred at $81\frac{1}{2}$. There were no transactions in the stock of the Baltimore United Railways during the entire two weeks' period—a fair reflection of the prevailing dullness. The income bonds fluctuated between $46\frac{3}{4}$ and $47\frac{1}{4}$, while the general mortgage 4s were very strong around 93. A fair demand continued for the other traction bonds, Anacostia & Potomac 5s selling up from $101\frac{1}{4}$ to $101\frac{7}{8}$, North Baltimore Traction 5s selling at 120, Baltimore Traction 5s at $101\frac{1}{2}$, Norfolk Street Railway 5s at 106, Atlanta Street Railway 5s at 106, Augusta Street Railway 5s at 102, Charleston Consolidated Street Railway 5s at $85\frac{1}{4}$, and Macon Street Railway 5s from $89\frac{5}{8}$ to 89. On the New York curb Interborough Rapid Transit reached yesterday a new high record at $134\frac{7}{8}$, following the reports of a deal with the Metropolitan. Five hundred St. Louis Transit sold at $10\frac{1}{2}$ down to 10, and 200 American Light and Traction common between $51\frac{1}{4}$ and $51\frac{1}{2}$. Nassau Electric bonds were very strong, rising from $82\frac{7}{8}$ to $84\frac{1}{2}$,

as were all the other securities of the Brooklyn system dealt in on the Stock Exchange. Washington Railway 4s were active, advancing to 79 and easing later to 78¾. Twin City Rapid Transit in the board room was taken in hand and bid up sharply, apparently by the same interests who have been behind the recent advance in the other Canadian properties.

Very little activity at Cincinnati last week. Cincinnati Street Railway sold up from 142 to 142½, Detroit United advanced to 65, Toledo Railways & Light ranged from 20¾ to 21½ and Cincinnati, Covington & Newport preferred sold at 89, all small transactions. A block of Indianapolis Street Railway 4s sold at 85¾, and a small lot of Dayton & Northern Traction Company's 5s brought 103.

Two small lots of Toledo Railways & Light at 20½ and a small lot of Cleveland Electric at 72½ were the only transactions at Cleveland last week.

At Columbus there were a number of transactions in Columbus Railway & Light, at a range from 35 to 37. There was a strong demand for Columbus Railway common, but offerings were few. Columbus, Buckeye Lake & Newark preferred and Columbus, Delaware & Marion preferred are reported to be in good demand; the latter sold at 90, ex-dividend.

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	
	July 26	Aug. 9
American Railways	47	47¼
Aurora, Elgin & Chicago.....	a12	a12
Boston Elevated	152¼	149
Brooklyn Rapid Transit.....	50¾	52¾
Chicago City	170	170
Chicago Union Traction (common).....	4½	4½
Chicago Union Traction (preferred).....	—	—
Cleveland Electric	71½	71
Consolidated Traction of New Jersey.....	66¾	66½
Consolidated Traction of New Jersey 5s.....	108½	109
Detroit United	61¾	64
Interborough Rapid Transit	133	134¾
Lake Shore Electric (preferred).....	—	—
Lake Street Elevated.....	3¼	3¾
Manhattan Railway	150¼	150
Massachusetts Electric Cos (common).....	17½	17½
Massachusetts Electric Cos (preferred).....	70	69
Metropolitan Elevated, Chicago (common).....	19½	18½
Metropolitan Elevated, Chicago (preferred).....	54	52½
Metropolitan Street	115	123¾
Metropolitan Securities	86¼	88¾
New Orleans Railways (common).....	9½	9
New Orleans Railways (preferred).....	29	a30½
New Orleans Railways, 4½s.....	73	74
North American	87¾	85½
Northern Ohio Traction & Light.....	13¾	13½
Philadelphia Company (common).....	39	38½
Philadelphia Rapid Transit	13	12¾
Philadelphia Traction	98½	98¾
St. Louis (common)	10¾	9¾
South Side Elevated (Chicago).....	91½	88
Third Avenue	117½	124½
Twin City, Minneapolis (common).....	95	97½
Union Traction (Philadelphia).....	54	53¾
United Railways, St. Louis (preferred).....	54	53¾
West End (common)	91	91
West End (preferred)	111	111

a Asked.

Iron and Steel

According to the latest and most trustworthy estimates, pig iron productions fell off during the month of July 210,000 tons. In spite of this, stocks on hand increased 46,322 tons, showing that consumption has declined even more rapidly. In the face of this showing it certainly cannot be said that there has been any turn for the better in the steel and iron industry. Quotations are as follows: Bessemer pig, \$12.65; Bessemer steel, \$23; steel rails, \$28.

Metals.

Metal quotations for the leading metals are as follows: Copper, 12½ to 12¾ cents; tin, 27 cents; lead, 4½ cents, and spelter, 4 5-16 cents.

TOLEDO, PORT CLINTON & LAKESIDE SOON TO BE OPENED

Within the next thirty days the Toledo, Port Clinton & Lakeside Railway will be operating cars between Toledo and Port Clinton. The road is practically completed between Genoa and Port Clinton. This week the company perfected a traffic agreement with the Lake Shore Electric Railway whereby its cars will operate over that road to Toledo. The agreement is on a car mileage basis, the Lake Shore Electric taking the cars at Genoa and operating them to the Toledo city limits as their own cars, and paying the other company two cents per car mile for the use of the cars. All fares collected while on the Lake Shore Electric Company's tracks will belong to that company and the through fares will be divided in proportion to the mileage. The Lake Shore Electric pays the crews while the cars are on its tracks. The cars will operate between the regular Lake Shore Electric cars, which will give half-hourly headway between Genoa and Toledo, in addition to three Lake Shore Electric limiteds. The new road opens up a new territory, touching Elmore, Port Clinton and Lakeside. This district is famous for its small fruit farms, and the fruit business promises to be very heavy. A great deal of summer traffic is assured for the road, as there are a large number of pleasure resorts along the shores of Lake Erie and on the islands which are accessible by this route.

ADVERSE REPORT ON PORT CHESTER GRANT

The Aldermanic Committee on Railroads, of the Board of Aldermen of New York, has reported to the full board against the granting of a franchise to the New York & Port Chester Railroad Company to cross streets in the Bronx. The adverse report, the committee explains, is due to the fact that it was unable to obtain any information as to the financial status or reliability of the company. After the reading of the report, the chairman moved that it be made a special order for the next meeting of the Board of Aldermen, Aug. 30.

At the last meeting of the Board of Aldermen the franchise of the New York, Westchester & Boston Railroad Company to cross streets in the Bronx for the construction of an electric railway, running to points in Westchester County, was granted, with the general understanding that the franchise of the Port Chester Company would be favorably acted upon. In fact, it is said, sufficient votes to grant the Westchester Company's application were obtained only through that promise, direct or implied.

THE REORGANIZATION OF THE MIAMI & ERIE CANAL COMPANY

As a result of an investigation into the affairs of the Miami & Erie Canal Transportation Company, the financially embarrassed concern that proposed to operate "electric mules" along the Miami & Erie Canal in Ohio, it is announced that the bondholders will effect a reorganization of the company and pay its debts. The investigation was held before a referee in Cleveland last week, and was the result of a suit to discover the names of the stockholders of the company in order that they might be held responsible for the debts of the company. The investigation was brought to a close at the end of last week, through the announcement that the Cleveland and Cincinnati interests had agreed upon a plan for the reorganization of the company. It is understood that the plan is to place a new mortgage on the property at about the wrecking value of the tracks and other property, which value is variously estimated at between \$250,000 and \$400,000. The debts of the company will be paid in full, and the balance will be used to complete the line into Dayton and put the canal in shape for operation. While it is now pretty generally admitted that little money can be made operating the road as a canal-boat line, it is believed that operating expenses and interest on the new money can be made. The present bondholders would then have to wait for their interest until the company could obtain additional rights from the Legislature. It is believed that despite the political capital made out of the issue, the State will sooner or later see the folly of maintaining the canal system at large expense when it can secure a fair rental for its banks for electric railway purposes.

The question of whether the company will be reorganized or a new one formed is yet to be settled. If the stockholders will submit to an assessment there will be no reorganization. It is understood that the claims against the canal company are about \$100,000, and that the Cleveland interests have agreed to pay 60 per cent of these and the Cincinnati interests 40 per cent.

ROCK ISLAND AND ELECTRICITY

It is stated that the Rock Island Railroad is seriously considering the equipment of some of its short suburban lines with electricity. One report is to the effect that estimates already made include mileage out of Davenport, Des Moines, Omaha and Kansas City. It is claimed that representatives of the Westinghouse Company have been over the system recently securing data to be used in making up estimates of the probable expense of installation, and that they are now actually engaged in this work. From one source comes the statement that electric service is contemplated out of Davenport to Muscatine and possibly east and west on the main line; out of Des Moines to Winterset and to Newton and possibly between Kansas City and St. Joseph.

RECEIVERS REPORT ON CHICAGO UNION TRACTION COMPANY

John C. Fetzer, the managing receiver of the Chicago Union Traction Company, has submitted a report for the year ending June 30, 1904, the first full fiscal year since the property came into the hands of Judge Grosscup. This report makes it possible to give a detailed comparison as between operations under the court's charge and prior thereto. It is accompanied by a letter from the receivers to Judge Grosscup, showing that his administration has resulted in permanent improvements and in a large increase of public service rendered, with a less average cost per passenger carried. The statement to the court is as follows:

July 30, 1904.

The Hon. Peter S. Grosscup, Circuit Judge United States Court, Chicago.

My Dear Sir.—I desire to call your attention to a comparison of the statement for the year ending June 30, 1904 (the first full year under your receivers), with year ending June 30, 1902 (last full year prior to the receivership):

1902—Paid rentals of	\$2,884,679
Which caused a deficit	247,527
Net earnings	\$2,637,151
1904—Rentals	\$1,843,078
Surplus	265,388
1904—Net earnings	2,108,467
Apparent deficit	\$528,684

Your management have, however, improved "Way and Equipment" over 1902 in a sum greater than this, as follows:

	1901	1902	1904
Way	\$198,928	\$274,575	\$609,559
Equipment	351,937	499,047	741,251
	\$550,866	\$773,623	\$1,350,851

Thus you show net earnings of \$265,388 after improving system \$577,228 more than 1902, and \$799,984 more than 1901—items formerly largely charged to capital account. Your receivers having no authority to charge it to such account, it has to appear under operating expenses. Further, you ordered the service improved wherever possible, and with same track mileage the car mileage has been increased—1904, 33,275,288 miles; 1902, 30,732,051 miles, an increase of 2,543,237 miles, or 8 per cent.

The 100 new cars were not received until last half of year, and with additional 100 now ordered and expected soon, a much greater improvement will be shown in the coming year. This improved service and your liberal transfer policy has increased the per cent of transfer passengers to revenue passengers from 40.98 in 1902 to 62.63 in 1904, yet your car earnings per car-mile are maintained, being 25.46 in 1902, 25.82 in 1904. Your expenses per car-mile have, however, increased from 14.87 in 1902 to 18.36 in 1904, largely caused in the increase of wages paid your motormen and conductors:

Conductors:			
1902.....	\$907,700.85	2.95 per car mile	
1904.....	1,132,226.30	3.40 per car mile	
Motormen:			
1902.....	\$723,260.70	2.35 per car mile	
1904.....	919,346.00	2.76 per car mile	

And while the total passengers carried have increased, the average car earnings per total passenger have decreased from 3.54 cents in 1902 to 3.06 cents in 1904, and operating expenses increased per passenger from 2.07 cents in 1902 to 2.18 cents in 1904.

Your system is carrying more passengers with better service

at less cost to average passenger than ever before. In showing comparison of per cent operating expense, I have added showing after deducting the \$577,228 spent in betterments:

	1902	1904
	Per Cent	Per Cent
Operating expenses and taxes to car earnings.....	66.26	74.49
Operating expenses and taxes to gross income.....	65.28	73.32

Under Operating Expenses, item "Transportation" has increased \$925,000. This is caused:

INCREASE IN WAGES	
Men in power plant.....	\$34,000
Conductors	225,000
Motormen	196,000
Other employees,	30,000
	\$485,000

INCREASE IN POWER USED	
In 1902 we hired power.....	\$127,000
In 1902 we sold power.....	155,000
	\$28,000
In 1904 we hired power.....	\$228,000
In 1904 we sold power.....	21,000
	\$207,000
Increase in fuel	66,000
	\$301,000

INCREASE OPERATING CABLES.	
To keep old system in the best possible condition.....	\$42,000
Supplies car service and street cleaning.....	97,000
	\$925,000

Your claim department shows a reduction:

1902—C. U. T. Company.....	\$546,075
W. C. Street Railroad.....	85,023
N. C. Street Railroad.....	80,857
	\$711,955
1904	573,104
Saving	\$138,851
Or 19.51 per cent.	

This department was recently examined by two expert "claimmen," unacquainted with the department officers or with each other, and in their joint report they praise the department highly for its thoroughness in investigation, detail in accounting and judgment and zeal shown in its operation. Respectfully submitted,

JAMES H. ECKELS,
MARSHALL E. SAMPSELL,
JOHN C. FETZER.

The "Chicago Economist" says that by comparing this report with the year ending June 30, 1902, and the year now reported on, which is the first full year under the receivership, it will be seen that gross earnings increased \$765,348, or over 10 per cent. The total increase in operating expenses was \$1,538,496, but \$577,228 of this was in maintenance charges, many items formerly charged to capital account being charged to operation under the receivership. The increase in cost of conducting transportation was largely in the item of wages, which in the several accounts directly under that heading shows an increase of \$500,000 in the two years. The increase in general expenses was merely nominal.

The report of earnings for the year ending June 30, 1904, with full comparisons, is as follows:

	Earnings, etc., Year Ending June	Increases, Year Ending June 30, 1904	
	30, 1904	Over 1903	Over 1902
Passenger	\$8,556,533	\$230,684	\$755,458
Other	33,934	2,480	9,890
Gross	\$8,590,467	\$233,164	\$765,348
Expenses:			
Maintenance way.....	\$609,600	\$240,765	\$335,024
Maintenance equipment	741,252	216,741	242,204
Transportation	3,718,746	492,515	924,747
General	1,039,618	192,985	36,521
Total	\$6,109,216	\$767,036	\$1,538,496
Net earnings	2,481,251	1533,872	1773,148
Other income	137,018	16,154	19,668
Total income	\$2,618,270	1540,026	1792,816
Charges:			
Rental	*\$1,843,078	113,038,473	11,041,604
Other	509,802	131,137	224,796
Total	\$2,352,881	114,169,610	11,266,397
Surplus	165,389	629,584	512,917
Statistics:			
Car miles	33,275,288	1,890,744	2,543,237

Passengers:			
Revenue	171,823,673	4,804,244	15,695,775
Free	944,923	84,936	133,475
Transfer	108,204,739	24,525,864	43,889,018
Total	280,082,335	29,415,034	59,718,268
Per cent transfer	62.63	12.79	21.65
Per Car-Mile:	Cents	Cents	Cents
Car earnings	25.82	†.81	.36
Operating expenses	18.36	1.34	3.49
Net	7.46	†3.15	†3.13
Per Revenue Passenger:			
Car earnings	5.00	0.00	†.01
Operating expenses	3.56	.36	.63
Net	1.44	†.36	†.64

* Contains no charge for dividends accrued on outstanding West and North Chicago stock for the period subsequent to Sept. 1, 1903, when the modified leases were adopted, except that part of the payments of Oct. 15 and Nov. 15 that applies to the period after Sept. 1.

† Decrease.

Thus on the side of increased public service rendered, the court's administration makes a fine showing, and there is also a public benefit in the half million dollars of increased wages paid by the system as compared with 1902. Additional power, as shown in the letter, has been secured, improving the service, at a cost of \$300,000. Under the receivership of late all earnings have gone back into the property, improving tracks, making first payment on cars and the like.

CALL FOR MEMBERSHIP IN THE MANUFACTURERS' ASSOCIATION

R. W. Meade, of 621 Broadway, New York, secretary of the manufacturers' committee of the American Street Railway Association, has just issued a circular which has been sent to all exhibitors at the last convention at Saratoga. This circular explains the purpose of the committee, suggests membership in the proposed association and requests suggestions as to future work. The circular follows:

"At an informal meeting of manufacturers of street railway material, held at the Saratoga convention of the American Street Railway Association, September, 1903, a committee of five was appointed for the purpose of organizing an association of manufacturers whose province it would be to take care of the exhibits at the annual conventions, thus relieving the association of that duty, and to assume other functions naturally pertaining to such a body if permanently organized. The contemplated change in the policy of the American Street Railway Association in the matter of selected sites for its conventions, under which the invitation of the local street railway company is no longer essential, makes the desirability of such an organization specially apparent and affords an opening for the manufacturers themselves to take charge of the exhibits, and to take over certain features of the entertainment programme which have heretofore been in the hands of the local street railway company as host, and which have become somewhat burdensome.

"The committee thus appointed held a series of meetings, adopted a name and plan for permanent organization, all of which was submitted to the executive committee of the American Street Railway Association at its meeting held Feb. 29, in New York City. The report was approved by the executive committee of the American Street Railway Association, and a sub-committee was appointed to act in connection with the manufacturers' committee. It is recognized that the best results can only be obtained by working in complete harmony with the American Street Railway Association, and no step has therefore been taken without their approval.

"Having thus explained its inception and aims, the manufacturers' committee of the American Street Railway Association now solicits your membership and co-operation. At the forthcoming convention at the St. Louis Exposition, on Oct. 12 and 13, there will be no provision for exhibits, but an excellent opportunity will be afforded by the exercise of other functions no less important to demonstrate the value to the association of this new auxiliary and lay the foundation for permanent success.

"No rental of space for exhibits being included this year, the membership dues have been fixed at \$30, which amount, it is estimated, will provide ample funds for the purpose of this year's work and all necessary preparations for the convention of 1905. An application for membership is herewith enclosed, which you are requested to sign and return promptly in the enclosed stamped and addressed envelope.

"Any further information desired will gladly be given, and the committee will welcome any suggestions relating to the interests of the manufacturers at these conventions."

INTERNATIONAL RAILWAY CONGRESS AT WASHINGTON

The programme of papers to be presented at the International Railway Congress to be held in Washington May 3 to 13, 1905, shows that the subject of electric traction is to be discussed. Those assigned from the different countries are: America, W. D. Young, electrical engineer, Baltimore & Ohio Railroad, Baltimore, Md.; France, Paul Du Bois, engineer of the Central Service Motive Power of the Orleans Railway, Paris; Great Britain and Belgium, Ernest Gerard, chief of the cabinet of the Belgian Minister of Railways, Brussels; Other Countries, Victor Tremontani, chief inspector of the Electrical Section of the Mediterranean Railway of Italy, Milan.

The International Railway Congress is composed of prominent officials of the steam railroad companies of different countries, and held its last session in Paris in 1900. Permanent offices are maintained at 11 Rue de Louvain, Brussels, in charge of Secretary Louis Weissenbruch. The chairman of the American section is Stuyvesant Fish, and the headquarters are at 24 Park Place, New York.

MEXICAN ELECTRIC RAILWAY PROJECT

An electric railway is planned to be constructed between the Rosa Amarilla mining property, located in the Autlan District, State of Jalisco, Mexico, to Navidad, a port on the Pacific Coast. The necessary energy to operate the system will be derived from water power plants to be built along the Cirslapa and Santa Maria Rivers. The cost of the construction and equipment of the road is estimated at about three-quarters of a million dollars (gold). Mr. M. D. Watson, who is primarily interested in the Rosa Amarilla mines, is understood to have been completed the financial arrangements. Surveys are already under way.

EXECUTIVE COMMITTEE MEETING OF OHIO INTERURBAN ASSOCIATION

The members of the executive committee of the Ohio Interurban Railway Association held their monthly meeting Aug. 5, and enjoyed a delightful trip to Cedar Springs on the line of the Dayton & Western Railway. Howard W. Fravel, superintendent of the Dayton & Western, acted as host, and the trip was made in the company's private parlor car "A". An excellent dinner was served at Cedar Springs Hotel, which is one of the finest park hotels in Ohio, and after an enjoyable meal the members went into executive session in one of the parlors of the hotel. It was decided to postpone the meeting of the association scheduled for September, this being done at the request of a number of managers of lines which cater to fair business, which is at its height about the date selected for the meeting. In consequence, the next meeting of the Ohio Association will be held the last Thursday in October, the place of meeting to be decided upon later. The committees appointed to look after various matters have not been idle during the summer months, and one of the most important subjects that will be discussed at the next meeting of the association will be the adoption of a uniform book of rules governing the operation of interurban cars. The committee appointed to formulate a set of rules has completed its work, and proofs of the proposed book are in the hands of a printer, and will be forwarded to the members of the association for their criticism, with a view to adopting the standard rules at the next meeting.

A committee of three, composed of President Harrie P. Clegg, Vice-President Edward C. Spring, and Member of the Executive Committee F. J. J. Sloat was appointed to represent the association at the annual convention of the American Street Railway Association at St. Louis in October.

A circular letter has been prepared by the executive committee outlining the work that has been accomplished thus far by the association, together with the work that will be taken up during the next few months. The officers of the Ohio Association have decided upon an aggressive policy for the winter campaign, and it is intended that a number of important problems for the mutual benefit of all interurban roads in the Central West shall be worked as soon as possible. To this end J. H. Merrill, of Lima, Ohio, secretary of the association, is making a determined effort to build up the membership and secure the co-operation of all the companies in this district. Managers of interurban properties in Ohio, Michigan, Indiana, Kentucky and adjoining States, who are interested in a movement that promises to be of great benefit to all concerned, are requested to correspond with Mr. Merrill before the next meeting of the association, so that they may receive an outline of the work proposed.

ENGINEERING FIRM IN KANSAS CITY

An engineering firm has been organized under the name of Cudworth, Axtell & Company, with headquarters at 616 Kansas City Life Building, Kansas City, Mo., to do general engineering work, but street railway engineering and development will be made a specialty. Mr. Cudworth is well known in electrical engineering circles, having been for three years connected with the Manhattan Railway Company, of New York. He was originally in charge of the foundation work of the Seventy-Fourth Street Station, and after the completion of that station was placed in charge of the construction of the subway conduits and of the sub-station construction and equipment of the Manhattan Company. He severed his connection with the Manhattan Railway in March, 1903, and became connected with Ford, Bacon & Davis, and for that firm has had charge of the construction and equipment of the Missouri River power station of the Metropolitan Street Railway Company, of Kansas City. Mr. Cudworth has contributed several articles to the columns of this paper. Mr. Axtell is a native of Kansas City, and has an extensive experience in steam railroad, water and sewer work. He will have charge of the State and municipal engineering of the firm, while Mr. Cudworth will take more direct charge of the railway work.

NEW HAVEN EMPLOYEES ACCEPT COMPANY'S PROPOSAL

The employees of the Consolidated Railway Company, of New Haven, Conn., voted Aug. 7 to accept the proposition of the company made in response to the demands of the men for an increase in wages, recognition of the union, and new regulations regarding extra men and pay for overtime work. By the terms of the reply of the company, which the men have accepted, all regular men who have worked a year will receive 21 cents an hour, in place of 20 cents. The men asked for 22½ cents an hour. Men who have served less than a year are to get 20½ cents, instead of 20 cents, hereafter. Overtime work is to be paid for at the rate of 25 cents an hour. This applies to extra men, as well as old employees, and is considered a concession, although the men asked for 30 cents an hour. The request for recognition of the union was refused.

NICARAGUAN ELECTRIC RAILWAY PROJECT

Considerable equipment, etc., will shortly be purchased in this market to be used in the construction of electric lines in Nicaragua, Central America. A strong group of Pittsburgers are primarily interested in the scheme. The United States & Nicaragua Company was recently incorporated under the laws of the State of Maine, with a capital of \$1,000,000, for the purpose of taking over the concessions granted to James Deitrick, of the Nicaraguan Government. M. K. Salsbury, a prominent Pittsburg capitalist, is president of the concern. William L. Abbott, president of the Iron City Trust Company, is vice-president. William M. Rees, of James Rees & Sons Company, is secretary and treasurer. Two subsidiary companies have just been formed, viz.: the Great Central Railway Company, capital, \$10,000,000, and the American Mining Company, capital, \$15,000,000. Robert Pitcairn, assistant to the president of the Pennsylvania Railroad, is president of the first-named company; Alexander R. Peacock, one of the Carnegie partners, is vice-president, and Mr. Rees is secretary and treasurer. The American Mining Company's head executive officer is Thomas B. Riter, of the Riter-Conlcy Company. Mr. Salsbury is vice-president, while Mr. Rees is secretary and treasurer. James Deitrick is managing director of all three companies. The Great Central Railway will build several electric lines running from the Coco River in Northern Nicaragua, several miles into the interior, where the American Mining Company is to conduct very extensive mining operations. Some idea of the vastness of the enterprise, the necessary capital for which is all assured, will be appreciated when it is stated that the mining concessions cover practically all Northern Nicaragua from the Atlantic to Pacific Coasts, and represent an area 40,000,000 acres in extent. The Central Company plans to build some 200 miles of steam road from the head of navigation on the Coco River to the Pacific Coast. A number of spurs will be constructed to the American Mining Company's mines. These spurs will be all electrically operated. There is said to be an abundance of water power in the territory. It is estimated that fully \$3,000,000 will be extended in electrical equipment, etc. The various companies, whose headquarters are in the Farmers' Bank Building, Pittsburg, Pa., have taken offices in the Park Row Building, New York, with a view to facilitate the placing of contracts for material, etc. Mr. Deitrick is in charge. He will remain here until October.

HONORARY DEGREES IN ENGINEERING

The editorial in the STREET RAILWAY JOURNAL for July 16, entitled the "Engineer Gets Left," has attracted wide attention in the scientific press. A correspondent in "Science," for July 29, has the following to say:

"For several years our technical press have called attention after each commencement season to the disproportionately small number of engineers among those whose attainments receive the sanction of academic approval in the form of honorary degrees. The STREET RAILWAY JOURNAL, the exponent in America of the most progressive branch of electrical engineering, calls attention to this unsatisfactory state of affairs in its issue of July 16.

"The value of education is to a very great extent realized in service, and there is no better indication of true appreciation of the ends of education on the part of our institutions which are devoted mainly to the beginnings of it, than the conferring of honorary degrees wisely. Our universities, to the extent that they stand for research, have an end in themselves, and academic honors are promptly bestowed upon those who contribute to the advancement of learning. Our colleges and technical schools, on the other hand, are devoted almost exclusively to teaching, and they have no end in themselves. No college teacher can draw much inspiration from the meager attainments of his untried graduates. The fruit of his labor is extra-academic, and the effectiveness of his labor depends upon his being sufficiently a man of the world to know these fruits and to draw his inspiration from them. If the granting of honorary degrees by our colleges to men outside of academic life has any reason to be, and surely it has, it is because such academic recognition is an expression of appreciation on the part of the personnel of the college of the things in which alone the results of their labors take on the garb of reality. As an expression of this kind of appreciation the function of the college in the granting of honorary degrees contributes vastly more to the credit of the college when wisely performed than to the sum of honor that rests upon those who do the world's work and carry its heavy dignities.

"Quite the most absurd notion respecting this conferring of honorary degrees is the more or less confused idea of many a circumscribed academician that it is the making rather than the marking of a distinction; and growing out of this pitifully foolish idea is the exaggerated dread of the prostitution of this really vital function of our academic institutions.

"It is a general impression, and perhaps it is true, that the number of engineers is disproportionately small among those who, at each commencement season, receive honorary degrees. If it is true, it is to be hoped that some of our larger schools of engineering may consider it. In any case it would be appropriate for our Society for the Promotion of Engineering Education to look into the matter."

INTERURBAN'S RIGHT IN INDIANA PUBLIC STREETS

It is apparent that every phase of the question involving the right of interurban lines to use public highways in Indiana will be tested in the courts, and additional legislation will probably result from the agitation. The latest move upon the part of a steam railroad in its opposition to electric lines is an injunction suit by the Pennsylvania Railroad Company to prevent the Indianapolis & Cincinnati Traction Company from crossing the railroad tracks in Morgan Street, in Rushville. The complaint alleges that as the interurban company is incorporated as a road for the carrying of passengers and freight from one place to another, it enters directly into competition with the steam roads, and is not entitled or allowed, under the law, to use a highway as a right of way, because such use is inconsistent with the easement on any street or highway. It is further averred that before the interurban company could ask for a right of way across the Pennsylvania tracks it should have been assessed and paid damages to the railroad company. It is also charged that the interurban company in question has adopted new method of electric power which will give it great speed, and will run night and day, with no provision for safety, and that it will be of great danger to passengers and employees of the plaintiff.

It is agreed by lawyers and interurban men that the settlement of this question may have far-reaching effects on the electric traction business in Indiana, and if the law is not adequate to deal with such cases the incoming Legislature will make it so. The citizens of Rushville are in sympathy with the interurban line, and while the suit may retard the construction of the crossing for a time, they feel quite sure it will be made in due time.

THE TOLEDO, BOWLING GREEN & SOUTHERN LEASED

The Toledo, Bowling Green & Southern Traction Company, operating an interurban line from Toledo to Findlay, with the city lines and lighting plant in Findlay, has been leased to the Toledo Urban & Interurban Company. The lease is on a basis of a sliding scale guaranteed dividend on the stock of the company.

The Toledo Urban & Interurban Company was incorporated several months ago with \$10,000 capital stock. This has since been increased to \$1,000,000, and it is proposed to authorize a bond issue of \$1,000,000. The new company will take possession of the road about Jan. 1. It will pay the floating debt of the company, and will probably make some extensions.

The Toledo Urban & Interurban Railway has under construction a line from Toledo to Perrysburg, which will provide a shorter entrance to Toledo for the cars of the Toledo, Bowling Green & Southern, which now operate over the tracks of the Maumee Valley Railway & Light Company from Perrysburg to the Toledo city limits. The new route will shorten the time between Toledo and Findlay to two hours in place of three hours and ten minutes, as at present. The new company has a private right of way into Toledo for a distance of 2½ miles. Last week it completed a traffic arrangement with the Toledo Railway & Light Company, whereby cars will operate to the center of the city by the way of the South Street and Broadway lines of that company. The arrangement provides that the interurban company collects the city fare and pays the city company three cents for each passenger brought into the city. The Interurban Company is building an extensive bridge across the Maumee River, and it is planning to build an expensive overgrade bridge over the tracks of three steam lines at East Toledo. This will be one of the largest structures of the kind ever built.

ELECTRIC TRACTION FOR MONTEREY

The Monterey Electric Street Railway, Light & Power Company, Limited, which was incorporated last week under the laws of the State of New Jersey, by Philadelphia capitalists, has this week acquired the existing horse car lines and the Mackin & Dillon concession in and around Monterey, the Pittsburg of, and one of the principal cities in, Mexico, and will commence practically immediately to electrically convert the lines, which will entail an expenditure of between \$1,500,000 and \$2,000,000, gold.

Edward F. Walker, whose offices are in the Drexel Building, Philadelphia, is now on his way from the southern republic, where he has just concluded negotiations for the acquisition of the properties on behalf of the company. About \$500,000 gold is understood to have changed hands in the various transactions. The Ferrocarriles de Monterey y Topo-Chico have been purchased. This concern was formerly controlled by the Slayden family, the president being ex-Congressman S. W. Slayden, of the financial house of S. W. Slayden & Company, of 50 Broadway, New York. The system is 15 miles long. It runs from Monterey to Topo-Chico. Included in the purchase of the Slayden system is a long lease of the park, baths and pavilion at Topo-Chico Springs. A hotel of large size will be built by the new interests, the bath house accommodations will be enlarged, new pavilions will be constructed and other up-to-date improvements will be brought about.

The Ferrocarriles Urbano de Monterey "Empresa Mexicana," S. A., has also been bought. This system's operations are at present confined to Monterey itself. F. Belden, the president of one of the big British-Mexican financial institutions, was the prime factor in the Empresa Company. The road is about 14 miles in length. The concession held by the American contracting firm of Mackin & Dillon, of Monterey, which as previously stated has passed into the control of the new company, permits of the construction of some 15 miles of line in the city proper and to one of the principal suburbs. The Monterey Electric Street Railway Light & Power Company expects to construct, in the first instance, some 25 miles of lines, but, ultimately, it intends to build and operate fully double that mileage.

While it is not yet definitely determined upon, it can be said that there is an extreme probability of Mackin & Dillon securing the contract for the construction of the new system. George D. Howell, of Philadelphia, is now in Monterey for the purpose of preparing the specifications, etc. C. W. Reece, of Philadelphia, is also on the spot. It is anticipated that part of the new system will be in operation by March next.

The Scioto Valley Traction Company, of Columbus, Ohio, has established permanent schedule, with hourly headway between Columbus and Lancaster.

EXTENSIONS IN WEST CHESTER, PA.

In a short news item which appeared in the last issue, a confusion was made between the West Chester Street Railway Company, of West Chester, Pa., and the West Chester, Kennett & Wilmington Railway, of the same place, and which was recently placed in the hands of a receiver. The West Chester Street Railway Company is in a very prosperous condition, and this is the company which is making the extensions mentioned.

The West Chester Street Railway Company owns the street railway lines in West Chester, Coatesville and Downingtown, and the lighting plants at Coatesville and Downingtown, and is now completing its extension from Lenape on the Western & Northern Railroad to Kennett, and a power plant at Lenape.

OHIOANS INTERESTED IN UTAH PROJECT

Barney Mahler, one of the leading members of the Everett-Moore syndicate, together with Salt Lake, Utah, capitalists, will build an electric railway from Ogden, Utah, through Salt Lake City to Payson. The Utah people interested are Senator Smoot, Jesse Knight, C. E. Loose, George Havercamp and S. R. Thurman. The section of the road between Salt Lake City and Payson, a distance of 60 miles, will be built first. Some of the larger towns between these points are Lehigh, American, Pleasant Grove, Provo City, Springville, Spanish Fort and Payson. Salt Lake City has 55,000 inhabitants; Provo City, 6,500; Springville, 3,400, and the other towns about 3,000. Ogden is 37 miles from Salt Lake City, and has a population of 16,500, and is a great railroad center. Eighty per cent of the population of Utah lies in this valley, one of the most fertile in the country, and considered one of the best traction fields undeveloped. Very liberal franchises have been obtained in the towns, some of them being for 100 years. One of the features of the proposition is the plan to erect a large power station at a large coal-mining property some distance from the line, which will be acquired by the company. The organization of the company is now being worked out.

WESTINGHOUSE COMPANY GETS NEW YORK, NEW HAVEN & HARTFORD TURBINE CONTRACT

The New York, New Haven & Hartford Railroad Company has closed a contract with the Westinghouse Company for two 1000-hp Parsons turbines, to be installed in the Warren power house of the railroad, from which the Warren & Bristol electric line is operated. The power house at Warren is to be enlarged to accommodate the new units.

WESTINGHOUSE BUREAU OF STANDARDS

The Westinghouse Electric & Manufacturing Company has established at its East Pittsburg works a department of standards which is at the service of all purchasers of its measuring instruments. As ordinarily sold, all direct connection between the manufacturer of electrical instruments and the instruments themselves ceases when they are shipped to their purchasers. With the Westinghouse plan an active interest is maintained in the instruments for the entire period covered by the period of free calibration (five years), and at intervals of greater or less frequency during this time the manufacturer reassumes a responsibility for the accuracy of the instrument by checking its performance and certifying to its accuracy.

To encourage periodical checking, the Westinghouse Company guarantees that there shall be no delay in the examination of instruments by its department of standards, and that they shall be promptly checked and restored to their owners. Unless repairs are necessary, there will thus only be a very few days in which the owner will be deprived of the use of his standards, and it will ordinarily be possible for him to send them away and get them back without any inconvenience because of their absence.

In addition to the benefits derived from having instruments checked continuously by the same standardizing department, there is a general advantage in having the same service as nearly universal as possible, particularly if that service gives a higher degree of security in the trueness of electrical measurements than can be gained by patronizing various establishments. It must be acknowledged that if perfect instruments could be furnished to all users and their accuracy maintained continuously by reference to a single set of standards of undoubted reliability, an ideal condition would prevail uniformly throughout the electrical field. It is this condition that the Westinghouse Electric & Manufacturing Company is endeavoring to produce so far as perfection may be attained under commercial conditions.

STREET RAILWAY PATENTS

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

UNITED STATES PATENTS ISSUED JULY 26, 1904

765,660. Tongue Switch; Edward B. Entwistle, Johnstown, Pa. App. filed May 28, 1903. Relates to means for holding down the movable point or tongue to its seat.

765,661. Railway Track Structure; George M. Ervin, Johnstown, Pa. App. filed March 18, 1903. Provides means for fastening in place the renewable wear portions or plates, so that the plates may be readily removed and replaced.

765,662. Tongue Switch; George M. Ervin, Johnstown, Pa. App. filed April 2, 1903. Relates to the bearing for the tongue pin or pivot.

765,663. Plate Fastening for Railway Track Structures; George M. Ervin, Johnstown, Pa. App. filed Oct. 22, 1903. A hollow, link-shaped key of spring material is driven between two parallel walls and being compressed binds the parts together.

765,669. Tongue Switch; Patrick Lavelle, Johnstown, Pa. App. filed Oct. 22, 1903. Relates to the bearing for the bed portion of the tongue in the body portion of the tongue switch structure.

765,718. Railway Switch; Robert S. Sheeley, Galesburg, Ill. App. filed Jan. 2, 1904. Aims to prevent accidents. Mechanism connected with the ordinary switching apparatus is operated by the weight of a train to positively close the switch in case it is left open.

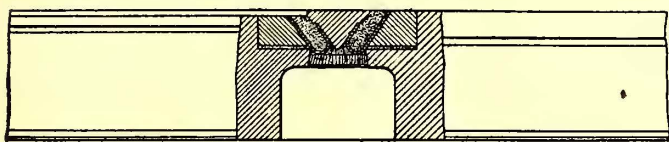
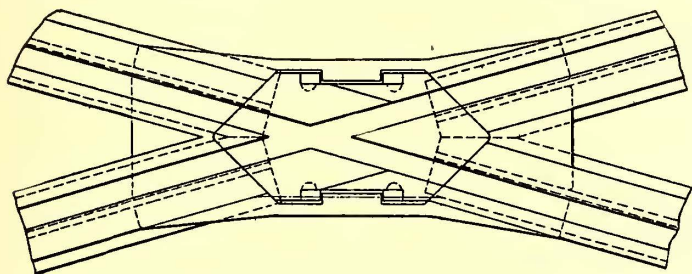
765,742. Track Sander for Motor Cars; William Lintern, Westpark, Ohio. App. filed Dec. 23, 1903. A push button in the controller handle operates a valve in a compressed air pipe which connects with and operates a sand trap.

765,743. Means for Operating Pneumatic Valves; William Lintern, Westpark, Ohio. App. filed March 28, 1904. See patent 765,742.

765,764. Street Railway Rail; Wilhelm Bertling, Berlin, Germany. App. filed April 29, 1903. The rail is made up of an upper and a lower part bolted together.

765,781. Device for Removing Sleet, Ice, etc., from Electrical Conductors; Don M. Miles, Aurora, Ill. App. filed Nov. 19, 1903. A circular plate is mounted so as to rotate about a vertical axis in spring-pressed contact with the third rail or conductor.

765,797. Railroad; Alexander J. Smithson, Portland, Ore. App. filed Oct. 21, 1903. A double-headed reversible rail.



PATENT NO. 765,661

765,813. Car Fender; Fred E. Caton, San Jose, Cal. App. filed Oct. 27, 1903. Comprises an apron or scoop and a net frame which acts as a trigger to release the apron. Invention relates to means for supporting the apron.

765,850. Trolley; Walter O. Miller, Louisville, Ky. App. filed Feb. 10, 1903. The trolley wheel is supported in a head which is in turn pivotally mounted in the end of the pole. The axis of the wheel support is transverse to the axis of the wheel.

765,852. Trolley; Jacob M. Olinger, Vienna Crossroads, Ohio. App. filed May 12, 1904. Relates to the mounting and centering of the wheel upon the journal pin.

765,917. Hanger for Overhead Conductors; Sidney H. Cochran and Austin E. Anderson, Lynchburg, Va. App. filed March 24, 1904. The hanger is so constructed as to provide a straight under-run for the trolley wheel, thereby preventing sliding movement of the wire in the hanger.

765,974. Trolley Wire Clip; Albert E. Haladay, New Haven, Conn. App. filed Dec. 30, 1903. A compression clip made in two halves, each half having a gripping flange for the trolley wire and devices for locking the halves together when in place.

765,979. Vehicle Lighting Apparatus; John A. Little, St. Louis, Mo. App. filed Nov. 9, 1903. Relates to the manner of mounting and supporting a train of gearing for driving a dynamo.

765,989. Car Truck; Edgar Peckham, Kingston, N. Y. App. filed April 8, 1902. Especially adapted for high-speed service on a roadbed having sharp curves, and where it is desired to use long cars which are comparatively narrow.

766,048. Car Body Stake; Arthur Lipschutz, St. Louis, Mo. App. filed May 13, 1904. Relates to a stake which is of trough shape in transverse section and on the surface of which is a rib of less width than the width of the trough.

766,102. Frictional Spring Dampener; Edward Denegre, Chicago, Ill. App. filed Dec. 5, 1903. Provides a frictional spring dampener which, while arranged to co-operate with, is independent of and disassociated from the springs themselves.

766,113. Side Bearing for Street Cars; John E. Norwood, Baltimore, Md. App. filed April 14, 1902. Details of a bearing of the roller type applied to a "Brill" truck.

UNITED STATES PATENTS ISSUED AUG. 2, 1904

766,177. Trolley; Orin Funkhouser, New Brighton, Pa. App. filed June 23, 1903. Upwardly-extending arms pivoted upon the trolley harp, having small wheels journaled in their upper ends and to the lower ends of which are secured the trolley rope, whereby the arms may be disengaged from their normal position so that the trolley wheel may be reversed.

766,195. Wheel Fender; Johann Ortner, Cleveland, Ohio. App. filed Nov. 7, 1903. The fender is pivoted to the frame of the car and has an arm extending behind the pivot, and a weighted lever fulcrumed at its rear end on the car and connected to the arm, and acting to lower the arm and lift the front end of the fender.

766,327. Controller; Fred B. Corey, Schenectady, N. Y. App. filed Feb. 4, 1903. Comprises a reversing switch having a plurality of semi-cylindrical members mounted so as to embrace the operating shaft of the reversing switch, each of said semi-cylindrical units being made up of insulating material molded into the proper shape, having the connecting members of the contact segments molded into the insulating material.

766,335. Electric Railway; Philip Farnsworth, Schenectady, N. Y. App. filed Feb. 21, 1901. The conductor which supplied current to the car motors is divided into sections normally disconnected from the feeder, but which are adapted to be connected thereto by electro-magnetic switches as the car proceeds along the way. The novelty consists in employing electro-magnetic means for positively opening the switches which connect the conductor sections with the feeder, so they cannot remain closed by residual magnetism or leakage currents, or become accidentally closed thereby.

766,348. Undercarriage for Tram or Railway Car or Wagons; Peter Herbert, North Sidney, New South Wales, Australia. App. filed Oct. 7, 1903. Consists of a skeleton turntable upon which the under frame rests, anti-friction bearing rollers between the turntable and the under frame, peripheral rollers around the turntable and anti-friction supporting roller below the turntable and axletree and wheels carried by the turntable and supporting it.

766,351. Reversing Switch; George H. Hill, Schenectady, N. Y. App. filed March 11, 1903. Consists of a reversing switch cylinder built up of a plurality of identical units, each unit comprising a disk of molded insulating material, having an opening through which the shaft upon which the unit is mounted is adapted to pass, and carrying a pair of conducting elements embedded in the insulating material, each conducting element carrying a contact segment, which may be replaceable.

766,378. Hand Strap for Cars; Joseph S. Paxton, New York. App. filed Oct. 10, 1903. A panel for the reception of advertising matter is interposed between the upper part of the strap, which is adapted for attachment of a support, and the lower part which is adapted to be grasped by the hand.

766,381. Electric Railway and Controlling Device Therefor; William B. Potter, Schenectady, N. Y. App. filed March 3, 1898. Means for returning to the distributing system of an electric railway the energy absorbed by the application of the brakes, consisting in connecting motor armatures in series when it is desired to return energy, so that their electro-motive forces act to supply current to the line at a voltage in excess of that impressed thereon by the main generator. It also consists in converging the ordinary motors actually employed for traction work into separately excited generators when it is desired that they should return energy. Their voltage is thus made independent of their out-put.

766,399. Current-Collecting Device for Electric Railway Systems; Abraham A. Shobe and William Embley, Jerseyville, Ill. App. filed Sep. 26, 1903. Provides a current collector for an underground conductor in which the movable conducting members are held at all times firmly in engagement with the stationary conductors without regard to irregularities in the road bed or variations in position of the conductors.

766,428. Car Fender; Franz Csanitz, Vienna, Austria-Hungary. App. filed March 26, 1904. Details of construction.

766,625. Third Rail System; Thomas Jenkins, New York, N. Y. App. filed April 6, 1904. Provides a protecting cover for the rail and a support for the contact-shoe, which will permit the shoe to be moved into and out of the cover and co-act with the rail.

766,650. Electric Trolley; George Ondo, Delancey, Pa. App. filed March 10, 1904. Details.

766,692. Hanger Cut Out for Trolley Wires; Geo. Hall, Manchester, England. Details.

PERSONAL MENTION

MR. CALVIN W. RICE was married on Aug. 6. at Winchester, Mass., to Miss Ellen M. Weibezahn.

MR. C. A. GILLES, assistant treasurer of the San Juan Light & Transit Company, of San Juan, Porto Rico, which is controlled by J. G. White & Co., is now on a visit to the States.

MR. JOHN MILLIGAN has been appointed superintendent of transportation of the Dayton, Springfield & Urbana Railway, with headquarters at Springfield, Ohio. He has been with the company for several years, starting as a conductor.

MR. T. H. BOYD, for several years superintendent of the car repair and paint shops of the Knoxville Traction Company, of Knoxville, Tenn., has been promoted to be master mechanic of the traction company. Mr. Boyd has been with the traction company since October, 1895.

HERR BARON WOLFGANG FERSTEL, building adviser (Baurat) of the Austro-Hungarian Railway Ministry in Vienna, has been appointed delegate of the Vienna Elektrotechnischer Verein to the International Electrical Congress to be held at St. Louis in September.

MR. A. W. McLIMONT, who superintended the construction of the Lima-Chorillos Electric Traction System, which Peruvian road—the first of its kind in that part of the world—was described in the STREET RAILWAY JOURNAL, June 4, will arrive in New York next week.

MR. C. M. RENTHER has resigned from the electric department of the J. G. Brill Company to become chief electrician and master mechanic of the Camden (N. J.) & Trenton Railway Company. He succeeds Mr. John Hyde, who resigned to take up the electrical contracting business.

MR. GEORGE H. BINKLEY, engineer of the railway department of Kohler Brothers, Chicago, has resigned to take the management of the business of the Hadley Derrick Company, Indianapolis. This is a new concern which will make a new portable derrick for agricultural and railway purposes. Mr. Binkley's office will be in the Talbott building, Indianapolis.

MR. ELLIS BARTHOLOMEW, of Toledo, has resigned as president and director of the Toledo, Columbus, Springfield & Cincinnati Railway Company, and Mr. E. C. Schinness has been elected in his place. Mr. Bartholomew was the original promoter of the company, which proposes to build a line from Toledo to Columbus and Cincinnati.

MR. W. S. CHESLEY, who has been selling steam and electric machinery for several years, and who was until recently connected with the foreign department of the Westinghouse Electric & Manufacturing Company, is now with the Power & Mining Machinery Company, the latter company being the successors of the Loomis-Pettibone Gas Machinery Company and the Holt-hoff Mining Machinery Company.

MR. F. S. SAGE has resigned his position as auditor of the Indiana Union Traction Company, and that office has been abolished, the duties being assumed by the comptroller. During his connection with the company, Mr. Sage introduced many important improvements in the accounting department, and when he resigned he was the recipient of many high commendations for his services by the officers of the company.

MR. E. H. McHENRY, fourth vice-president of the New York, New Haven & Hartford Railroad Company, has been

elected first vice-president of the Consolidated Railway Company, the organization into which the electric street railway properties in Connecticut owned by the New Haven road have recently been merged. Mr. McHenry was formerly chief engineer of the Canadian Pacific Railroad, and now has charge of all of the electric railway divisions of the New Haven road.

MR. CYRUS ROBINSON, vice-president of the Power & Mining Machinery Company, New York, has recently returned from Europe. While there Mr. Robinson took the opportunity to carefully investigate the recent excellent practice upon the Continent and elsewhere in the gas producer and gas engine field, with a view of furthering the interests of the American Crossley gas engine, of which his company are the American manufacturers.

MR. W. W. HERRICK, of Cleveland, claim adjuster for the American Steel & Wire Company, died in Cleveland last week. For five years, from 1895 to 1900, Mr. Herrick was in charge of the claim department of the Cleveland Electric Railway, which department he organized and brought up to a high state of efficiency. During his connection with the American Steel & Wire Company, Mr. Herrick was instrumental in bringing about the worthy beneficial and pension system now in vogue for the relief of employees of that company.

MR. G. R. MITCHELL, of Bradford, Pa., has succeeded Mr. J. A. Barry as general manager of the New Jersey & Pennsylvania Traction Company's lines, with headquarters in this city. Mr. Mitchell has had considerable experience in the electric railway field, dating back to the old Thomson-Houston days, when he was an electrical engineer. He has been connected with the Bradford-Rock City-Olean line for some time past. Upon the eve of his departure from Bradford the employees of the road presented him with a handsome gold watch and chain. Mr. Barry, it will be remembered, becomes connected with the Indiana Northern Traction Company.

MR. J. A. BARRY, the retiring general manager of the New Jersey & Pennsylvania Traction Company, of Trenton, N. J., was recently presented with a magnificent watch charm, containing the emblems of the Masonic order upon one side, and cross of rubies surmounted by a crown of diamonds upon the other, by the employees of the company. Mr. Frank S. Katzenbach, Mayor of Trenton, made the presentation speech. Mr. Barry's acknowledgement was heartily received. Mr. Jilson J. Coleman, president of the Indiana Northern Traction Company, of which Mr. Barry is to be general manager, made a speech in which he stated his reasons for tendering Mr. Barry the position in Indiana.

MR. CHARLES REMELIUS, formerly of the St. Louis Transit Company, has been appointed master mechanic of surface divisions of the Brooklyn Rapid Transit Company, succeeding Mr. A. J. Wilson, who recently resigned, owing to ill health. Mr. Remelius has had a long and thorough experience in street railway mechanical work. He began with the Cleveland City Railway nearly sixteen years ago when its lines were changed from horse to electric traction. He left Cleveland in the early nineties to go to Detroit with the Johnson interests. Since this he has held the position of chief engineer and master mechanic of the Indianapolis Traction & Terminal Company, and later was connected with the St. Louis Transit Company. Mr. Remelius will, in his new work, have charge of the mechanical department of surface lines only, this change involving a new departure of the company; the work of both the surface and elevated divisions was formerly carried on together, but hereafter will be separated, Mr. William G. Gove, assistant mechanical engineer, having assumed direct charge of the work upon the elevated divisions.

THE DIRECTORS OF THE BOSTON & WORCESTER STREET RAILWAY COMPANY had as guests on an inspection of the company's property, Aug. 3, H. H. Vreeland, president of the New York City Railway Company, of New York; F. S. Gannon, vice-president of that company; Frank Hedley, general superintendent of the Interborough Rapid Transit Company, of New York; Henry Sanderson, president of the New York Transportation Company; A. T. Potter, vice-president of the Rhode Island Company; R. J. Todd, general manager of the Rhode Island Company; C. S. Sergeant, vice-president of the Boston Elevated Railway Company; Frederick A. Huntress, general manager of the Worcester Consolidated Street Railway Company, and Charles C. Pierce of the General Electric Company. The roadbed, overhead work, signal system, power house and car shops were all inspected, and the visitors congratulated President William M. Butler and Mr. James F. Shaw upon the excellent appearance of the property. Messrs. Vreeland, Gannon, Hedley and other members of the party are making a study of street railway conditions in New England. They recently went over the system of the Boston Elevated Company.