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## Durable Interior Finish

A matter to which every company which is constructing new cars can afford to give much serious attention is the durability of the interior finishes of cars. While passengers judge of a road somewhat by the exterior appearance of cars, the interior finish has much more influence. Furthermore, it is usually much easier to make the outside of a car look like new than the inside. To freshen up the interior of a car is a difficult task, and it is very desirable to select at the outset some plain and durable style of interior finish which can be freshened up

from year to year if necessary. Interior finish should receive more attention than it has in the past. The present tendency toward simplicity of interior finish is in the right direction, as it is conducive to the maintenance of the interior of a car in good condition.

## Clean Rides in Hot Weather

This is the season of the year when the traveler most appreciates the superiority of interurban electric service over steam railroad service, for it is the season during which the smoke and dirt which accompanies the average steam railroad train is most offensive. In a journey on a steam railroad in such weather the passenger is in a constant dilemma between leaving the windows open and taking the dirt, or closing them and submitting to unbearable heat. Where the time between terminals compares as favorably with steam railroad time as it does now on a number of interurban roads giving limited service, there is no room for a question as to which the public will prefer, nor is there any question but that the very existence of such limited service will create traffic. It is for the interurban manager to see that its passengers are carried in every way as comfortably as possible. Although sprinkling is not common on interurban roads of the more recent type which do not follow the highway, nor is it usually necessary, it is certainly money well spent on that class of suburban and interurban roads which follow the highway and pass through small towns at frequent intervals. An electric train of one car usually leaves its dust behind it, and in this way has an advantage over a long train, but if the speed is slow and the car is running along a very dusty highway, there will be a decided need for sprinkling.

## Concrete Bus-Bar Compartments

In these days when bus-bar compartments of masonry are in such common use owing to the frequency with which high-tension electric current is employed in electric railway work, the question of the material for such bus-bar compartments and barriers becomes important. Heretofore bus-bar compartments have been usually made of brick, but concrete has such advantages for this work that it would not be strange were it to largely take the place of brick in future construction work around high-tension switchboards. Probably the most notable example of its use in this county at present is in the great power station of the Kansas City Railway & Light Company. An inspection of the bus-bar compartments and barriers in this station, which are made of concrete, cannot but impress one with the better appearance of the concrete construction, to say nothing of the fact that, if well constructed, it is more substantial. A concrete wall or barrier consists of one piece where, if it were of brick work, it would consist of many pieces held together by mortar of rather uncertain strength. While thin brick walls, if placed indoors and located where there are no strains upon them, may be fairly durable, the fact remains that as usually constructed they are nowhere near as substantial



as well mixed concrete would be, and furthermore, they are likely to be much more expensive to install than the concrete. Concrete barriers can be made in sections, and forms for this purpose can be provided which will permit of their very rapid manufacture, the process consisting simply of mixing the concrete and tamping it into the form. Those parts of the construction too heavy to be made in this way can, of course, be constructed in place after the usual manner of concrete walls and with a considerable saving in time over brick masonry, which calls for more skilled labor than the concrete work.

### Passenger Solicitors for Interurban Roads

The opportunities for creating new passenger business for interurban roads are almost unlimited, and there are comparatively few interurbans worthy of the name but would find it a profitable investment to maintain a man who could devote his time exclusively to working up special excursion business. On smaller roads the duties of passenger solicitor might be combined with that of freight and express solicitor, but during the summer months at least, a live solicitor working exclusively after passenger business could make his position a remunerative one for almost any road. At the present time a great majority of the roads in the Central West have passed through the construction era and have arrived at the stage of development, and they are awakening to the fact that the regular passenger traffic that has been built up by reason of the frequent service and low fares of the electrics does not represent the full possibilities in the development of such roads. There are certain classes of short-haul excursion business which the electric lines are particularly adapted to handle. The excursion business is profitable to a steam road only when it can attract large numbers of people on a single train, but with an electric road there is practically as much velvet in handling an extra car load of people to this point to-day and another car load for another point to-morrow as in handling a large crowd at once to a single point.

The methods pursued by those roads which are catering to special excursion business are numerous, and there are comparatively few roads but could turn nearly all these schemes to their own advantage if the matter was given the personal attention of some official who had the time to work them out. Frequently it would be found of advantage to co-operate in such work with connecting lines or other roads in a vicinity, and we know of instances where two or more roads maintain a passenger solicitor and divide the expense.

Mention has been made in these columns recently of several Ohio roads that have formed baseball leagues among the towns on their lines. Each town is represented by a club and regular scheduled games are played. The roads do not attempt to support the clubs, but simply organize the movement, and in one or two cases they have given the players free transportation. If enough interest can be awakened, it is possible to run special cars from one town to another or, if desired, the increased traffic caused by the local pride in the home team can be handled on regular cars.

In this issue will be found outlines of plans being worked out by several other Ohio systems. One of these has organized a county fair circuit, embracing all the principal towns on its system as well as points on a connecting line. The road is very likely to reap a rich harvest from its enterprise, as it will not only handle the people to and from the various fairs, but its freight receipts will be increased through handling horses and the baggage of those who follow the circuit. A circuit of street fairs is another scheme that has been worked out to ad-

vantage. Almost any town of a thousand or two inhabitants will support an old-time country or street fair if some one is enterprising enough to start the game, and the electric road with its cheap rates and frequent service will practically insure success to events of this kind if they are properly pushed and advertised. In connection with advertising such events, they should be brought to the attention of people in the neighboring large cities, since many city people who formerly lived in the country would be attracted if their interest was awakened.

The roads at Dayton, Ohio, are operating special excursions from all points to the Masonic, Knights of Pythias, Odd Fellows and Soldiers' homes in these districts, and the "personally conducted" feature has been added to good advantage. These roads work in conjunction with one another on these excursions and the results are proving very satisfactory.

The Lake Shore Electric Railway, of Cleveland, has long maintained an excursion solicitor, who is constantly employed working up picnics and pleasure trips for societies, Sunday schools and other organizations.

Another road makes a specialty of working up family reunions. The solicitor goes to a prominent citizen, secures the names of his relatives and near friends, corresponds with them and gets up a reunion picnic. Sometimes they get a carload, sometimes more. Or it may be the party can be handled on regular cars. The point is, the company's representative furnishes the incentive.

The company that does not maintain or at least have some connection with a summer park misses one greatest inducements for excursion business, since, as has been outlined in these columns many times, it is not only possible thereby to work numerous excursions and picnics, but a great many roads are enabled to make the excursion business profitable in winter as well as summer by working up trolley parties and suppers, dances, theater parties and skating carnivals.

### The Technical Graduate

Among the important topics to be considered at the coming convention of the New York Street Railway Association, to be held at Utica in September, is one which should arouse discussion and prove fruitful in results. A paper will cover the subject of the relation of the graduate of the technical school to the business and profession of electric railway operation. It would seem that this matter is timely, as the young men from the colleges are being accepted for service in railway work in increasing numbers. They are also coming to realize more and more how attractive this field is for their activities. The technical schools are introducing into their curricula those subjects which fit young men for railway work in particular, while at the same time laying stress upon the branches taught for mental discipline and general culture. In addition, the manufacturing and operating companies are taking a hand in the educational side of the work by furnishing apparatus for exhibition and demonstration in the colleges.

For many reasons the operating side of the electric railway business has been the last to demand college-trained men. It is well recognized by engineers and manufacturers that men with training are most profitable for designing electrical machinery, for superintending its construction and for placing it upon the market. It is only logical to carry this still further and to suppose that this machinery can be operated with good profit by men who have had the discipline of a thorough education. The men who have brought the electric railway business to its present successful condition have, as a rule, begun their



careers with the horse and cable railways. When the addition of electric machinery to their equipment increased the possibilities of their business they were quick to avail themselves of the opportunity. They met the increased difficulties connected with the improved facilities in a remarkably satisfactory manner, calling to their aid the necessary technical assistants. These successful leaders will soon desire to yield their places to younger men who will not have had the benefit of participation in the gradual evolution of the industry. The young men will come into a complicated business, which is becoming more so every day with the adoption of higher speeds and more elaborate machinery. They will need the best possible training for their future work, and undoubtedly a part of this must be obtained in the technical school if economy of time and energy are to be considered.

It is not to be expected of the technical schools that they will teach business foresight and common sense except as the necessity for acquiring these elements of manhood can be pointed out by precept and example. For this reason some time must elapse between the period at which the young man leaves school and that at which he is ready for any considerable responsibility. This time can be spent either in an apprenticeship course with manufacturing companies or in subordinate positions with operating companies, but wherever spent the motive must be the same—to cement together technical training and business sagacity.

### Concerning Statistics

The practice of street railways in collecting and using statistics varies widely in different parts of the country. Some companies attach little value to figures outside the lump sums of gross earnings, operating expenses, fixed charges, etc., while others go to the pains of analyzing not only their own, but other properties, through the gathering of figures based upon units of output like the kw-hour and of transportation service like the car and ton-mile and the car-hour.

Although the value of the gathering of statistics beyond the simplest figures is in dispute in more than one manager's office to-day, there can be no reasonable doubt that the proper use and collection of this kind of information is often worth many times the cost of obtaining it, and that any fault in this direction lies in the abuse of statistics rather than in the figures themselves. There is a great deal of truth in the statement that one never gets more out of mathematics than one puts in, so that the value of calculated results depends as much upon the data assumed as upon the accuracy of the process. As little reason exists for condemning statistics wholesale as can be found in calling a chisel worthless because its edge is dull.

On large systems the gathering of statistics generally falls to the employees of the auditing department. If these employees are ordinary clerks, possessed of little technical knowledge, it goes without saying that certain phases of the company's work are almost sure to be neglected. There must be closer harmony between the auditing and mechanical departments before the important problems of repair cost, depreciation and maintenance can be successfully analyzed. It is a question if it would not be worth while to maintain a statistical department on some of the larger systems for the purpose of gathering those figures which lie outside the sphere of every-day accounting. This work could be inaugurated by authorizing a single employee with technical knowledge and a taste for figures to devote his entire time to collecting and dissecting data upon energy consumption, schedules, fuel supply, tests, traffic, acci-

dents, etc., upon a unit basis as well as in toto. Those who have had occasion to quickly obtain figures of this kind from an auditing department—occupied as it constantly is with figures of total receipts and expenses—realize the convenience it would be to be able to secure the desired information in a few seconds by referring the matter to a specially organized information department.

We understand that a department of statistics is in operation upon the Lehigh Valley Railroad, and are acquainted with at least two firms of engineers, each of which maintains such an organization, independently of the auditing department and its library. In each case the statistics department of the firm is located at its home offices; it handles all the receipts, expenses, records of fuel consumption, traffic and energy output, movement of rolling stock and business per capita, per mile of track, etc., which are sent in monthly by the resident managers of the different properties which it controls; it records these figures in convenient form, and by plotting them diagrammatically from month to month preserves a continuous history of all the important physical and financial quantities which appear in operation. The department also collates the statistical information in regard to outside roads, published in the technical press and elsewhere, and arranges it for instantaneous reference. It is a matter of a very few minutes to secure from this department almost any analysis of operation that one desires, and the constant watch which the department keeps upon the operation of the various properties controlled goes a long way toward paying for the expenses of maintaining the department itself. Some half dozen employees are required, all told, for this work. Still another very important feature of this particular organization is the handling of new propositions by the statistics department, which bases its preliminary recommendations upon the gathered records and experiences of its own and other companies.

The instance quoted would lead us into a discussion of the pros and cons of centralized management if followed to its logical conclusion, which is aside from our present purpose. Enough has been said, however, to indicate that it might well pay a large operating road to pursue the statistics question further, even though it be done on a much smaller scale than that of the two firms of engineers mentioned above. A great deal of useful information can be obtained at the cost of a couple of thousand dollars a year; the card index offers a ready solution of the filing problem, and a single active, alert employee would be the means of keeping the executive and operating officials in close touch with the concrete quantities which make up the daily business of the electric railway.

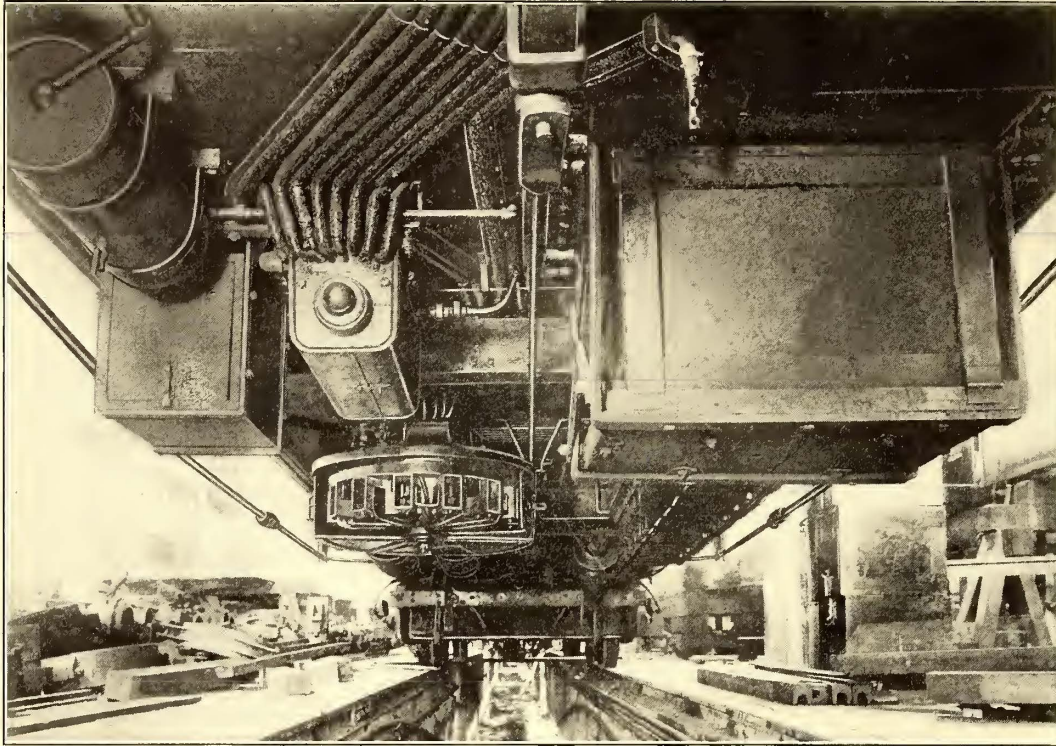
Perhaps the greatest value of statistics lies in the power of analysis which their pursuit confers. It is easy to see how any abnormal expense or increase in business may be immediately detected by the routine work of the statistician. Lessons drawn from the different departments may be co-ordinated, and many leaks in operation discovered by a persistent study of operating figures. The legal profession of to-day bases its work upon a great body of precedents which have been handed down from generation to generation, and the time is coming when the highest economy in the conduct of the transportation business will depend in no small degree upon the accumulated experience of the past as recorded in the dissected statistics of analyzed operation. The cost of gathering statistics on large systems weighs but little against their potential value, and the future will doubtless witness a notable expansion of this sort of quantitative analysis.



## THE RECONSTRUCTION IMPROVEMENTS IN EQUIPMENT OF THE BROOKLYN ELEVATED CARS

In the preceding issue of this journal (page 222) was presented a description of the important reconstruction work

possible and also reduce complications, in order to reduce the liability of short circuits, etc.; then by lining the entire underside of the car body with adequate fireproof covering, it is thought that even in case of dangerous arcing, due to wire troubles, the conditions favorable to the starting of a fire will be reduced to a minimum.



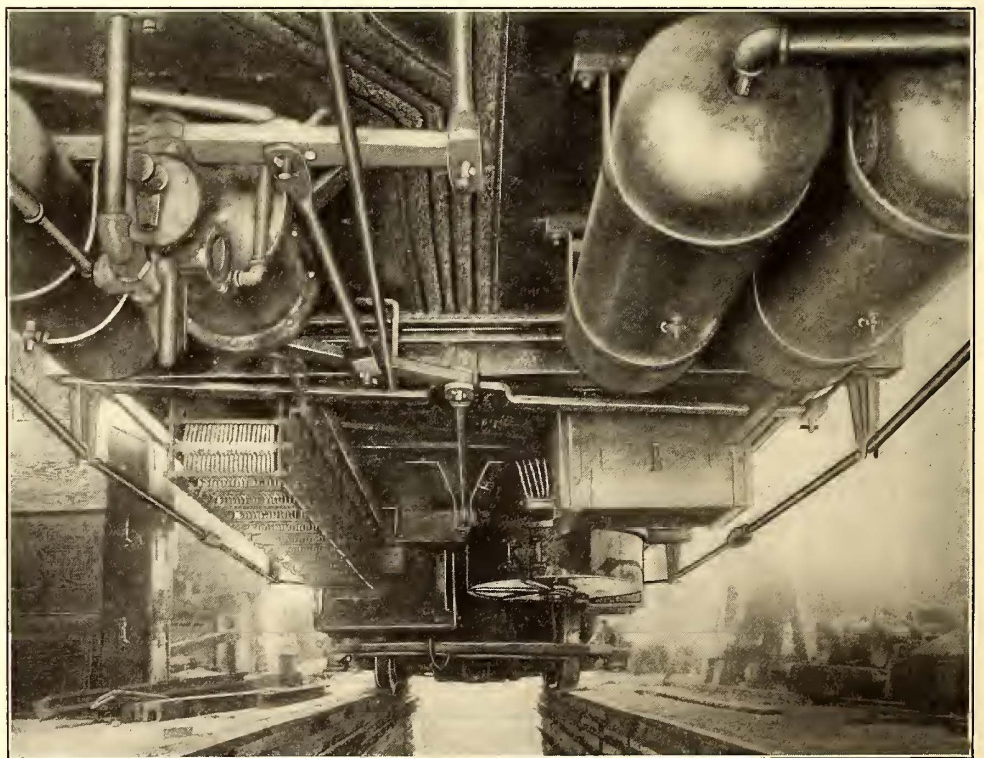
VIEW OF UNDER SIDE OF A TYPICAL RECONSTRUCTED ELEVATED CAR OF THE BROOKLYN RAPID TRANSIT COMPANY, SHOWING METHOD OF FIREPROOFING OF WIRING AND UNDERFRAMING, AND ALSO NEW ARRANGEMENT OF APPARATUS

The fireproofing is being effected in the first place by sheathing the entire underside of the car under-framing by a covering of  $\frac{7}{8}$ -in. hard maple flooring, and upon this is fastened the fireproof sheathing. The use of hard maple in this connection is important, as it is the least inflammable of the different kinds of wood commercially available in this country. The fireproof sheathing used is the well-known transite board, manufactured by the H. W. Johns-Manville Company, New York, a composition based upon asbestos, but which is much stronger mechanically than asbestos, and is not subject to the difficulty met with in that material of absorbing moisture; numerous tests have been made upon transite board in which it has been found to withstand the high heat of reverberatory furnaces used

which is under way upon the rolling stock equipment of the elevated divisions of the Brooklyn Rapid Transit Company. This article supplements the discussion of car body, platform and truck reconstruction given there by a detailed description of the improvements in electrical equipment and the important fireproofing of wiring, which were there omitted owing to lack of space.

### FIREPROOFING

One of the most important features of the reconstruction work is the elaborate provision being made for the fireproofing of the underside of the car body, and of all other parts where any portion of the wiring will be run. One of the most serious troubles that has been experienced in heavy traction work has been that resulting from fires caused by the overheating of resistances, crosses and short circuits in the wiring, etc. The intention is to reduce the possibility of fire being transmitted to the woodwork of the car body from the destructive arcing by covering all exposed portions of the woodwork by suitable fireproof sheathings, which will tend to remove the conditions favorable to fires under such circumstances to the greatest possible extent. The system of wiring has been entirely redesigned, so as to make the wires as accessible as



VIEW OF UNDER SIDE OF THE RECONSTRUCTED CAR FROM THE OPPOSITE END, SHOWING FIREPROOFING COVERINGS FOR WIRE LEADS AND UNDERFRAMING AND METHOD OF MOUNTING RESISTANCES

for the melting of wrought iron and steel. It is being applied to the cars in sheets  $\frac{1}{4}$  in. thick, which are carefully lapped so that no portion of the woodwork is exposed below. The transite board is fastened to the sheathing by nails, and,



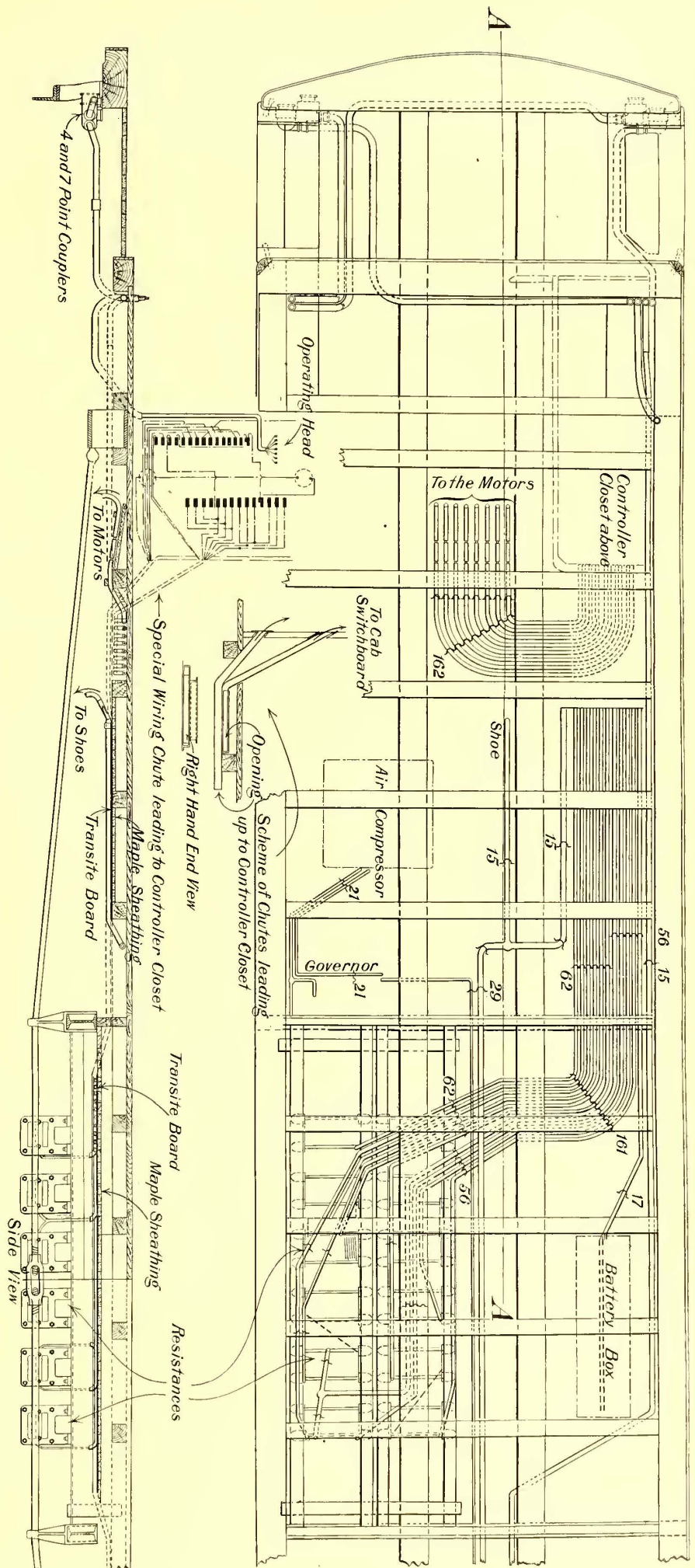
as an additional precaution, each of the nails are afterward carefully tested electrically in order to see that no possible contact is made with any portion of the metal framing of the car; in this manner no nail appearing on the lower side of the transite board will make possible a ground connection in case of accidental contact with any part of the wiring.

The new arrangement of car wiring to be used upon the majority of cars under reconstruction is shown in the accompanying car plan. This plan applies specifically to those cars which have the earlier design of Westinghouse electro-pneumatic multiple-unit control; the style of wiring which is being used upon all new cars and those formerly equipped with the Sprague system of control, which are now being equipped with the new Westinghouse unit switch-group system of control, will differ somewhat from this arrangement, in that the length of the group of leads which are now carried from the resistances over to the controller closet at one end of the car is thereby considerably shortened and other features of the wiring details are correspondingly simplified. The principal features of the new arrangement of this wiring will be evident from an inspection of the drawing. It may be noticed that the air-pump governor is, in the new arrangement, located beneath the car, which further assists in keeping the wiring beneath the fireproofing. The locations of the cars' electrical equipment have been slightly changed; the battery box, the Christensen air compressor and resistances are now carefully arranged to simplify and shorten the wiring as much as possible.

The actual fireproofing of the wiring is provided by forms of the molded electrobestos, specially molded by the H. W. Johns-Manville Company, which are provided to cover the wiring after it is located in position. Representative detail drawings of this special molded conduit are presented here to give an idea of the completeness of the study that has been given to this work; special forms are provided to take care of the wiring in all of the necessary positions. Form No. 161 covers the wiring to the resistances at the sharp bend at one side of the car; forms No. 56 and 62 cover these wires as they approach the resistances; other representative types of this special work are also shown to give an idea of their character.

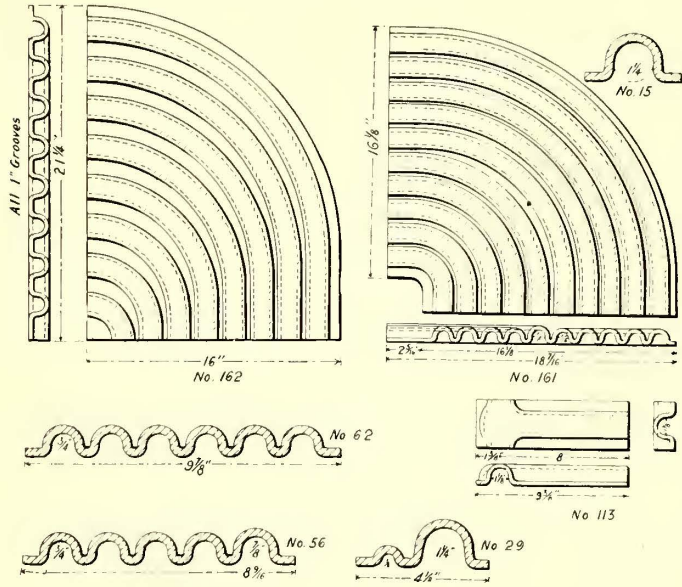
An important piece of special work is involved in the special metallic chutes through which the motor wiring is carried up into the controller

PLAN OF UNDERFRAMING FOR ONE OF THE RECONSTRUCTED BROOKLYN ELEVATED MOTOR CARS, SHOWING NEW ARRANGEMENT OF MOTOR AND CONTROL WIRING TO CONFORM WITH THE WESTINGHOUSE ELECTRO-PNEUMATIC SYSTEM OF CONTROL. DETAILS OF FIREPROOFING OF CAR-BODY APPEAR IN COMBINED SIDE VIEW AND SECTION





closet; these are made of galvanized iron, carefully fitted through the car floor and into the side of the closet, and are lined with similar fireproofing for the reception of wires. These were planned by J. L. Crouse, the representative of the Westinghouse Company, supervising the installation of the electrical apparatus. As may be noted from the detail drawing of the chutes, a side opening is made beneath the car to receive the eight wires coming from the motors, while be-



DETAILS OF THE SPECIAL MOULDED FORMS OF ELECTRO-BESTOS USED FOR SUPPORTING THE WIRES BENEATH THE CAR-BODY AND THEIR FIREPROOF INSULATION

neath this is another chute opening endwise to receive the twelve leads from the resistances and other portions of the car. This greatly simplifies the wiring and still preserves the much-desired fireproof feature. It is in this connection that a noticeable saving may be noted from the new arrangement provided for the location of the two motors on the car upon one truck, the other truck operating as a trailer; in this case the truck carrying two motors is located at the end of the car beneath the controller closet, and thus the motor leads which would otherwise require to be carried to the opposite end of the car, are rendered entirely unnecessary; the simplification of wiring thereby secured is of great importance.

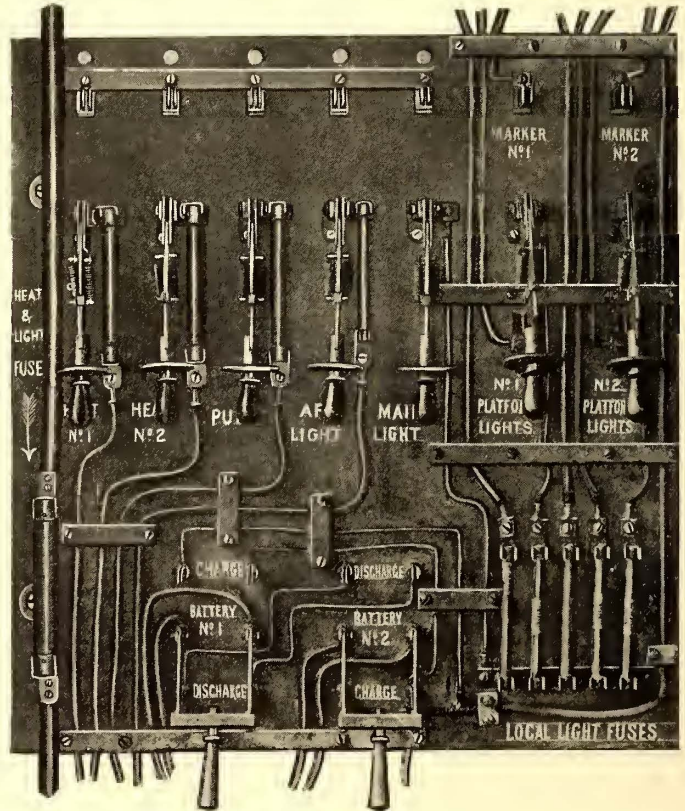
The work of fireproofing of the car wiring has also been carried into the controller closet and the motorman's cab as well as beneath the car. The controller closets are carefully lined with the fireproofing board, so that almost no combination of destructive arcing can set fire to the woodwork. An important feature has been introduced in connection with the rearrangement of the wiring in the installation in the motorman's cab at one end of each car of a power and lighting switchboard to control all the circuits used upon the entire car. This is a very convenient feature, as it brings all of the switches and fuses to one central point, where they may be easily gotten at and attended to. Furthermore, the fire risk is greatly reduced by centering all the wiring above the car floor at this one point, where it may be easily and adequately fire-proofed.

THE CAB SWITCHBOARD

The additional drawing which is presented to show this new arrangement of the motorman's cab, shows also the arrangement of the switchboard at the back of the cab, and also the provisions for fireproofing. As may be noted, the switchboard proper consists of a panel of Monson's slate 24 ins. high, 22 ins. wide and 1 1/4 ins. thick, which is mounted within the switchboard closet by a special frame work of angle-iron. This angle-iron serves also to provide a metal guard at all sides to

prevent wires from coming in contact with the woodwork. The door facing the switchboard is constructed of 3-16-in. steel plate, and the door frame at the sides is heavily covered by strips of transite. The space at the rear of the switchboard is lined with transite board for further protection, although no wires are carried to the rear of the switchboard, all connections being made at the front. Thus, in event of a fuse blowing, or even a possible short-circuit occurring at this point, the metallic and transite board protection will render a fire almost impossible. Similar precautions are made for the fireproofing of the wiring connections to the master controller in the cab, in the running of the wires to the controller through iron piping. The other details of construction of the cab do not, however, differ materially from former construction, the principal change being that of providing for the switchboard.

The importance of the switchboard as used in this connection makes its illustration of interest. The accompanying drawing shows the arrangement of switchboard and fuses to provide for all the circuits used in the car. As may be noted, the current supplied to the board is brought in at the lower left hand corner, where it passes first through a large 50-amp. enclosed fuse, labeled "main heat and light fuse." This delivers the current to a bus-bar extending across the top of the board to five single-throw switches, as shown. The first of these supply current to the two heater circuits; the third to the Christensen air compressor; the fourth to the arc headlight connections, and the fifth to the group of fuses and switches which control the light circuits. The lighting is divided up into five circuits, as shown, all of which circuits are provided with



THE NEW SPECIAL MOTOR-CAR SWITCHBOARD, LOCATED IN THE MOTORMAN'S CAB, FOR THE CONTROL OF ALL LIGHT, HEAT AND POWER CIRCUITS OF THE CAR

separate enclosed fuses. Three of these circuits operate the interior lighting of the car, while the other two supply the platform and marker lights. The latter are controlled by single-throw double-pole switches, as shown; when in the upper position the marker lights are operated while their lower position connects in the platform lights. The switches controlling the storage batteries, required to supply the current for the operation of the multiple-unit controller magnets, are located in the lower central portion of the board; two batteries are



used with the Westinghouse control, one being charged while the other is being discharged. To provide for this, each battery has a double-pole, double-throw switch, as shown; it has been conveniently arranged so that when these switches are in the upper position one battery is being charged and the other discharged, and vice versa when the handles are in their lower positions. As may be noted, all the wiring from the board is taken care of upon the front side, no wiring connections being made at the rear; this keeps all details in plain sight for facility

by displacing the swinging bracket support. The motorman's seat is 10¾ ins. x 14 ins. in size, and finished in cherry, without a cushion. Its location permits the motorman to lean out of the side window of the cab, and yet is such as to give a clear view through the front window. The larger main seat, as arranged for passengers, is 20 ins. x 24 ins. in size, and finished with a cushion of the rattan-covered type.

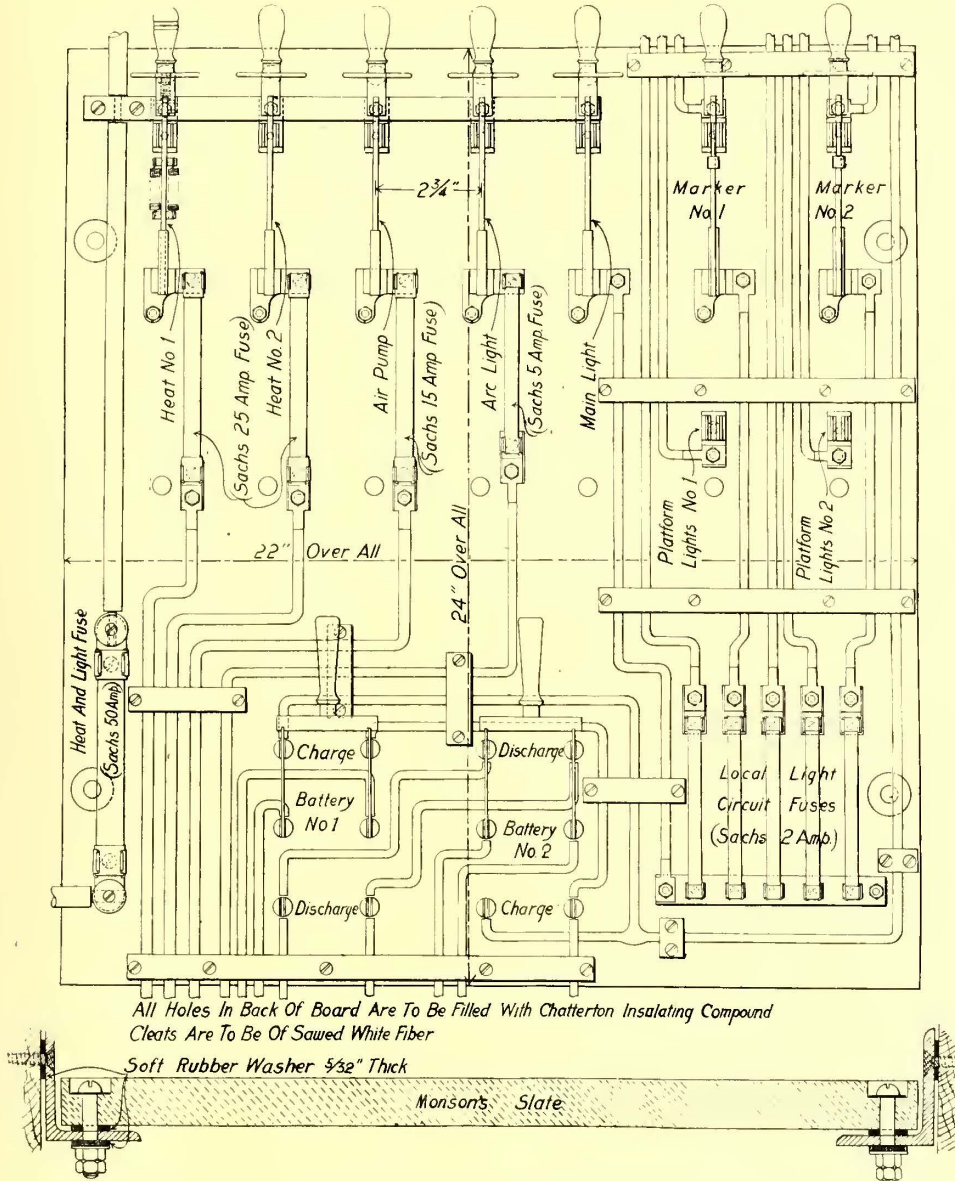
The mechanism of the seat may be readily understood from the drawing. The motorman's seat is hinged to the underside

of the large passenger seat, the former being used as a leg to support the latter when lowered for the use of passengers. When the cab is occupied by the motorman the passenger seat is raised to its upper folded position and locked there by means of a special locking device provided on the under front edge of the seat. The motorman's seat may be then lifted and held up by the swinging malleable iron bracket, as shown. This bracket is of strong construction, the members being of I-beam shape for the maximum rigidity. This interesting folding seat construction was designed by F. A. Overfield, general foreman of the East New York shops of the elevated divisions.

Another feature of the new cab arrangement is the provision of an electric heater for the comfort of the motorman, and also auxiliary apparatus which is of great value for emergency use. The electric heater is of the cab panel type of heater, supplied by the Consolidated Car Heating & Lighting Company, and sets in the woodwork flush with the surface. It is mounted in the panel in the rear side of the cab beneath the switchboard; as indicated in the cab drawing, and is connected in one of the main heater circuits of the car. The heater will add considerably to the comfort of the motorman in the winter operation, but this arrangement has the additional advantage, however, in that the provision of heat in the cab will be of material assistance in the satisfac-

tory operation of the motorman's air-brake valve; these valves are often found to give trouble when the lubricant used becomes chilled by extreme cold weather, and this provision of heat will tend to prevent troubles of such a nature.

The new standard auxiliary equipment, which is being applied to the cabs, consists of a wooden slipper, a paddle-shaped device of hard wood for lifting the third-rail shoe off the conductor rail in case of accident or necessity of repairs to the electrical equipment of the car, a separate link and pin for the Van Dorn automatic couplers, and an emergency third-rail-shoe fuse of a new type, which can be quickly and easily applied in case of blowing of the regular fuse, thus enabling the train to proceed without delay. The slipper is found invaluable in an emergency case of any sort, when it is desirable to lift the shoes out of contact with the third rail for positively cutting off the current supply; this may be done by means of the



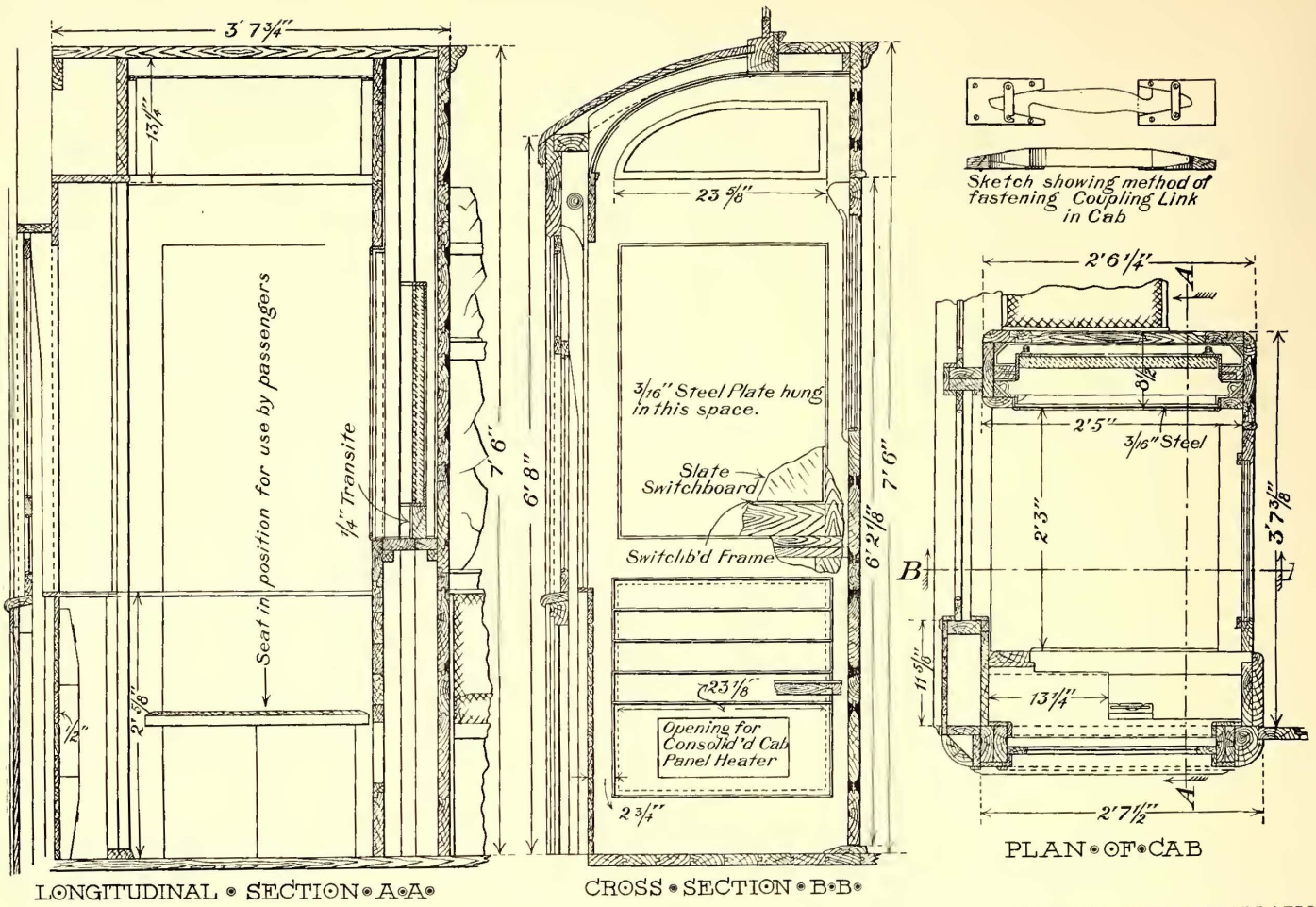
DETAILS OF THE SPECIAL CONSTRUCTION OF AND THE ARRANGEMENT OF SWITCHING APPARATUS AND FUSES UPON THE NEW CAB SWITCHBOARD

of inspection and repair. Furthermore, it may be noted that there is only one negative connection made upon the board, that being necessary for the storage battery connections; this negative wiring is carried down at the extreme right hand side of the board out of the way.

NEW CAB DETAILS

A very important change in cab detail is to be seen in the new style of folding motorman's seat which is being provided. This seat is of a type similar to that which has been adopted upon other elevated lines for this purpose, although it differs considerably in construction. As may be noted from the detail drawing, the seat may be arranged for the use of the motorman at a height of 31 ins. above the floor, or may be tipped down to a height of 16 ins. from the floor for the use of passengers when the compartment is not in use by the motorman. If the motorman should desire to stand his seat may be dropped down



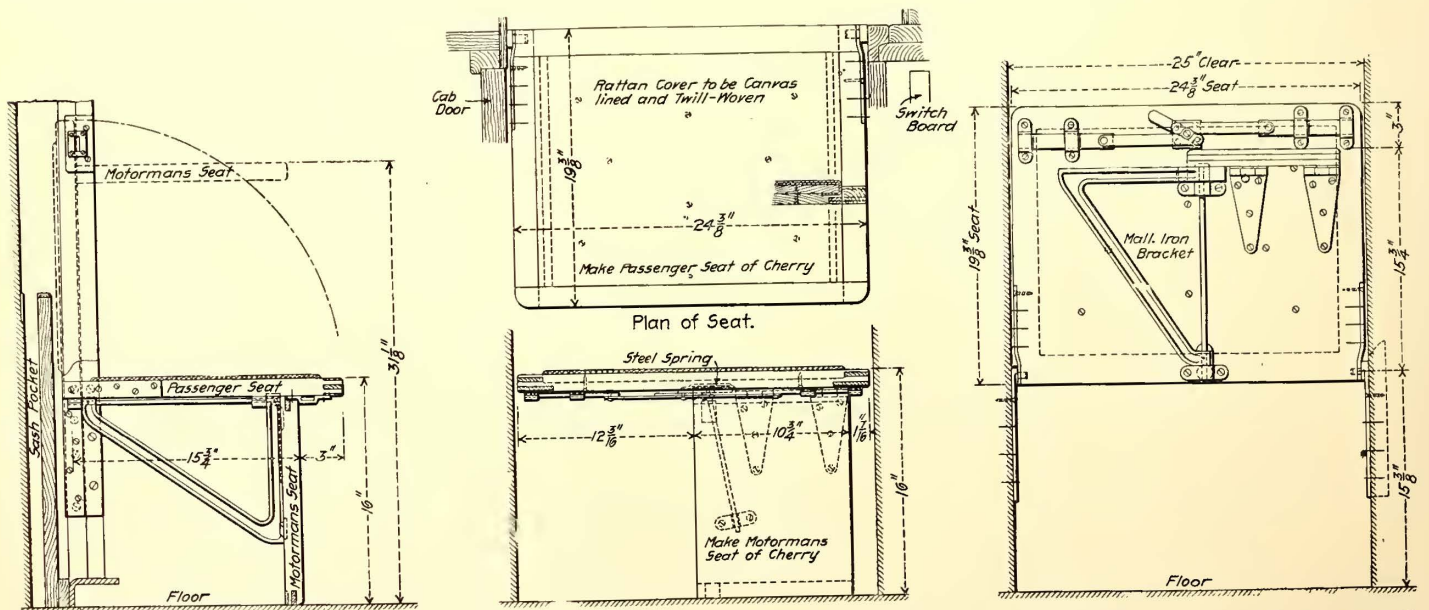


DETAILS OF THE NEW MOTORMAN'S CAB CONSTRUCTION, WHICH HAVE BEEN ADOPTED TO PROVIDE FOR THE INSTALLATION OF THE CAB SWITCHBOARD, THE CAB HEATER AND THE AUXILIARY CAB EQUIPMENT

slipper as easily as a trolley wheel may be pulled off of the trolley wire in surface operation.

The separate link and pin of the couplers is illustrated in position at the front side of the cab in the accompanying drawing of the cab. A special supporting bracket is provided to carry it, so that it may be easily and surely found when wanted. The emergency shoe fuse consists of two special connectors with insulated wooden handles, between which is connected an emergency main fuse; in case of the main shoe fuse blowing, this extra fuse may be connected in by clamping the special

connectors over the bolt heads upon the shoe-fuse blocks. This may be done with entire safety to the motorman, and also very quickly, and will enable the train to proceed without delay. Another new feature to be noted in the new cab is the change in the whistle piping and valve. A separate pipe was formerly run from the main air-brake reservoir beneath the car to either cab for the operation of the whistle, it being thought that to take air from the reservoir line in the cab would tend to cause brake applications. This has been found erroneous, however, and the whistles are now connected directly to the reservoir



DETAILS OF THE COMBINATION FOLDING SEAT FOR THE MOTORMAN'S CAB, ACCOMMODATING THE MOTORMAN IN ITS RAISED POSITION, AND PASSENGERS IN ITS LOWERED POSITION, WHEN CAB IS NOT IN USE

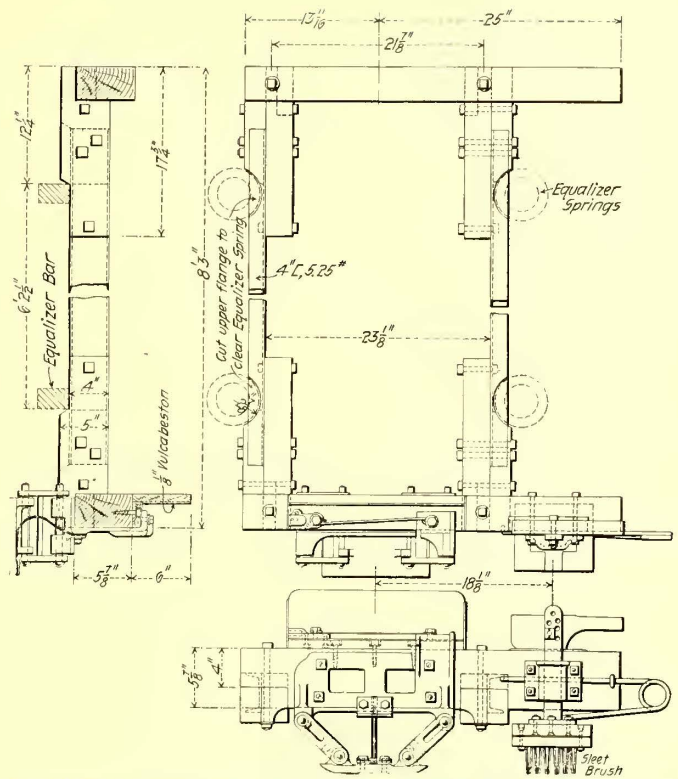


line just beneath the engineer's brake valve. The whistle valve cord has also been arranged more conveniently for the motorman, and may be manipulated without taking the hand off of the brake valve.

NEW SHOE SUPPORT

In this connection an interesting change in the third-rail shoe mounting is to be noted. The former construction provided for the carrying of the current from the shoe up through a heavy stranded cable to the shoe-fuse block, for the delivery of current to the car. The new construction, as shown in the accompanying detailed drawing, provides a steel casting of considerably different design from that formerly used, which is bolted to the wooden supporting bar in the usual manner for carrying the shoe. This casting has a lug projecting up above the supporting bar, which has a binding screw provided upon it to receive an end of the shoe fuse, this obviating the necessity of carrying a stranded conductor from the shoe up to the fuse block.

The type of sleet cutter used upon this system for removing ice from the third rail in winter is a steel brush, which, when in use, is held down upon the conductor rail with a spring pressure of about 75 lbs. The type of brush used is clearly shown in the engraving. The brush block is of hard maple, and is provided with sixteen rows of wire bristles, each row

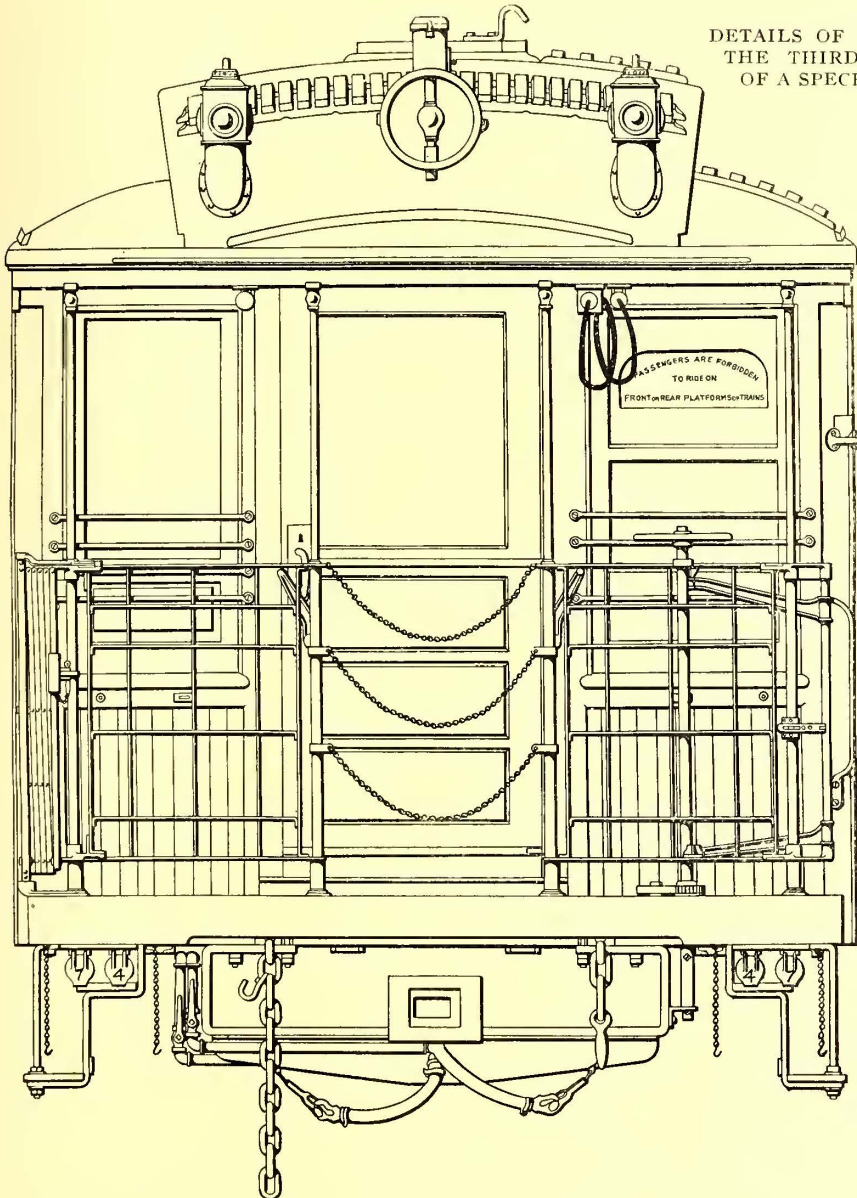


DETAILS OF THE NEW STYLE OF SUPPORTING FRAME FOR THE THIRD-RAIL CONTACT-SHOE, INVOLVING THE USE OF A SPECIAL SHOE-SUPPORT CASTING AND FUSE BLOCK

containing twelve sets. Each set of bristle consists of seven No. 23 B. & S. steel ribbons 1/8 in. wide. The brushes are operated upon the rail so that the bristles brush broad side against the rail surface. The brush is carefully insulated from the supporting guide bar by the hardwood and fibre separators. A special eccentric lifting handle is provided by which the brush may be lifted up and held out of position when it is not in use; by merely revolving this handle from vertical to horizontal, the brush is dropped upon the conductor rail and held there by the spring pressure.

STANDARD CAR ENDS

A standard car-end arrangement has been adopted for all motor and trail cars, this standard applying to the form and size of platforms, dimensions of hoods and arrangement of all apparatus, including the headlight, markers, gates, steps, air hose, safety chains, etc. A drawing is presented to illustrate this new standard arrangement. The hoods upon the various cars differ slightly, owing to the different types of roof construction upon the several builds of cars, but the markers are in all cases arranged to be located upon the front sloping edges of the hood by special cast brackets, as shown, the handle for the turning of which projects down through to the underside of the hood, so as to be easily operated from the platform. In addition to the ladder provided for ease of access to the top of the car for trolley-pole repairs, a safety grating has been provided for the protection of the hood in case the trolley pole jumps from the trolley, when the train is in surface operation, and rebounds from the span wire upon the roof. With the usual hood construction, a trolley pole is, in such a case,

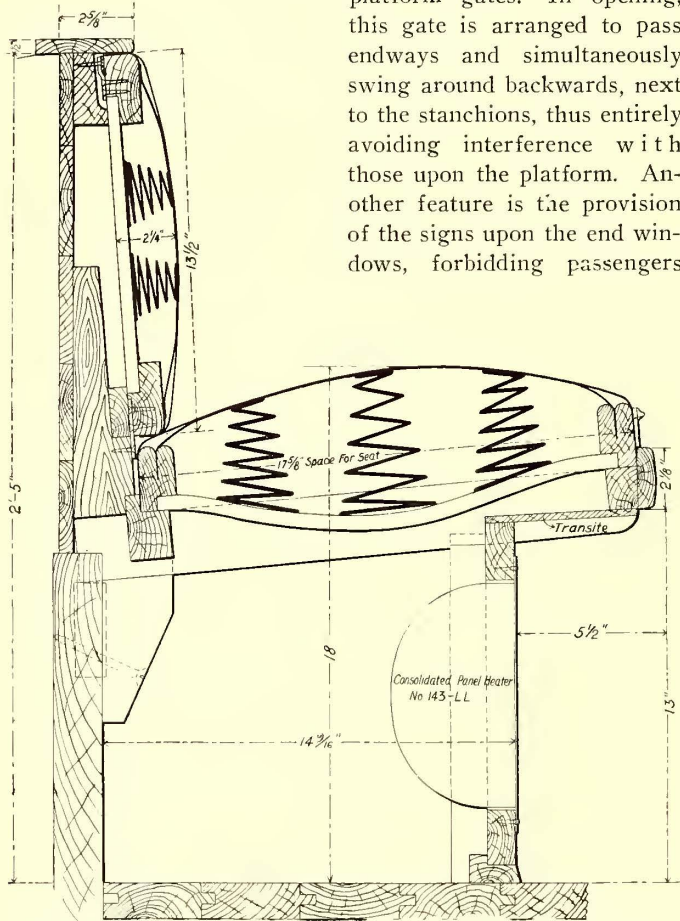


DRAWING OF THE NEW STANDARD END DETAIL ARRANGEMENT WHICH HAS BEEN ADOPTED FOR THE ELEVATED MOTOR AND TRAIL CARS OF THE BROOKLYN ELEVATED LINES



liable to strike hard enough to break through a roof, but here the special grate is provided to receive the blow of the trolley wheel in such a case.

The other features of the end construction are evident from the drawing. For all new work the new type of side gate, built by the Pitt Car Gate Company, New York, is being installed. This gate provides for the handling of large crowds upon the platform with far greater ease, and without the inconvenience of extreme crowding in closing, as met with the usual styles of platform gates. In opening, this gate is arranged to pass endways and simultaneously swing around backwards, next to the stanchions, thus entirely avoiding interference with those upon the platform. Another feature is the provision of the signs upon the end windows, forbidding passengers



DETAILS OF NEW LONGITUDINAL SEAT CONSTRUCTION, SHOWING NEW ARRANGEMENT OF HEATERS TO ELIMINATE DANGER TO CLOTHING OF PASSENGERS

standing upon the front or rear platforms of trains; this is applied upon the window glass by the sand-blast principle, in the form shown upon the left hand end window upon the drawing. The details of the platform construction and the arrangement of apparatus beneath have been referred to in connection with the new standard platforms; this drawing, however, shows the entire end arrangement in assembly.

INSIDE DETAILS

The standard inside end arrangement provides for a single sliding door of the type generally used in elevated cars. A novelty is here introduced, however, in the form of a new type of combined latch and door handle, embodying a type of spring lock which catches upon closing the door, but is easily unlocked without twisting or lifting or other complication, the mere act of pulling the handle to open the door unlatching the lock. This is the same type of door lock as is being applied on the new cars of the Rapid Transit Subway system in New York City. The door is of the three-panel type, with a 24-in. x 30-in. glass. End windows are provided in all cars.

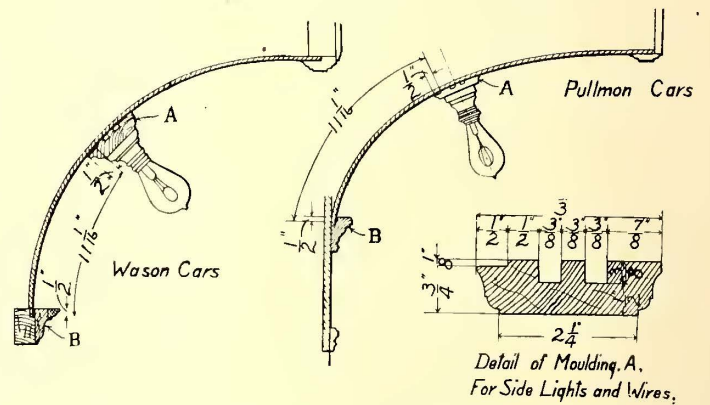
Another drawing shows the details of the new seat construction. Spring cushions are provided throughout for the backs and seats, the covering being of canvas-lined rattan. This rattan is painted white and finished with two coats of varnish, so that they may be easily washed and kept in a sanitary condition with the least amount of trouble. The use of

the white color in this connection results in a very bright and attractive appearance of the cars. This effect is strengthened by the use of white headlining in the monitor and sides of the car roofs, which is also painted white and varnished, and assists greatly in the diffusion of night lighting through the car.

The arrangement of the heaters under the car seats is also indicated in the above seat drawing. The heaters used are the panel type of the Consolidated Car Heating & Lighting Company, and the overhanging portion of the seat is protected from overheating by the use of a lining of transite board, as shown; a novel feature may here be noticed in the locating of the heater panels beneath the seats at a distance of 5 1/2 ins. behind the seat edge, this being done to provide an air space between the heaters and clothing, at all times, and thus prevent injury to passengers' garments. The new cars are being equipped with new window curtain fixtures of the Forsyth adjustable roller-tip type, supplied by the Curtain Supply Company, Chicago, Ill.

Another interesting detail is to be seen in the new arrangement of wiring moldings along the sides of the car roof, for carrying the advertising placards. Wiring moldings for carrying the lights in that portion of the car are milled specially, as shown in the detail sketch, to provide for holding the placards without the use of an additional molding. This greatly simplifies the interior construction of the car and adds to its appearance. It should also be noted that in the reconstructed cars the incandescent lighting is being arranged upon the single-outlet plan, all fixtures being done away with. This introduces the supreme advantage of the best possible distribution of light and produces an effect which is absolutely impossible with fixture arrangements. The cars are profusely lighted, five circuits of five 16-cp lamps each being used in every car.

Important safety precautions have been provided for emergency use. While there is little danger of fire being communi-



INTERESTING NEW TYPE OF LIGHT-WIRE MOULDING TO PROVIDE FOR THE ADVERTISING PLACARDS

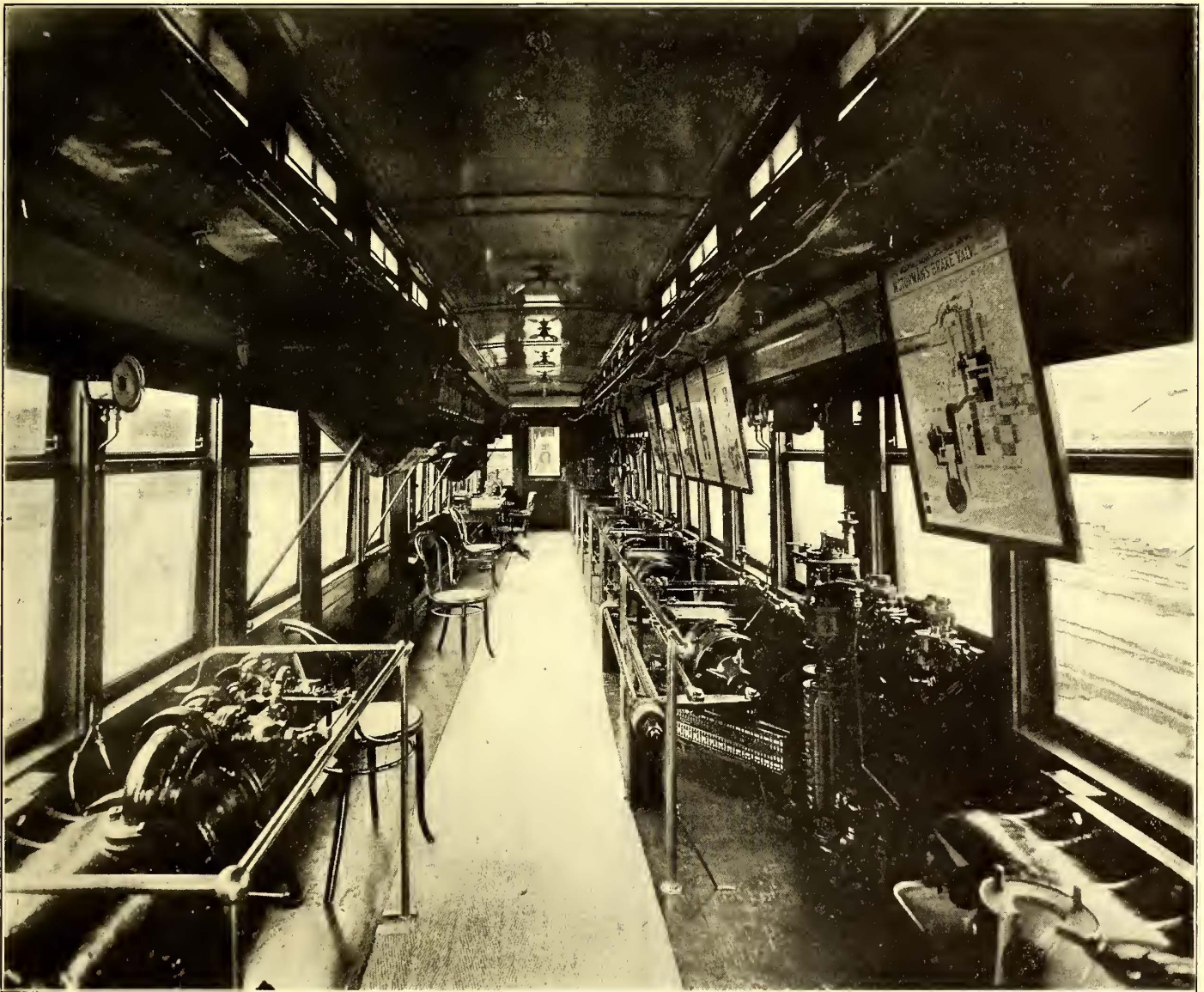
cated from the electrical apparatus to the car body, still it is thought advisable to provide for the most extreme case and be on the safe side, and accordingly chemical fire extinguishers are provided in every motor car upon the system. The extinguishers used are of the Fire Underwriter type, furnished by Knight & Thomas, Boston, Mass., and are neatly finished in polished brass, each being provided with a specially large instruction plate for directing its use in emergencies. This instruction plate, like the new door handles for the car doors, all bear the new monogram of the company, formed of the three letters, B, R and T, which has been adopted. The extinguisher is conveniently mounted upon a bracket at one end of the car, being secured in position merely by a strap, so that when needed it can be easily taken down. Furthermore, a system of inspection has been instituted for the periodical examination and testing of the extinguishers, in order that they may always be in good condition for immediate use.



Another provision has been made for the immediate stopping of a train in case of any danger. Two conductor's valves are inserted in the train line of the air-brake system, one at each end of the car inside, at diagonally opposite corners; cords of bright blue color are extended from each valve along the opposite sides of the car beneath the ventilator windows and out under the hood, so that within the car two cords are easily available, and also there is one extending out upon each platform. By the pulling of one of these cords the brakes are set under emergency application and will bring the train to a stop within two train lengths. This action is facilitated by the arrangement of the multiple-unit control system, which, it will

### INSTRUCTION CAR ON THE NEW YORK SUBWAY

The officers of the Interborough Rapid Transit Railway Company, of New York, have facing them a problem, in connection with the operating force for the Subway, which is probably without parallel in the history of railroading. This is the work of organizing and training a body of some 3000 men to the use of the train apparatus, so that when the Subway is opened the train force will be ready to perform their duties satisfactorily and safely. The situation in New York is such that it would probably be impossible to put the completed portion of the Subway in operation in sections as is usually done on new



INTERIOR OF INSTRUCTION CAR, SHOWING MASTER CONTROLLER IN FOREGROUND AT RIGHT, AND QUARTERED TRIPLE VALVE AT LEFT

be remembered, automatically shuts off the propulsion current supply to the motors when the brakes are applied. This system of safety-brake cords permits a passenger to stop the train in case of impending danger without waiting to communicate with the guard or motorman.

This journal is greatly indebted for the valuable information embodied in this article to R. C. Taylor, mechanical engineer, and W. G. Gove, assistant mechanical engineer, who have given every opportunity for the examination of the new work of reconstruction; to F. W. Butt, chief draughtsman, for valuable assistance in arranging the drawings; to R. A. Bowers, superintendent of the Thirty-Ninth Street Elevated shops, and to the Westinghouse Electric & Manufacturing Company for photographs and information.

systems. The population of New York has been awaiting a subway for so long that any attempt at the beginning to introduce a partial service, either in length of line or number of trains, would only produce excessive crowding at the stations and greater consequent evils than would follow the putting in operation of practically the complete system. The Interborough Company has decided, therefore, to begin without delay the breaking in of the entire force which will be required to operate its Subway cars next October.

Although the company also operates the Manhattan Elevated Railway in New York, the Subway train crews and those on the Elevated train service will be kept entirely distinct. The complications which would be introduced by attempting to draft any portion of the Subway force from the ranks of the

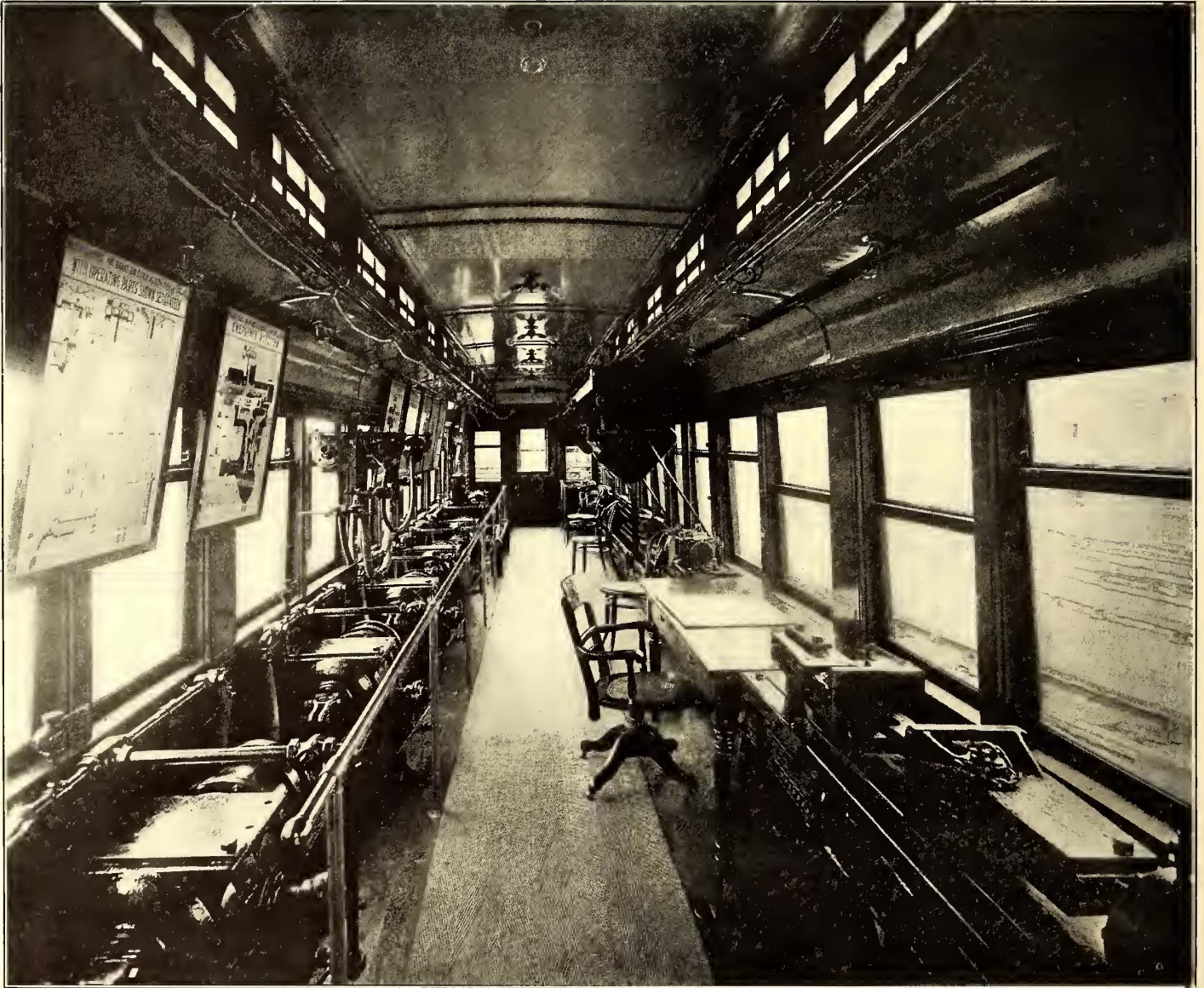


present elevated railway men, even temporarily, would be considerable. Such a plan would involve serious changes in the runs, seniority rank and other features of the elevated railway organization, which will be understood by every practical operating manager, besides depleting the efficiency of the elevated train service at a time when the best judgment would dictate that it be kept to its highest point, in order not to overcrowd the Subway more than was possible. The Interborough Company is therefore now recruiting its large force of motormen, conductors and guards, and is giving them the practical instruction in the operation of a train which will be required in the performance of their duties.

To accomplish this the management has not only designed a most complete set of instructions, but in addition has provided

and one devoted to a series of questions and answers as to how to detect causes for failure of train movement and the methods of removing them. In this connection it should be said that the management believes in instructing the motormen so that they are able to make minor repairs to both the air and electrical equipment on the road. This is because the volume of train movement on the line will be so large that a delay of even a few seconds, not to say of the longer time which would be required if inspectors or trouble-men were sent for, would seriously interfere with the successful operation of the line.

The course of instruction followed with the new men on the Subway is as follows: The school car instructor first gives each of the motormen a lesson to learn from the instruction book. When this is acquired the lesson is followed by various



A VIEW FROM OPPOSITE END OF INSTRUCTION CAR, SHOWING AUTOMATIC COUPLER AT RIGHT AND ROW OF BRAKE CYLINDERS ALONG LEFT-HAND SIDE OF CAR

a school car that contains all of the mechanical and electrical apparatus comprising the car equipment.

The motormen are first provided with an electrical and automatic air-brake instruction book that contains descriptions and illustrations of the principal apparatus on the motor cars, and also a list of questions and answers pertaining to train operation and what to do in emergencies. This book, which is probably the first of its kind ever published devoted to multiple-unit train operation and control, contains some fifty-two pages, besides illustrations, and is divided into three sections, viz: air-brake instructions, with a description of the air-brake apparatus; a similar section devoted to the electrical equipment,

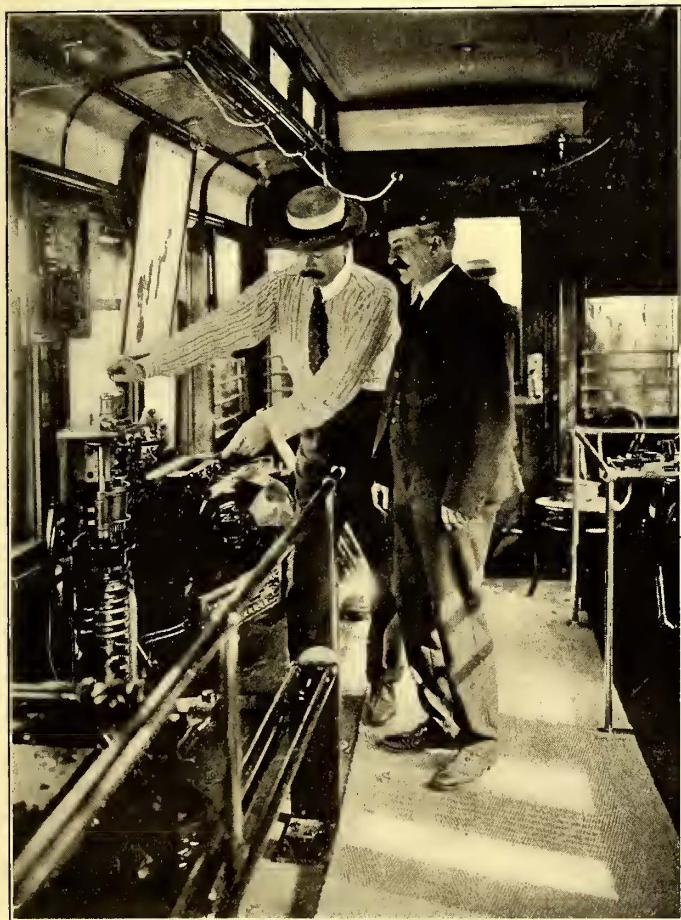
object lessons on the school car, thus affording each pupil ample opportunity to obtain sufficient knowledge of the apparatus before the final examination is made for promotion to the running or operating lessons on the trains. The successful motorman who passes the required examinations is then instructed by an assistant instructor in the actual movement of trains, and has to learn the road—that is, become familiar with the signal system, grades, curves and station stops before he is allowed actually to operate a train.

All train men are required to take a course in the school car pertaining to their respective positions before they are admitted to the running class, which means that they must be



thoroughly conversant with the rules and regulations and possess a practical knowledge of the car equipment before they are admitted to the next course or actual operation of the trains. This rigid course of training results in obtaining an unusually intelligent class of men, which is essential in the operation of a railway system. For motormen, former steam railroad engineers are preferred, as they are, of course, familiar with the air apparatus, and experience has shown that they learn the manipulation of the electrical apparatus quickly.

The school car, of which several views are presented herewith, is one of the original Subway cars, the "August Belmont," which was built some two years ago. Not being a standard at present on either the Subway or Elevated lines, it has been reconstructed for this purpose. It contains a complete equipment of all the apparatus that will be used upon the standard local and express trains in the Subway. A sample equipment of the electric controller system is installed inside of the car within easy access for examination while under operation. There is also at one side a complete equipment of the Westinghouse air-brake apparatus, five-car equipments being arranged in the car and accurately connected up so that they may be manipu-



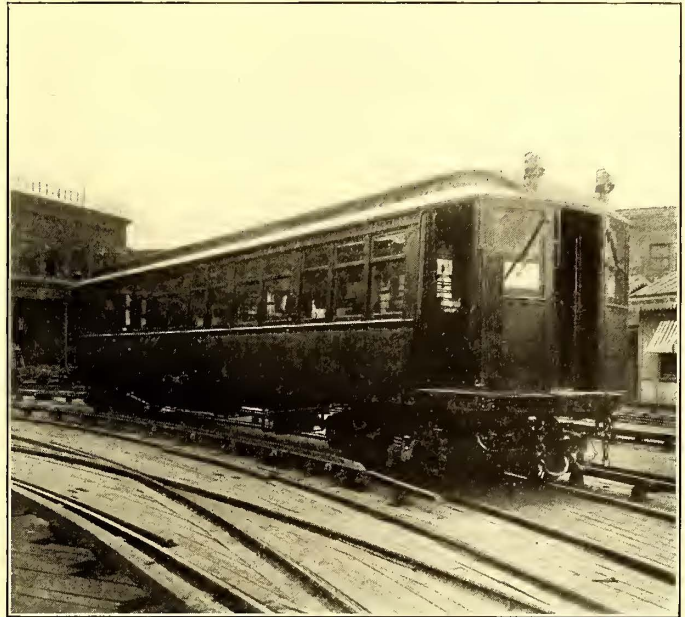
MASTER MECHANIC DOYLE INSTRUCTING PROSPECTIVE MOTORMAN ON THE OPERATION OF THE MASTER CONTROLLER

lated as under service conditions. The air-brake equipment consists of a motor-driven air compressor, a pump governor, a main reservoir, a main reservoir pipe, motorman's brake valve, two air gages, train pipe and the five-car equipments, which consist of auxiliary reservoirs, brake cylinders, triple valves, conductors' valves, with the necessary angle cocks, bleed cocks, cut-out cocks and hose and couplings.

The action of the air-brake equipment is made plain by quartered working models of the Westinghouse triple-valve, so arranged as to indicate in the open model the actual cycle of events in a brake application, as well as various framed and colored diagrams. Numerous air gages are provided to show

the resulting brake cylinder and reservoir pressures for various train line productions in braking.

The electrical equipment consists of a complete type "M" control system, comprising a master controller and the necessary apparatus accompanying the controller equipment, and also the necessary contactors, reverser, rheostats, circuit breaker, main switch and main fuse for one car. The action of the reverser and of the contactors is clearly shown by the com-



EXTERIOR OF INSTRUCTION CAR

plete mounting of controller apparatus upon the ceiling of the car, so that they may be approached in the same manner as if the student were beneath the car; the equipment is mounted inside of the car in the same relative positions which they occupy beneath the car, and are equipped with their regular outside cases.

In addition, this car has an open switchboard at one end, which indicates the standard arrangement of an electrical switching apparatus with which each motor car for the Subway is to be provided. At this board all lighting, heat and power circuits for the car are operated. Two knife switches control the lighting circuits, while two additional switches operate the heat circuits in various combinations. The main motor-current switch is also located upon this board, as well as also various fuses for that and the other circuits.

As some of the repairs have to be made on the road, the student, before being "passed," is obliged to make certain repairs to live apparatus. This teaches him how to disconnect certain portions without injury and gives familiarity with the operating conditions as they will be found in emergency work.

When it is considered that this immense system, the largest of its kind in the world, is to be in full operation within one hour and thirty minutes after the departure of the first train, carrying thousands of passengers promptly and safely to their destinations, one can best appreciate the enormity of this great undertaking and the value of the educational process now going on.

Two masked highwaymen held up car No. 204 on the new Portland Heights line, in Portland, Ore., at 11:15 o'clock a few nights ago, and secured from the conductor and motorman more than \$30 in cash. There were eight passengers on the car at the time, but they were not molested. One of the bandits shot twice at the conductor, who made an ineffectual attempt to prevent the robbery, but the bullets did not take effect. The robbery occurred at a dark point on the curve at the head of Carter Street.



## QUESTION BOX OF THE NEW YORK STATE STREET RAILWAY ASSOCIATION

One of the features of the Utica convention of the Street Railway Association of the State of New York, to be held Sept. 13-14, is a "question box." Sixty-seven questions were contributed by members of the association, and have been sent in printed form by the editor of the question box to all the members and a few others outside the association. In answering the questions, the association has suggested that the reply should not merely be "Yes" or "No," but the reasons also should be given, illustrated wherever possible by examples from actual practice. Photographs and line drawings necessary to make the meaning clear will be very acceptable. It is proposed to print the questions and answers received up to a short time before the meeting, giving an opportunity for general discussion on the topics at the Utica convention. The questions follow:

### CONSTRUCTION AND EQUIPMENT

#### POWER STATION CONSTRUCTION

1. What is the life of a good storage battery when well taken care of? Is a floating battery preferable to a booster installed in station? How much attention does a battery require?
2. Is the specific heat of superheated steam constant, and if not, what law will give the specific heat of superheated steam at various temperatures and pressures?
3. One company has in its power house one 800-kw, 550-volt, direct-current generator with compound fields. In the armature there are 800 coils and 800 commutator bars, 12 poles and 12 brush holders. Would like to know the proper connections to make to balance the magnetic circuits of this machine and size of wire necessary.

#### TRACK CONSTRUCTION

4. What type of rail has given the best satisfaction for city service in unimproved streets, and what troubles, if any, have been met with the 9-in. girder rail?
5. Cannot a limited number of standard rail heads be adopted for paved streets?
6. What rights has a railroad company in arranging drainage for its tracks? Where the company pays for paving between tracks and for a certain distance on each side, can it claim any jurisdiction in arranging grades for drainage?
7. Which is the better material for paving—Medina sandstone or granite block?
8. What type of rail joint has proven best in paved streets?
9. What is the best method for detecting broken bonds? Is the electrical drilling machine practicable?
10. What is the best type of bond—the compressed head or the pin head?

#### OVERHEAD LINE CONSTRUCTION

11. What wood is best adapted to stand the elements, and what paint; how many coats, and how often should same be painted?
12. Which is the better hanger—the mechanical or soldered clip?
13. What is the best method of spacing d. c. lightning arresters along the line?
14. How many lightning arresters to the mile in the best practice? Should more arresters be used in suburban than city lines?
15. Has it been observed that the presence of a high-voltage transmission line, running along the same right of way with the trolley, has a tendency to relieve the d. c. line from some of the lightning disturbances to which it would normally be subject?

#### POWER TRANSMISSION LINE CONSTRUCTION

16. Information is requested with regard to the use of aluminum for a. c. high-tension lines and for d. c. trolley feed-

ers; also for use bare in underground conduit as an auxiliary to the rail return.

17. What are the most efficient methods of jointing the main conductors and of attaching trolley taps to the main feeders?
18. What are the principal advantages and the disadvantages in the general use of aluminum for such purposes?
19. What is the maximum distance direct current can be advantageously transmitted for the operation of interurban cars?

#### SELECTION OF ROLLING STOCK

20. Have the semi-convertible cars given as good satisfaction for summer service as the open cars, and to what extent have double-truck cars replaced single-truck for strictly city service?
21. Has any practical type of power brake been developed to take the place of air brakes?
22. What is the difference in current consumption of two and four-motor equipments?
23. What is the best method of determining the life of motor parts?
24. What type of snow plow has given the best satisfaction for city streets?
25. Are electric heaters economical? What other system is more efficient and convenient?
26. Have any experiments been made, or any one had experience with hot-water heaters, and if so, what has been the difference in expense between them and electric heaters?
27. Viewed from the standpoint of maintenance, which is preferable: the split or solid gears?

#### BLOCK SIGNAL SYSTEM

28. Which is more reliable: automatic signals or those manipulated by hand?
29. Is there a satisfactory automatic block-signal system used that will take care of any number of cars passing through the same block?
30. Are telephonic train orders satisfactory?

### OPERATION

#### ACCIDENT DEPARTMENT

31. Where and when should derailing switches be used, excluding steam railroad crossings?
32. Give experience with accidents with derailing switches.
33. Have you used the premium system with your employees for avoiding accidents; if so, what percentage have the accidents been reduced?
34. Has not the practice of giving premiums to conductors and motormen for avoiding accidents made them careless in reporting slight accidents?
35. What is the best method of training employees to avoid accidents?

#### CAR HOUSES

36. What is the best design for a car house?

#### EMPLOYEES

37. What has been the benefit, if any, of forming an association among employees?
38. Can associations of employees be made sufficiently attractive to take the place of union organizations? Can a successful benefit fund be established by contributions from employees alone without assistance from the company? If so, would not such a fund be more appreciated by the men than one on which they had received assistance? Would not a written examination at the end of each year of all conductors and motormen employed during the year, somewhat in the nature of the competitive civil service examination, be the best method of determining seniority?
39. What is the best method of disciplining employees?



40. Give experience of the merit system in connection with discipline of employees.

41. Does the merit system entail extra office expense, and to what extent has it helped discipline?

42. Do all roads subject their intending employees to a physical examination?

43. What benefit or check has resulted in the securing of bonds from employees?

44. Should conductors furnish bonds, and if so, who should pay the premium?

#### FARES ON INTERURBAN RAILWAYS

45. What is the best method of collecting and accounting interurban fares?

46. Are there any data available to show the percentage of tickets used to tickets sold, and what is a fair per cent of shrinkage?

#### PARKS AND PLEASURE RESORTS

47. Is it better to operate all attractions at parks or to induce outsiders to put them in on a percentage basis? Are any pleasure parks self-sustaining, or can they be made so?

48. What is the most effective method of advertising, for the least expense?

#### REPAIR SHOPS

49. What is the proper test to give equipment before leaving the shop for service?

50. What is the best method of keeping shop records of cost of maintenance; bodies, trucks and motors?

51. Considerable trouble has been experienced with broken car axles from crystallization, especially during cold weather. The axles break either at the end of the key way or at the shoulder next to the journal bearing. We would like to know the cause; also, if salt water getting into a small check will cause it to spread or deepen. From the appearance of some of the breaks, those are the indications. Also would like to know which grade of steel is considered best for car axles.

52. Which is productive of the best results—pit work, or overhauling from above?

53. Is it best to overhaul equipment by mileage?

#### SNOW REMOVAL

54. What amount of snow can the city authorities demand removed?

55. What is the best form of organization of snow fighting forces?

#### TRAFFIC DEVELOPMENT

56. Has it proven beneficial in moderate sized cities to largely increase the number of cars during rush hours, over the ordinary times of day?

57. What has been found to be the best method of advertising to develop traffic?

58. What has been the experience with the use of trailers as regards accidents, and have they proven more satisfactory than the use of larger cars with no trailers?

59. Does not the use of trailers increase the number of derailments?

60. Should the extra list be a revolving one? (i. e., after an extra has had work, should he go to the bottom of the list and work up again?)

#### WHEELS—CHILLED IRON, STEEL TIRED, FUSED WHEELS AND SOLID STEEL

61. Would not the trouble, which was experienced by many roads during the past winter, of motors dragging on the ice, be eliminated by the use of 36-in. wheels?

62. What are the relative merits of steel and cast-iron wheels?

63. How does the life of cast-iron wheels compare with steel-tired, fused and solid steel wheels? Is not the cost of maintenance per mile in favor of the cast-iron wheel?

64. Is not a 550-lb. double-plate cast-iron wheel as safe to run under our modern interurban cars as the steel-tired wheels now being used?

65. What is the principal cause of wheels being flatted on air-brake interurban cars?

66. What are the causes, all of them, of flat wheels?

67. What weight and model of chilled car wheels, 33 ins. in diameter, are proper and safe for an 8-ton single-truck electric car for city service, and the probable life of the same?

### OHIO INTERURBANS DEVELOP THROUGH TRAFFIC

Several of the roads of Northern Ohio have adopted plans for stimulating through traffic from one road to another along lines brought out and discussed at recent meetings of the Ohio Interurban Railway Association. This is effected by the various roads advertising through connections and by one company selling through tickets to any point on a connecting line. The Cleveland & Southwestern Railway by this arrangement sells tickets to Toledo or points on the Lake Shore Electric Railway, passengers changing cars at Norwalk. Recently the Lake Shore Electric Railway sold tickets at Toledo for a party to Wooster, at the extreme end of the Cleveland & Southwestern Traction Company's line, being a distance of about 170 miles. The Toledo & Western Railway and the Detroit, Monroe & Toledo Short Line are in the arrangement, and tickets are now being sold through from Cleveland to Detroit, a distance of nearly 200 miles. As stated in these columns recently, the Lake Shore Electric Railway has a similar arrangement with the Clover Leaf (steam) road for business to St. Louis, and through this arrangement the other roads are also participating in the St. Louis business. One of the greatest advantages to the passenger is the through checking of baggage, which relieves the passengers of all annoyance at points of transfer.

The arrangement between the companies is a simple one. Each road supplies the others with its tariff sheets and time tables, and agrees to accept the tickets issued by the other company. The round-trip ticket issued is made up of various coupons, and is precisely similar in general appearance to the coupon strip tickets used on steam roads. It contains an agent's stub, which is detached by the agent, and the points of starting and destination are left blank and are filled in by the selling agent. Each road receives its regular fare and settlements are made each month. The tickets are now on sale by all the agents of the various roads. An effort will be made to interest other roads in this district, as the managers believe it will materially improve the service and make it appeal more strongly to the public. This plan, in connection with the interchangeable coupon books which will soon be issued by a number of Ohio roads, indicates that the lines in this district are strongly alive to the possibilities of through electric traffic, and that the physical connection of roads is opening up a new and promising source of revenue.

A step in advance of this plan for building up through traffic is that of operating through fast cars over two or more roads. As has already been outlined in these columns, the Western Ohio Railway and the Dayton & Troy Electric Railway have in operation an arrangement for through limited cars between Lima and Dayton, a distance of about 80 miles. There are four cars each way every day, and the schedule is two and one-half hours, the cars stopping only in the largest towns. Each company furnishes one car, and the crews run clear through, the crews being paid by each company in proportion to the time they are on the tracks of that company. The agreement between the two companies provides that each company shall be liable for accidents while the car is on its track, regardless of whose car or crew it may be. The crews are subject to the rules and regulations of the company on whose



tracks they are running, and it might be stated that the rules of the two companies in question differ in a number of points. The service has only been in operation about two months, and it is almost too early to determine whether it will materially swell the earnings of the two companies. The traffic on these cars has been excellent thus far, despite the fact that commercial travelers, for whose requirements the service was mainly designed, are not at present as numerous as they are during other seasons of the year. Baggage is carried on these trains at a cost of 25 cents per piece for the entire run from Lima to Dayton. Transferring of baggage to other roads in Dayton is made free of charge. The freedom from the necessity of transferring baggage at Piqua, the connecting point of the two roads, together with the high-speed service, which is claimed to be the fastest trolley service in the world for the distance, seem bound to create new business. When this service was instituted the parallel steam road threatened that if it was not withdrawn it would reduce its rates to below that of the electric lines and install additional trains. Thus far the steam road has not put on extra trains, but it has reduced its fare to within 5 cents of that of the electrics. On the other hand, the steam road has so altered its schedule as to give the electrics a decided advantage by reason of their frequent service and time of leaving terminals. The schedules over the two routes are practically the same, but if allowance is made for the fact that the electric cars take passengers from the center of one city and land them in the center of the other city, the electric service has an advantage in time, in addition to the freedom from dust, smoke and cinders.

Of late there has been considerable talk relative to the practicability of operating through fast service over the four electric roads between Erie, Pa., and Cleveland. The managers of the various properties were in favor of making the experiment, and a short time ago a number of gentlemen made a trip over the properties in Henry A. Everett's private car with a view to inspecting the roads and considering the possibilities of the plan. It was found that on one or two of the roads the bridge and devil strip clearances and the general condition of the track would not permit of the use of cars that would be suitable for such service. It was understood, however, that these physical obstacles were to be cleared up so that the question might be taken up later. However, there was another obstacle—namely, that the attorneys for the Everett-Moore syndicate had rendered an opinion that in case of accidents the liability would follow the car. In other words, it was thought that if a wreck occurred on another road the owner of the car would become equally liable with the company owning the road. Some of the companies concerned were unwilling to assume such a liability, and there the matter stands.

To obviate this point, Mr. Everett has been figuring on a plan which may be presented to the various roads. He suggests the formation of a car trust to operate the special cars, the same as is done by steam roads. Each company would pay in a certain amount toward the purchase of cars for the service. The cars would then be mortgaged under a special bond issue covering them. The cars would be operated over the various roads under a traffic agreement, and the earnings of the cars would apply on the bond issue mentioned, the surplus or profits to be divided among the companies interested. Thus, in case of accident, the car trust would be responsible. This is a mere outline of the plan, and the details have not yet been figured out. It seems probable, however, judging from the interest the roads in question have been displaying, that some arrangement for through traffic will be worked out over this route, or at any rate, part of this route.

Some of the roads radiating from Dayton are also selling through tickets to points on other roads. The Dayton & Troy Electric Railway and the Western Ohio Railway are selling tickets to all points on both lines, and they are advertising week-end excursions to all points on these lines. The tickets

are sold good going Saturday or Sunday and returning Monday, and give very low rates over a wide territory. The Dayton & Western Railway has an arrangement with connecting lines in Indiana whereby tickets are sold through from Dayton to Indianapolis and baggage is checked through.

### QUESTION BOX OF THE AMERICAN RAILWAY MECHANICAL & ELECTRICAL ASSOCIATION

The American Railway, Mechanical & Electrical Association, as already announced, is to have a "question box" at its St. Louis meeting. The questions are being mailed to the members, with the request that each one will reply to those in which he is especially interested, indicating the questions referred to by their numbers in this circular. All answers should be in the hands of the secretary by Sept. 1. Unless instructed to the contrary, the names of those making replies will be published. The questions appear below:

1. What is a "frequency changer" and how used?
2. Of what use is a "power factor" on a circuit?
3. What is a reasonable life for brooms on snow sweepers?
4. What is the best material for a gear case, cast-iron, steel or wood?
5. Is there any way of telling when a car axle is crystallized and unsafe?
6. What is the best method of preventing car-circuit breakers getting out of adjustment?
7. Can satisfactory results be obtained by using a 25-cycle machine for lighting purposes?
8. Which is the best material for car axles, common steel, cold rolled steel or forged iron?
9. What is the best water and heat-proof insulation and paint to use in winding field coils?
10. What results have you obtained with asbestos-covered wire for winding fields? Have you had any trouble from moisture?
11. Which is the better pinion for length of service, for noiseless running, and for wear on the gear—machine cut or hot pressed?
12. What head-linings for cars, other than veneered, are on the market, particularly something in which glue is not used, and which are both water and fireproof?
13. Some roads have motor inspectors out on the street, under the mechanical department. Does the benefit derived warrant the expense incurred, and in what way?
14. Which is preferable for lubricating motor bearings, oil or grease? How do they compare for cost?  
How can oil be substituted for grease in the standard grease boxes of the Westinghouse 12-A, G. E.-67, and G. E.-800 motors?
15. What are the relative costs of journal lubrication with regular grease, the Galena system, and the automatic oil lubricator?
16. What are the comparative merits of steel-tired and cast-iron wheels for interurban, suburban and ordinary city service?
17. Is it economical to grind cast-iron chilled car wheels with an emery grinder before they are put under a car? By so doing, is their life lengthened or shortened?
18. What has been your experience with rolled-steel wheels, as regards wear, after they have been turned down once?  
Can you explain why the flange on one wheel should wear to a square shoulder, while that on the other end of the axle retains its shape?
19. What is the exact mode of procedure in winding "fire-proof" fields that are to be filled with whiting, shellac, or other fire-resisting insulations?
20. When babbitt metal is run into an armature shell, in cooling it contracts and pulls away from the shell. By what means could the babbitt lining be made to fit the shell tight?



21. Armature bearing shells become loose in the motor frame. How can this be corrected in old motors, and could not street railway motors be so designed as to prevent it, or to take up the wear?

22. How can flashing or burning be prevented with the K-12 controller on cars equipped with four G. E.-1000 motors, 22-62 gearing, 600 volts on the line and a fast schedule; or any equipment where a heavy fast schedule has to be maintained?

23. What is the best method of testing an armature after re-winding?

In using the Conant instrument for testing motor fields, widely different readings are often obtained when a certain coil is tested in the motor, then removed and tested separately. How can such errors be avoided, and by what method can weak fields be positively located?

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### THE ELECTRIC RAILWAY TEST COMMISSION

BY CLOYD MARSHALL

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The work of the Electric Railway Test Commission has now progressed to such a point that it is possible to describe some details of work accomplished following the recommendations of the engineering committees. As previously announced, the plans embrace four main lines of investigation, namely: acceleration, braking, motor rating and train resistance. In carrying out this programme experiments are being performed upon a large number of cars supplied by the different companies interested in the tests. The full number of assistants, seventeen in all, and three superintendents are conducting at the same time several series of tests. One corps, under the direction of Prof. H. T. Plumb, and with the co-operation of the St. Louis Transit Company, has completed a successful investigation of one of the storage air-compressing plants installed for this company by the Ingersoll-Sergeant and Westinghouse Traction Brake Company. Measurements were made to determine the energy consumption in compressing a given amount of air, the efficiency of the cooling system, the thermodynamic losses, the amount of air consumed by each car on the line per stop, and the various losses throughout the system from the electric motor to the air-brake cylinders. The report of this test is now being prepared, and interesting and practical conclusions are sure to be reached. This test is the first in a series, the purpose of which is to put at the disposal of the operating railways of the country all information obtainable in regard to the operation of air brakes for electric railways. The same corps of observers is now making an exhaustive series of measurements to determine the amount of air used per stop under different conditions of track and service by different motormen. They are also determining the efficiency of a motor-driven compressor equipment supplied for these tests by the National Electric Company. This car will be operated in regular service exactly similar to that of the cars furnished with the storage outfit. The St. Louis Transit Company has also placed at the disposal of the commission the necessary facilities for determining the service capacities of the motors used by them, and these tests are now well under way.

A second body of assistants in charge of Prof. B. V. Swenson has had under way practically all summer an interesting and practical series of measurements of the voltage drop and power loss in steel rails carrying alternating current. Through the courtesy of the Bullock Electric & Manufacturing Company, the mechanical and electrical department of the Exposition, the Jessop Steel Company and the Laclede Gas Light Company, it has been possible to test rails, bars and pipe with frequencies varying between 10 and 60 cycles per second, with currents up to 600 amps. This work has been remarkably suc-

cessful, in spite of enormous difficulties in measuring the very small drop in pressure which occurs at low frequency and small current density. Through the unfailing courtesy of the members of the staff of the National Bureau of Standards, the best possible facilities in the way of calibration and the loan of special apparatus have been afforded. A neat sign giving the details of the tests under way enables the visitors to the Bullock space in the Palace of Electricity to follow the progress of the work. The results of this series will be supplemented by measurements of the impedance of the special test tracks. The same corps of assistants has been determining the efficiency and power of the Hunt storage-battery locomotive exhibited by the C. W. Hunt Company in the court of the Palace of Electricity. A specially-constructed oil dynamometer reading up to 8000 lbs. has been used for determining the draw-bar pull upon a fixed anchor and upon loaded cars.

The work upon the test track is in charge of Prof. H. H. Norris, who, with a corps of assistants, has made extensive preparations for a number of special car tests. The Wesco Supply Company has equipped the track with overhead construction of handsome and substantial design. The steel poles are firmly set 6 ft. deep in concrete, and these carry substantial brackets, ornamented with neat and unobtrusive iron scroll work. A cast-iron cap surmounts the whole. The trolley wire and bonds for the track were supplied by the American Steel & Wire Company through its St. Louis office. The latter company has also manufactured for the commission a special number 0000 duplex lead-covered cable for the purpose of connecting the test track with the rotary convertor in the Bullock exhibit, a distance of nearly 3000 ft. from the track.

An important series of tests is now being conducted upon these tracks. Experiments are being made upon a car exhibited by the Westinghouse Traction Brake Company and the St. Louis Car Company. The car is equipped with Westinghouse motors of 50-hp each, and also with hand brake and with the Westinghouse magnetic track brake. The car is being operated upon a series of regular schedules designed to duplicate all service conditions under which it would be used in practice. The readings which are being taken will furnish data for showing the variation in the motor capacity with different time-speed curves, the efficiency of the magnetic brake as compared with the hand brake, the energy consumption with different rates of acceleration, and with the application of the brakes at different speeds. It is also in the plans for this work to determine the adhesion between wheels and track, with different conditions of the latter, such as dry, wet, sandy and dusty. The light car just described, which is designed for city and suburban service, will furnish facilities for a complete set of car tests, differing only in details from those which would be made upon any car to determine its fitness for the conditions under which it is designed to run.

It is not intended by the commission to conduct tests upon train resistance upon the Exposition grounds. With the assistance of the Union Traction Company of Indiana, these tests will begin in a few days, or as soon as conditions at St. Louis will permit the separation of the testing corps into two sections. In accordance with the recommendations of the engineering committees, the power consumption in single cars and trains will be measured at different speeds up to the limit of the cars and track. In addition to this the commission has prepared designs for the apparatus for separating the components of train resistance by actual measurement. A number of important companies have volunteered to supply apparatus for these tests, which will be conducted after the conclusion of the others now under way.

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The Consolidated Railway Company, of New Haven, Conn., has just ordered thirty new cars.



**A NEW MATERIAL FOR THE INSULATION AND FIRE-PROOFING OF ELECTRIC CARS**

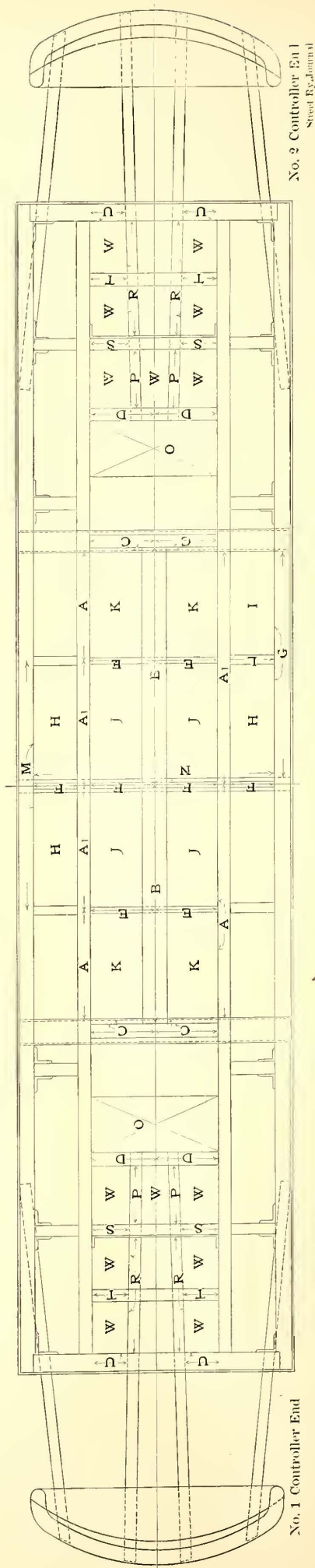
One of the most noticeable developments in electric railway work during the past two or three years is the growing tendency toward the use of fireproof insulation on cars. This step was first thought necessary in underground work, but is gradually becoming common in elevated railway service, and is now being adopted on surface cars as protection against explosions and fire panics constantly being reported, and also in order to comply as nearly as practicable to the recent recommendations of the Board of Underwriters, which require underframes to be covered with a fireproof insulating material.

A new material for this purpose has recently been brought out by the Keasbey & Mattison Company, in two different compositions, one based upon asbestos and the other upon magnesia. The former, which has been named asbestos building lumber, is composed of asbestos fibre, each fibre being coated with a cement, and these coated fibres then properly united by a peculiar process, giving the resulting material a fibre-like construction, which adds incalculably to its strength. The other material, in which magnesium silicate is used, has been termed magnesia building lumber, the natural fibres of magnesium silicate being felted together and thoroughly cemented by the use of an artificially created magnesium silicate, crystallized within and around the natural fireproof fibres employed in making the felt. Under great pressure, both materials can be molded to any shape, but for general use are made up in boards or panels of standard sizes, which may be sawed or cut to meet requirements. The materials are not breakable like slate, nor are they brittle, being capable of receiving very severe shocks and very rough treatment without breaking. They partake somewhat of the nature of slate or stone, however, in that when hammered they emit a sonorous sound like earthenware. The natural color of the asbestos lumber is of a slate gray, while the magnesia lumber is of a very light gray, although in process of manufacture they can be made any color.

A number of important tests have been made of this new material, perhaps the most important by Prof. G. F. Sever, of Columbia University. The object was to determine the principal characteristics of the two materials, of which the most important are as follows: the electrical resistance, the break-down voltage, the effect produced by the heat of an arc, the capacity for absorbing moisture, the structural strength, and the susceptibility of sawing and nailing. The material was tested in three thicknesses for both materials, viz: 1/8-in., 1/4-in. and 1/2-in.

The tests for electrical resistance were made at 550 volts, and showed, for the 1/8-in. asbestos lumber, an insulation resistance per inch of thickness of from .97 megohms up to 2.3 megohms; for the 1/4-in., from .2 megohms up to 1.2 megohms, while in the 1/2-in. thickness the insulation resistance ranged from .8 megohms to 1.5 megohms per inch of thickness. The magnesia lumber showed even more favorable results—that is, for the 1/8-in. thickness from 1.3 megohms up to 8.7 megohms; in the 1/4-in. thickness, from 1.05 megohms up to 4.1 megohms, and in the 1/2-in. thickness, from 1.9 megohms to 3.5 megohms, due probably to the greater resisting qualities of magnesium silicate over that of cement. The specimens tested were 6 ins. x 6 ins.

The break-down-voltage test was made upon specimens of both materials dried five hours at 150 degs. F., and also upon specimens which had not been dried. In the asbestos lumber the results showed break-down voltages ranging from 7000 to 21,000 volts per inch of thickness of the material, while, when undried, the break-down voltage required ranged from 3700 up to 12,000 volts per inch of thickness. In the magnesia lumber the difference between the undried and dried specimens was practically the same. In the thoroughly dried magnesia lumber,



PLAN OF DOUBLE-TRUCK CAR FOR NEW YORK CITY RAILWAY COMPANY, SHOWING FIREPROOFING OF FLOOR

**PARTS OF CAR TO BE COVERED WITH INSULATING MATERIAL.**—Bottom and inner side of three stringers corresponding to A. stringers A1 being covered on both sides and bottom. Bottom and both sides of two stringers B. The inner side of four cross-pieces C. Bottom and both sides of four cross-pieces D. Bottom and both sides of four cross-pieces E. Both sides of four cross-pieces F. Bottom of four sections J. Bottom of sections K. Bottom of sections H. Bottom of section I. The inner side of stringer G. Bottom and both sides of cross-piece L. Bottom of sections W. Bottom of circuit-breaker blocks, to which circuit-breakers are bolted. The inner side of stringer M. Top, bottom and both sides of cross-piece N. Top and both sides of stringers P. Top and outer side of stringers R. Bottom and both sides of stringers S. Bottom and both sides of cross-pieces T. The inner side of cross-pieces U. Bottom of sections O.



the break-down voltage varied from 9000 to 30,000 volts per inch of thickness, while, when undried, it ranged from 4800 up to 15,000 volts per inch of thickness.

In the heat test the specimens were subjected to the heat of a 500-watt arc light for a period of twenty seconds. The surface of both the asbestos and magnesia after the test indicated a destruction of the fibrous material, which rendered that portion where the arc was applied brittle and easily broken. From this it would appear that the large arcs have a destructive effect upon the materials, although when subjected to a small and definite arc, there are no radiating cracks from the point of application. The results of these tests were very much the same, although it was concluded that the asbestos was somewhat the better material when considered as a fire resistant.

The absorption tests tend to indicate that both materials absorb a certain amount of moisture, the magnesia lumber showing the greater tendency in this direction on account of its structure. The highest absorption that could be obtained with the asbestos lumber was an increase in weight of from 16 per cent to 21 per cent after soaking in water for forty-eight hours, while the magnesia lumber absorptions ranging from 25 per cent to 38 per cent were obtained. In either case, however, the material proved capable of being dried out to practically its original weight; in some cases, however, in the magnesia lumber there was a showing of an increase after such treatment of from .1 per cent to 3 per cent increase over it in weight. From this it would again appear that the asbestos lumber, while not so high in insulation resistance as compared with magnesia building lumber when perfectly dry, is the better material for use under car bodies, and in other places where moisture is liable to be present. It is obvious, of course, that to prevent absolutely the absorption of moisture by both of these materials, it is quite essential that they be painted with moisture repellent paint, but, as there appears to be no paint which is absolutely fireproof, and since the percentage of moisture absorption is so small and is attended by no deterioration in the material after drying, it can be used in many cases without any finish.

The magnesia lumber lends itself much more readily to being worked with ordinary tools such as saws, drills, etc., than does the asbestos; furthermore, the magnesia lumber permits the driving of nails through it with great facility. Wire nails can be readily driven in the asbestos lumber in thicknesses not over  $\frac{1}{4}$  in., as shown particularly in the use of the lumber "Century" asbestos shingle,  $\frac{3}{8}$ -in. thick, in roofing and framing of buildings, their most recent applications being the roofs of the Hotel Bingham in Philadelphia and the Keasbey & Mattison Company's factory buildings at Ambler, Pa. When subjected to a vibratory test in the nature of rapid hammering, the asbestos lumber appeared much more capable of withstanding heavy blows and hard usage. The magnesia lumber proved liable to split if a series of blows or a sudden shock occurred near the edge. It proved very difficult to damage the asbestos lumber by the most severe treatment; as a result of the tests, it was seen to not indent easily, and under the treatment given it did not break. Metal-working tools should be employed in cutting or sawing the asbestos building lumber, under which circumstances the material is readily handled.

As a result of these tests, Prof. Sever concluded that of the two, the asbestos lumber possesses better mechanical properties than the magnesia, although the latter is a better electrical insulator than the asbestos, when dry. The asbestos lumber, however, stands higher as a heat-resisting material and an arc-resisting material than the magnesia lumber. Both of these materials, when covered by a paint capable of preventing the entrance of moisture, and which is not in itself of a fire-conducting nature, will prove acceptable as electrical insulators. He found that this treatment of applying the fireproof paint would be quite essential in cases where potentials of over 500

volts are to be placed in close proximity to the materials.

A series of fire tests of the asbestos lumber was also made by Prof. Ira H. Woolson, E. M., of Columbia University. As the result of these and of other fire tests which their Chicago laboratories have made, the National and New York Boards of Fire Underwriters have recently signified their acceptance of the materials for use under their specifications. The Boards have also declared their approval of the use of this material as an insulator, etc., for the protection of car bodies against electric arcs, specifying merely that, in order to obtain structural strength required under such severe conditions, the material be used in the  $\frac{1}{4}$ -in. thickness.

Important tests of the asbestos lumber for strength have also been made by Prof. Woolson, which indicate that this material compares favorably in strength with ordinary white pine, and results are such as to warrant its use in places where it would be subjected to hard usage.

One of the chief uses to which the material seems well adapted is for insulating and fireproofing the lower parts of the cars. The New York City Railway Company is using it for this purpose on a large order of new double-truck cars which are being built. The under-framing will be very carefully protected in this way, so that derangements to the electrical apparatus cannot result in fire in the car. This company is also putting the asbestos lumber to an important use for the protection of its circuit breakers; the breakers are housed in compact and neatly arranged boxes, built entirely of this material, and conveniently located beneath the car. The use of asbestos lumber permits any possible destructive arcing to occur at that point without damage or starting a fire in the car framing.

The Interborough Rapid Transit Company is also using the asbestos lumber for protecting the bases of the third rail in the subway, where the rail comes within 3 ins. of the metal structure, the object being to prevent any arc passing over. The lumber for this purpose is painted with moisture-proof, insulating paint, and is clamped on to the base of the rail. They are also using it for panels in oil-switch and bus-bar compartment doors and for cable-flue partitions in their main power station and sub-stations, besides using it on their new steel cars under the buffer platforms for protection and special insulation of the cable coupling and the motor leads under the car, and also for protecting and boxing the car switchboard in the motorman's cab. The General Electric Company is using the asbestos building lumber extensively for finger shields, arc deflectors, barriers, panels, hot-air ovens, linings and under-floorings. The Brooklyn Rapid Transit Company has just decided to install the asbestos building lumber on twenty new cars just ordered for the bridge service. The specifications of these twenty cars provide that the underflooring is to be covered with asbestos building lumber of not less than  $\frac{1}{4}$ -in. thickness, as is provided in the specifications of the cars of the New York City Railway Company. The Montreal Street Railway Company has also recently specified the material for some new cars now being built by the J. G. Brill Company and the Niles Manufacturing Company.

That its uses in the electrical field are manifold goes without saying, and the development of these materials, through several years of experiment, has proven an important departure upon the part of the Keasbey & Mattison Company, which is to be congratulated upon the perfection of so greatly needed a material. This company is now prepared to furnish either the asbestos or magnesia lumber in standard sizes of board, 42 ins. x 48 ins., and in special lengths up to 100 ins., in any thickness up to 1-in. It is also prepared to furnish the materials cut to any shape. The firm of Wendell & MacDuffie, 26 Cortlandt Street, New York, has been appointed sole agents for the introduction of this material in the electric railway and general electric field.



## ONE CAUSE OF THE BURNING OUT OF MOTORS

BY W. G. PRICE

It is supposed to be impossible for a man to lift himself over a hill by pulling on his boot-straps, yet electric motors accomplish very nearly a similar result with the added load of a street car. They do this many times a day for many days in the year before they fail, and the designers of motors deserve great credit for having produced such efficient machines. The motor pushes the car by rolling the wheel ahead so that some part of the truck connected to the wheel is pushed by it. It was, of course, the intention of truck designers that the truck and car should be pushed through the axle journal bearings, where the friction and resultant loss of power would be a minimum, but in many cars this result is not accomplished.

By an inspection of most of the trucks in service to-day it will be found that when the motor rolls the wheel ahead the journal box can move from  $\frac{1}{8}$  in. to  $\frac{1}{2}$  in. forward in the

has thus to furnish 120 units of force where 100 units should be sufficient. The investor in street railway securities has not only to pay for the extra cost of the plant required to run such cars, but also for the coal and the brake shoes and car wheel wear and burnt-out motors. When the car is stopped by the application of the brakes the wheels are forced apart and the shoes will then be found to be perfectly loose, so that the cause of a car running slow, or the excessive heating of the motors on long grades may not be suspected.

Of course, the remedy is to reduce this lost motion to a minimum by a better construction of the trucks. By machine finishing the sides of the journal bearings and the inside of the journal boxes, this part of the lost motion can be reduced to at least 1-32 in. By adopting the equalizer bar type of truck the effect of lost motion between the boxes and pedestals will be eliminated as the boxes are held a fixed distance apart. Trucks which do not have their journal boxes connected by an equalizer bar could be made efficient except for a very close shoe adjustment by machine finishing the boxes and pedestals, but the



NEW PRIVATE CAR FOR MILWAUKEE

pedestal jaws, and that the journal bearing can move from  $\frac{1}{8}$  in. to  $\frac{3}{8}$  in. forward inside of the journal box, making a total movement of from  $\frac{1}{4}$  in. to  $\frac{7}{8}$  in., and owing to the rapid wear of the journal boxes and pedestals this movement is becoming greater. If we had no brakes on these cars we would care nothing about this movement, as there would be no loss of power, but good quick-acting brakes are a necessity. To permit a brake to act quickly the shoes must be adjusted close to the wheel, and if we get down in the pit with the brakeman we will find that he adjusts the shoes to not over  $\frac{1}{8}$  in. from the wheels, and in many cases to within 1-16 in. of the wheels. Of course, previous to this work of shoe adjustment, the car has been stopped by the application of the brakes so that the wheels have been spread apart by the movement of the journal bearings in the boxes and of the boxes in the pedestals.

When the car is being rapidly accelerated, or when it is being pushed up a grade, the rear wheels in each truck move forward, owing to this loss of motion, until these wheels press against the shoes, and then, as the shoes are rigidly connected, the rear wheels move the shoes until the forward shoes press against the forward wheels. Thus the motors in pushing the car act also to brake all the wheels of the car. The coefficient of friction between the shoes and the wheels is probably not less than 20 per cent, so that for every 100 foot-pounds of force exerted by the motors to push the car along 20 foot-pounds are consumed in brake-shoe friction. The power house

rapid wear of these parts, due to the friction between them when forced together by the application of the brakes, would soon increase the lost motion, so that the motor would then again be doing the aforesaid difficult stunt.

### JOHN I. BEGGS' PRIVATE CAR, "MILWAUKEE"

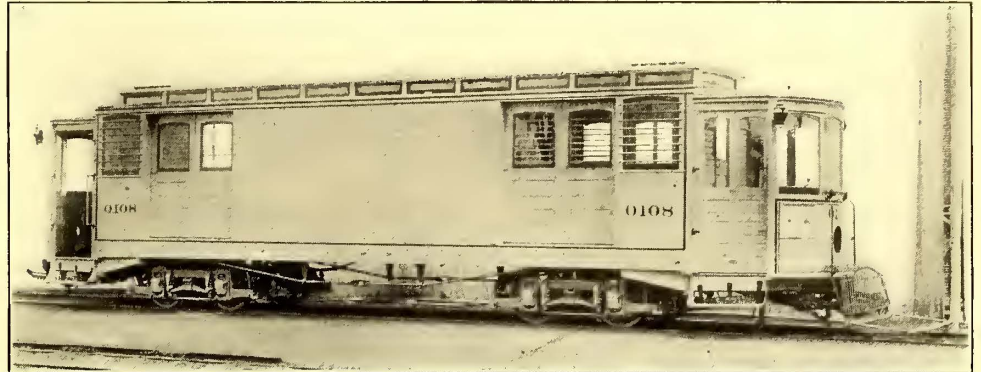
Mention has been made before in these columns of the private car being constructed by the St. Louis Car Company for President and General Manager John I. Beggs, of the Milwaukee Electric Railway & Light Company. This car has now been completed and is on exhibition in the Transportation Building at the Louisiana Purchase Exposition. It is undoubtedly the most costly private car ever built for use on electric railways. The accompanying engraving is from a photograph of the exterior of this car. The interior is so divided into compartments that photographs giving an adequate idea of the interior cannot be obtained. There is an observation compartment on the right side of each end of the car, the left side being occupied by a motorman's cab. Each of these observation rooms has an upper and lower berth, and a typewriter desk is located in one compartment. These observation compartments are finished in East India vermillion wood, with marquetry inlay lines. The dining room, which is situated in the center, is beautifully finished in Philippine rosewood, with mar-



quetry inlay lines. In the dining room is a sideboard and a fireplace. The table is circular, with chairs of special design. A double refrigerator extends from the dining room into the kitchen. The kitchen is finished in quarter-sawed oak, which is provided with a range and linen lockers, besides the refrigerator above mentioned. Handsome silver lockers are provided in the dining room. Besides the observation compartment, dining room and kitchen, there are two other compartments, one of which is finished in Hungarian ash, and is provided with a sofa, upper and lower berth, dressing case and folding washstand. The finish in the other compartments is in prima vera. This compartment has a writing desk and folding bed, which folds up in a cabinet under a book case. The toilet room is finished in zebra wood. The passageways are all finished in vermilion. The ceilings are full empire, decorated to harmonize with the finish of each room. The lower window sashes are filled with polished plate glass and arranged to drop into side pockets. The upper sash is gothic form, with art glass that is stationary. The ventilator sashes are filled with art glass. The interior lighting is by incandescent clusters, covered with Holophane globes. The car is mounted on St. Louis 23-E trucks, with four G.E.-74 motors, with type M multiple-unit control and Christensen air brakes. Both electric and hot-water heaters are provided, the hot-water heater being of Peter Smith make. The car is made of the maximum dimen-

**AN INTERESTING EXPRESS AND FREIGHT CAR FOR THE PUBLIC SERVICE CORPORATION OF NEW JERSEY**

A car for freight and express service has lately been delivered to the Public Service Corporation of New Jersey by the J. G. Brill Company, which is probably the most thoroughly equipped and substantial car of the kind ever built for electric service. The numerous manufacturing interests of the cities along the lines of this extensive railway system offer an ex-



SIDE VIEW OF FREIGHT CAR FOR PUBLIC SERVICE CORPORATION

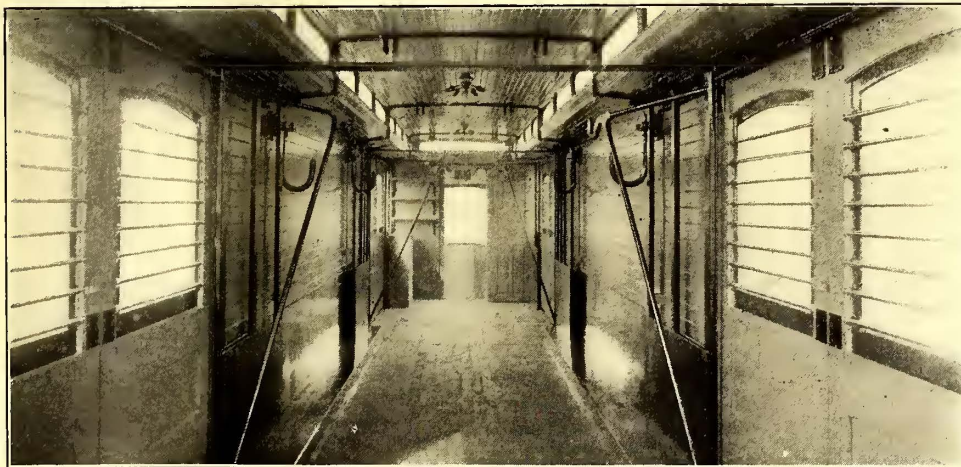
cellent field for service of this character. Equipped with powerful wrought steel cranes at each side door, heavy pieces of material may be conveniently handled. There are four 2-in. x 1-in. steel frames, bent to conform to the cross section of the car, from which are suspended hooks, holding round-steel bars or rollers. These are for holding long pieces of material that are brought into the car through the central window of the vestibules, and 1½-in. steel rollers are bracketed to the dash outside of the windows to prevent injury to the sash and facilitate the handling of materials. Two powerful steel hooks are located on each side of the car, which may be swung around out of the way, or removed; they are also intended for suspending material. All parts of the car which are liable to excessive wear are sheathed with steel, and the sliding doors are protected, when drawn back, by ¼-in. steel, secured to heavy wrought iron uprights.

The framing of the bottom and side consists entirely of selected white oak, including the side sills. The side sills are 6 ins. x 10

ins., plated on the outside with ¾-in. steel for their full width and extended their full length. The end sills are 6 ins. x 10 ins.; the side sills, 2½ ins. x 4 ins., and the center crossings, 6 ins. x 8 ins. Tie-rods of 1¼-in. wrought iron are located at each crossing, and brought through the sill plates.

The flooring consists of 1½-in. tongued and grooved white oak, with steel plates counter-sunk, and extending from door post to door post. The truss rods are 1½ ins. in diameter. Top rails, side posts and side post bracing are composed of 3-in. x 4-in. white oak, and corner posts 4-in. x 5-in. The end door posts have ¾-in. rods extending from top of head pieces to under side of end sills, and side posts have ¾-in. rods. These rods are let into the posts. There are ten steel carlins, 1½ ins. x 5½ in., one to each side post.

Length of car over bumpers, 42 ft. 8 ins., and over corner posts, 32 ft.; width over sills, 7 ft. 9 ins.; width over trolley board, 11 ft. 1 in.; width over platform from rail, 2 ft. 3½ ins.



INTERIOR OF FREIGHT CAR

sions which would permit its operations over Milwaukee city streets. These dimensions are:

Length over all .....	51 ft. 6 ins.
Length over vestibule .....	50 ft. 6 ins.
Width over all .....	8 ft. 6 ins.
Width over sheathing .....	8 ft. 4½ ins.
Height from under side of sill to top of roof .....	8 ft. 7½ ins.
Truck centers .....	29 ft. 1 in.

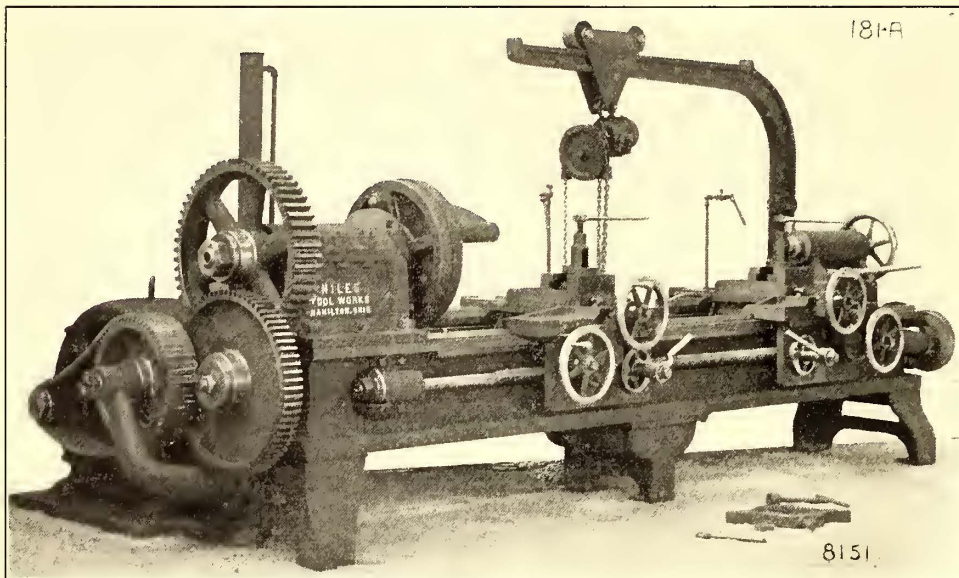
From the foregoing description it will be seen that the car is such that its owner can live on it in comfort for any length of time, just as on any private steam railroad palace.

One thing which neither the description nor the illustration can make clear, however, is the beauty of the various woods used for the interior finish. These must be seen to be appreciated. Undoubtedly the car will be inspected with a great deal of interest at St. Louis this fall.



## A NEW NILES SINGLE-AXLE LATHE

The accompanying engraving illustrates a new design of single-axle lathe which has many improvements upon it that will make it of interest to railway shop managers, not only as to capacity for production, but also as to economy of labor in manipulation. This lathe is particularly well adapted to the



THE NEW NILES SINGLE-AXLE LATHE FOR RAPID MACHINING OF MOTOR AXLES. MOTOR-DRIVEN THROUGH MORSE CHAIN DRIVE

machining of axles for electric railway service, whether elevated, surface or interurban. Where very heavy axles are used and must be handled in great quantities the double type of axle lathe would perhaps be preferable, but under normal conditions of operation this lathe is equal to the most exacting requirements, its capacity being sufficient to provide for the turning of the heaviest locomotive axles. It swings 12 ins. over the carriage, and has a maximum capacity between centers of 8 ft.

As may be noted from the engraving, this lathe is provided with a simple, single-speed headstock, which is provided with a permanently-mounted double-equalizing driver for facility in the mounting of the axle. Two carriages are provided, one right hand and the other left hand, both having power feed and rapid hand traverse. Brackets are also provided at the rear of the bed on which formers may be placed. The bed is of a very heavy design, strongly braced to resist torsional stresses, and is provided with an effectively arranged oil pan for facilitating the use of oil in rapid cutting.

An economical and efficient adjunct of this lathe's equipment may be noted in form of the lifting crane. The lifting crane consists of a jib crane, with an I-beam shaped section, and has a radius of about 6 ft., which is sufficient length to project over the middle of the bed. It is substantially mounted at the rear of the tailstock, and is equipped with a rapid-lifting Harrington hoist, by which axles may be handled into and out of the lathe with the utmost rapidity.

The motor drive is an admirable example of the application of the electric motor for the driving of machine tools. A 20-hp Westinghouse direct-current motor is used, driving the tool through a Morse silent chain. The motor is arranged for variable speeds by the well-known system of field control, the range made available at the motor armature being from 375 r. p. m. to 1500 r. p. m.

This drive is an excellent example of the applicability of the Morse chain-drive to the driving of machine tools. Most notable of all is the especially short distance between sprocket centers—the Morse chain permits the location of driving and

driven shafts at center distances under which belts could not be operated. This not only saves greatly in the room occupied by the machinery, but also results in a smoothness and quietness of operation that is impossible with any other type of drive.

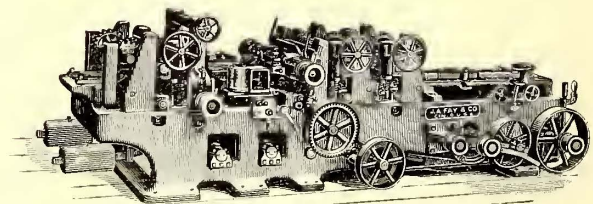
It will be remembered that the important feature of the Morse chain, which is made by the Morse Chain Company, Trumansburg, N. Y., is the rocker type of joints incorporated in its design, which results in rolling instead of sliding friction as would otherwise result. One of the most important advantages of this chain is its ease of lubrication as well as its durability.

## DOUBLE CYLINDER "LIGHTNING" FLOORER

The accompanying illustration shows an improved flooring machine for car shops recently brought out by the J. A. Fay & Egan Company, of Cincinnati. It was patented March 20, 1900, and is built especially for those who make flooring, ceiling, siding, casing and other work of that character in large quantities. The following are some of its important points:

It works four sides 9 ins. or 14 ins. wide up to 6 ins. thick, and by the use of belt-tightening apparatus 2-in. stock can be matched to advantage. This last device is a decided improvement on this machine, and one easily appreciated by all woodworkers. The frame is massive, prevents vibration and resists all strain, and the machine can be run at a very high rate of speed, under instant control of operator.

The feed is six large powerfully driven rolls, with expansion



DOUBLE CYLINDER "LIGHTNING" FLOORER

gearing, that can be easily raised and lowered, and the feeding-out one is provided with scrapers.

The matching works are very heavy, and cylinders four-sided and slotted, and chip-breaking lips are provided to work cross-grained or knotty lumber. Shaving hoods swing outward to give access to knives. Pressure bars have easy adjustments to insure easy operation. Taken altogether, this machine will be found to possess many new advantages, and is in fact one of the most successful specialties of the makers.

James F. Shaw, of the Boston & Worcester Street Railway, recently entertained the city officials of Salem, taking them on a trolley ride from Salem to Worcester, a distance of 66 miles, without a change. The route was over the Boston & Northern Street Railway, from Salem to Boston; thence over the Boston elevated surface tracks to Chestnut Hill; thence over the Boston & Worcester Street Railway to Worcester, where the trip was completed over the Worcester Consolidated Street Railway. The return trip was over the same route, a total of 132 miles.



## FINANCIAL INTELLIGENCE

### The Money Market

WALL STREET, Aug. 17, 1904.

The money market continues dull and without noteworthy feature. The tone is called firm, but rates and conditions remain practically unchanged from those prevailing at the close a week ago. The influx of currency from the interior, and the arrival of new gold from Japan and from the Klondike continues to increase the cash holdings of the local banks, but the demand for funds, both on call and time is unusually small, despite the increased activity in the securities market. Money on call is in abundant supply at  $\frac{7}{8}$  and 1 per cent, but the inquiry is only moderate. Time money is practically at a standstill. The demand from stock commission houses is almost nil. Lenders, however, are not disposed to prune their funds, or to offer with any degree of liberality, owing to the near approach of the crop-moving season, when it is expected that substantially better returns will be obtained in all classes of accommodations. Sixty-day funds are quoted at 2 per cent, ninety days at  $2\frac{1}{4}$  per cent, and over the year maturities at  $3\frac{1}{2}$  per cent. Commercial paper is moderately active, with 4 per cent the minimum. Gold continues to go to Cuba in payment of the bonds recently issued, the total amount to date being \$7,000,000. The sharp decline of about 40 points in the rates for sterling exchange, however, puts gold exports to Europe out of the question, at least for the present. The foreign money markets are somewhat easier, rates at all the leading centers being slightly lower than a week ago. At London call money ranges at between 2 and  $2\frac{1}{2}$  per cent, while the open market discount rate for short bills is  $2\frac{3}{4}$  per cent. At Berlin the rate is  $2\frac{5}{8}$  per cent, while at Paris  $1\frac{1}{8}$  per cent is quoted.

### The Stock Market

The past week has witnessed continuance of the rise in stocks, with somewhat broader trading and considerable activity. It cannot be said as yet that the outside public are taking much of an interest in the dealings; the business originating in commission houses comes mostly from the semi-professional traders. For the rest the operations of the regular professional element and the pools make up the bulk of the business done. The fact that outside purchases have not been much in evidence is one of the arguments commonly heard that the upward movement has further to go, because there has been as yet not a sufficient opportunity to distribute the holdings of the insiders. The great impulse behind the advance is still the magnificent outlook for the cotton and corn crops. The government report on crops published a week ago made an unexpectedly good showing, the condition of corn being estimated higher on the first of August than on the first of July, and the condition of spring wheat being decidedly above what the recent stories of damage in the Northwest had led the average person to expect. In a general way, it may be said that the market, which had previously been one of specialties, took on its character of a general advance immediately on the announcements of the crop estimates. One circumstance which has prevented complete confidence on the part of a speculative community is the reports of an unsatisfactory situation in the iron trade. Following the recent cut in steel billets made by the Republic Iron & Steel Company a week ago, there have come all sorts of stories about an impending struggle between the steel-producing interests, and fears are entertained that further price cutting and other evidences of an unpleasant competition may soon be witnessed. The practical result of all this is the renewal of bearish feeling toward the Steel Corporation securities, the weakness of which has undoubtedly retarded the upward tendency in the general share list. Should events in this quarter prove less serious than anticipated, we may look to see the upward movement go on with the usual fluctuations attending every speculation.

Nothing yet has been definitely announced about the much-talked-of traction deal. There is, however, an unusual confidence felt that the advance in the Metropolitan issues is anticipating some very important change to be made known shortly in the affairs of the property. That the arrangement contemplates some sort of an alliance with the Interborough Company is the commonly accepted version. Interborough stock on the curb is up nearly ten points from where it was selling a week ago. The Metropolitan shares on the Stock Exchange have made no such record as this. Metropolitan sold as high as  $125\frac{3}{4}$ , and Metropolitan Securities went to  $66\frac{1}{2}$ , but since these high levels were reached toward the end of

last week both issues have felt the effect of very heavy realizing sales, and have been weaker rather than stronger than the general market. Brooklyn Rapid Transit developed some independent strength, advancing to  $54\frac{3}{4}$  on Monday. It was evidently moving, however, in sympathy with the general course of prices, rather than with the special operations in the traction group.

### Philadelphia

Trading in the Philadelphia traction list has not been up to the standard of activity set by other quarters of the market. Prices have altered very little, dealings have been light. Philadelphia Electric sold between  $6\frac{1}{4}$  and  $6\frac{3}{8}$  all the week. Union Traction did not go above  $54\frac{1}{8}$  nor below  $53\frac{7}{8}$ . Nine hundred shares of Rapid Transit changed hands at the one figure of 13. Philadelphia Traction did not vary from  $98\frac{3}{4}$  to  $98\frac{7}{8}$ . Fifty shares of Reading Traction were taken at  $32\frac{1}{2}$ . Altogether it was a very stupid market outside of two stocks, American Railways and Philadelphia Company common. The former, after selling at  $47\frac{1}{2}$  for 340 shares, moved up on odd lots to  $49\frac{3}{4}$ . There was a very marked scarcity of the stock for sale. Philadelphia common declined from 39 to  $38\frac{5}{8}$ , then gained a point to  $39\frac{5}{8}$ . The preferred sold down a point from  $45\frac{1}{4}$  to  $44\frac{1}{4}$ .

### Chicago

There were no outside developments of interest in the market for traction shares during the week. A few more sales were recorded than in the previous weeks, but the increase was hardly noteworthy. South Side Elevated continued heavy around 89. Fifty shares of Northwestern Elevated common were taken at  $16\frac{1}{2}$ , and 50 of the preferred at  $47\frac{1}{2}$ . West Chicago sold at 43, North Chicago at 70, and Union Traction preferred at 30. One hundred Metropolitan Elevated common sold at  $18\frac{1}{2}$ , and 25 shares at  $18\frac{3}{4}$ . City Railway sold at  $172\frac{1}{2}$  to 175 for 35 shares, and 30 shares of Metropolitan preferred went at 54.

### Other Traction Securities

Trading has been very light in all the Boston specialties during the week. Elevated shares have hung idle around 150. Massachusetts Electric preferred has weakened again from  $69\frac{1}{2}$  to  $68\frac{1}{2}$ , 100 shares selling at the latter figure. No transactions are reported in Massachusetts common. West End common sold at  $91\frac{1}{2}$  and later at 91, and the preferred at 112. Two hundred and fifty Georgia Electric common changed hands at  $44\frac{1}{2}$  to 45. In Baltimore the United Railway generals were strong at an advance to  $93\frac{3}{8}$ . The income bonds rose from 47 to 48, and reacted to  $47\frac{1}{2}$ . Six hundred shares of the stock were dealt in between  $8\frac{1}{8}$  and  $8\frac{7}{8}$ . The only other transactions comprised Charleston Consolidated 5s at  $84\frac{1}{4}$  to 85, Atlanta Street Railway 5s at  $106\frac{1}{4}$  and Augusta Street Railway 5s at 101. On the New York curb, the heavy dealings and sensational rise in Interborough Rapid Transit have monopolized interest. Between 133 and 139, which were the low and high figures for the week ending Saturday, 13,000 shares changed hands. On Monday the stock advanced to  $143\frac{1}{2}$  on transactions of 9000 shares, and on Tuesday it rose to  $144\frac{1}{2}$ , with sales of 4500 shares. The mysterious "deal" which has already been alluded to in a previous paragraph, was the motive for this remarkable movement. Washington Traction issues were the only other active feature, 600 shares of the preferred stock being dealt in between 65 and 66, and \$148,000 of the bonds between  $80\frac{7}{8}$  and  $83\frac{1}{2}$ . Nassau Electric 4s continued their advance, selling on the curb as high as 85 and on the Stock Exchange as high as 87. New Orleans  $4\frac{1}{2}$ s sold at  $74\frac{3}{4}$ .

Cincinnati Street Railway gained strength at Cincinnati last week and advanced to  $142\frac{1}{2}$ , sales about 260 shares, all small. Detroit United advanced from  $64\frac{1}{2}$  to  $65\frac{1}{2}$ . Cincinnati, Newport & Covington preferred sold at  $88\frac{1}{2}$  on sales of 240 shares. Indianapolis Street Railway preferred sold at  $85\frac{1}{2}$  on several sales aggregating \$47,000 worth.

Syracuse Rapid Transit bonds have been attracting attention in Cleveland since the Andrews-Stanley interests acquired control, and several large blocks were bought for investment purposes last week at 90 to  $90\frac{1}{4}$ , with inquiry for more at these figures. More than \$400,000 of the underlying bonds of the Detroit United have been sold lately to investors, and there have been private sales of Cleveland & Southwestern, Cleveland Electric and Toledo & Western bonds in rather large lots. Announcement is made that Eastern interests have practically completed a deal to purchase \$1,000,000 Northern Ohio Traction and Light 4s and 5s. The former have



been selling at around 58 and the latter around 72, and in view of the earnings of the road, they are now regarded as first-class securities.

### 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	
	Aug. 9	Aug. 16
American Railways.....	47¼	49
Aurora, Elgin & Chicago .....	a12	a12
Boston Elevated .....	149	150
Brooklyn Rapid Transit .....	527¼	53¾
Chicago City .....	170	170
Chicago Union Traction (common) .....	4½	5¾
Chicago Union Traction (preferred) .....	—	30½
Cleveland Electric .....	71	70
Consolidated Traction of New Jersey.....	66½	66½
Consolidated Traction of New Jersey 5s.....	109	108½
Detroit United .....	64	66
Interborough Rapid Transit .....	134¾	142½
Lake Shore Electric (preferred) .....	—	—
Lake Street Elevated .....	3¾	3¼
Manhattan Railway .....	150	151¼
Massachusetts Electric Cos. (common).....	17½	17½
Massachusetts Electric Cos. (preferred).....	69	65½
Metropolitan Elevated, Chicago (common).....	18½	18½
Metropolitan Elevated, Chicago (preferred).....	52½	52½
Metropolitan Street .....	123¾	123¾
Metropolitan Securities .....	88½	93¼
New Orleans Railways (common) .....	9	9½
New Orleans Railways (preferred) .....	a30½	29
New Orleans Railways, 4½s .....	74	74¾
North American .....	85½	88
Northern Ohio Traction & Light .....	13½	12¾
Philadelphia Company (common) .....	38½	39¼
Philadelphia Rapid Transit .....	12¾	12¾
Philadelphia Traction .....	98¾	98¾
St. Louis (common) .....	9¾	9¾
South Side Elevated (Chicago) .....	88	89
Third Avenue .....	124½	124
Twin City, Minneapolis (common) .....	97½	99
Union Traction (Philadelphia) .....	53¾	53¾
United Railways, St. Louis (preferred) .....	53½	52
West End (common) .....	91	91
West End (preferred) .....	111	111½

a Asked.

### Iron and Steel

The alleged cutting of steel billet prices has furnished the chief topic of discussion in the steel trade during the week. It is pointed out, however, by leading authorities that the market for billets has in reality been an "open market" for some time past, that quotations have been adjusted on a sliding-scale system, declining with the quotations for pig iron, and consequently that the big consumers have all along been obtaining their billets for much less than the nominal rate. A more serious possibility confronting the trade is a dissolution of the pools in structural material and plates which hitherto have been fairly successful in holding prices up to the published schedules. Quotations are as follows: Bessemer pig iron \$12.35, Bessemer steel \$23 (nominal), steel rails \$28 (nominal).

### Metals.

Quotations for the leading metals are as follows: Copper 12½ to 12¾ cents, tin 27 cents, lead 4¼ cents, and spelter 4 15-16 cents.

## CLEVELAND & SOUTHWESTERN POWER CHANGES

The Cleveland & Southwestern Traction Company will shortly abandon its old power station at Rockport, and the entire system of 135 miles of road will be operated from the main station of the company near Carlisle. This station, which contains two 1500-kw Westinghouse-Parsons steam turbines, was fully described in a recent issue of STREET RAILWAY JOURNAL, and the abandonment of the old plant is in line with the distribution plan outlined in the article. Two 300-kw rotaries have been installed in the old building, and the old equipment, consisting of three 250-hp Allis & Slater engines with three 300-kw Westinghouse & Walker generators, will probably be dismantled. The change is being awaited with considerable interest by the engineers of the company, as it will throw the full load of the system onto the turbines, and will enable them to make some interesting efficiency tests which have been impossible heretofore because the old station was cut in with the new.

## INTERBOROUGH RAPID TRANSIT REPORT FOR QUARTER ENDING JUNE 30

The Interborough Rapid Transit Company has filed at Albany its report for the quarter ended June 30, which shows an increase in surplus of \$211,112. As the Interborough began operating the Manhattan Railway under lease on April 1, 1903, the quarter ended June 30 last is the first which can be compared with a corresponding quarter in the previous year. The earnings for the fiscal year ended June 30, 1904, made up by combining the figures of the last four quarterly reports, show: Gross earnings, \$14,187,684; operating expenses, \$5,846,052; net earnings, \$8,341,632; other income, \$341,504; total income, \$8,683,136; fixed charges, \$6,757,412; surplus, \$1,925,724. This surplus is equivalent to 5½ per cent on the outstanding stock of the company.

The results of operation for the quarter ended June 30 are shown as follows:

	1904	1903
Gross earnings .....	\$3,746,101	\$3,271,787
Operating expenses .....	1,532,213	1,302,089
Net earnings .....	\$2,213,888	\$1,969,698
Other income .....	81,768	90,187
Total .....	\$2,295,656	\$2,059,885
Fixed charges .....	1,537,222	1,512,563
Surplus .....	\$758,434	\$547,322

The general balance sheet shows cash on hand \$2,432,770, and a profit and loss surplus of \$1,773,048.

A dividend of 2 per cent on the \$35,000,000 capital stock of the Interborough Rapid Transit Company was paid on July 1.

## PROPOSED PLAN OF REORGANIZATION OF THE BRISTOL COUNTY STREET RAILWAY COMPANY AND THE MIDDLEBORO, WAREHAM & BUZZARDS BAY STREET RAILWAY COMPANY

The plan of reorganization of the Bristol County Street Railway and the Middleboro, Wareham & Buzzards Bay Street Railway provides for the organization of a securities or holding trust under the name of the Southeastern Electric Companies, on the plan of the Massachusetts Electric Companies, with a preferred stock and a common stock and having as assets all the stock of the Middleboro, Wareham & Buzzards Bay and Bristol County Railways, and to offer to creditors of the Middleboro Road common stock of the trust in exchange for claims allowed by the receivers on the basis of fifty cents on the dollar and to creditors of the Bristol County Street Railway common stock on the basis of one hundred cents on the dollar. In order to accomplish this it is proposed to ask the receivers to sell the Middleboro and Bristol County properties subject to the respective mortgage deeds and to purchase said properties at such receivers' sale in the interest of the holding trust at such price as may be possible.

It will be necessary, if the Middleboro and Bristol County Railways are acquired by purchase at the receivers' sale, to raise approximately \$150,000 in cash to settle prior claims and necessary expenses. This is to be raised by a sufficient issue of preferred stock of the trust, which shall be preferred in liquidation up to par and be preferred in dividends out of the earnings up to 5 per cent. The amount of the common stock of the holding trust distributed in exchange for claims may be roughly estimated at not exceeding \$700,000.

Under the above plan a creditor has the alternative to take such dividend as a sale of the roads will yield him or to join with other creditors who may be so disposed in working out the problem through the conservation of the roads themselves.

It is reported, after investigation, that the physical condition of the roads is good. The Bristol County has the right to build through Seekonk to the Rhode Island line and is now so operated as to run its cars to Pawtucket. The plans above set forth would probably admit of running through cars from Pawtucket through Attleboro, Taunton and Middleboro to Buzzards Bay, a total distance of about 50 miles. A connecting line could be built between Taunton and Middleboro, a distance of about 11 miles, and with a power house to operate the Middleboro road, the increase in fares secured by the receivers and the joint operation of the roads economies could be worked that would no doubt result in creating a surplus.



## INDIANA STATE TAX BOARD ENCOURAGES INTERURBANS

The Indiana State Tax Board has concluded to reduce the assessments for taxation against the interurban roads operating in the State. The decrease on the assessments was wholly unexpected by the interurban corporations, as their representatives had only asked that they remain the same as for last year. J. L. Jones, of Philadelphia, and George F. McCulloch and others addressed the members of the board and stated that the earnings would have to be large this year if they covered the necessary improvements on account of the flood and paid the operating expenses and fixed charges. They impressed the board with the fact that the interurban business was in its infancy, and that the State of Indiana should do all in its power to encourage the building of more railways and the improvement and extension of those already built. The board voted to allow the assessment on other corporate interests remain at about the same figure for last year, including railroad, telegraph and telephone lines, pipe lines, etc., but will decrease the assessment on express companies and interurban lines.

## CHICAGO TRACTION MATTERS

The franchise ordinance which the Local Transportation Committee of the Chicago City Council has drawn up for the Chicago City Railway Company has been published in pamphlet form for general distribution in Chicago. The essential features of this ordinance were given in the STREET RAILWAY JOURNAL of July 30. The directors of the Chicago City Railway Company have taken no action on this ordinance, many of them being out of the city, and President Hamilton being in Europe. It is thought that a similar ordinance will be drawn up for the Chicago Union Traction Company. The new ordinance cannot be voted upon by the Council before fall. There is a possibility that it may be submitted to a referendum vote of the people at the November election. Mayor Harrison has expressed himself to the effect that unless a petition is presented asking that the ordinance be submitted to the people at the November election, he will consider that it is acceptable to the people, and will be favorable to its passage.

Mayor Harrison has since issued the following proclamation regarding the ordinance:

To the Citizens of Chicago: I believe that the proposed Chicago City Railway Ordinances is the best practical solution of the traction question in the present circumstances. It solves the question of immediate improvement of the service, and at the same time, by securing a waiver of the ninety-nine year claim, avoids expensive and protracted litigation and opens the way for municipal ownership.

In accordance, however, with my repeated pledges, I desire to afford an ample opportunity for an expression of public opinion on the proposed Chicago City Railway Company Ordinance. Therefore, if a referendum is desired upon the proposition, it is suggested that those who object to the passage of said ordinance immediately undertake the work of securing the signatures necessary to have the question placed on the ballot at the November election.

On Sept. 9, the time expires for filing the petition with the Board of Election Commissioners in order to have the proposition submitted to vote at said election; but if, by the date of the next Council meeting, Oct. 3, it appears that a sufficient number have signed such petition to indicate a general desire on the part of the people of Chicago for its submission, I shall recommend to the City Council that the consideration of said ordinance be deferred a reasonable time for securing the remainder of the signatures necessary; and if the remainder of the necessary signatures are obtained by Oct. 20, and if the question cannot be submitted at the November election, I shall then recommend the deferring of the ordinance until it shall have been voted on at the spring municipal election, 1905.

Unless a petition with the necessary number of signatures is filed by Oct. 20 next, it will be assumed that the ordinance meets with public approval, and will be called up for passage in the City Council.

CARTER H. HARRISON, Mayor.

The preparation of a plan for a through routing of elevated cars has been referred by the Local Transportation Committee to Frank Hedley, general superintendent of the Interborough Rapid Transit Company, of New York, and George A. Yuille, general manager of the Chicago Engineering & Constructing Company. Mr. Yuille has already done much valuable expert work in connection with Chicago's transportation problem.

## THE LOADING OF FREIGHT IN THE STREETS

An interesting and important interurban question has been raised at Kokomo, Ind., involving the right of interurban companies to load and unload freight upon the streets of a city. Dr. J. C. Thorn, in his complaint and action at law against the Indianapolis Northern Traction Company, alleges that the traction company uses the street in front of his house for loading and unloading freight, and he challenges the right of the company to do this. The company claims that its franchise gives it a right to such use of the street, but the city officials are inclined to oppose their interpretation of the franchise. As this same question is likely to be raised in other Indiana cities, the Kokomo case will be watched with interest by traction managers and property owners.

## CLEVELAND CROSS-TOWN LINE DEFEATED

In a sensational speech before the City Council Monday evening, Aug. 8, Mayor Tom L. Johnson, of Cleveland, defeated the aims of the Cleveland Electric Railway Company for a cross-town line on Woodland Hills Avenue and Doan Street. The cross-town line, which is badly needed by citizens of the south and east ends of the city, was almost unanimously supported by the residents of the streets to be traversed. The company only asked for a ten-year grant, and there was every indication that the ordinance would have passed had it not been for the Mayor's statements. He declared that in the petition filed by the Cleveland Electric Railway recently to restrain the Forest City Railway Company, the three-cent fare company, from taking possession of Woodland Avenue line on Sept. 8, 1904, under the ordinance granted by the city some time ago, the Cleveland Electric Railway claimed that every franchise it owns had been extended to 1914.

The company based its claim upon the fact that whenever the city obliged the company to issue transfers from one line to another or intersecting line, the grant of every line so included was lengthened to the life of the grant that expires last, even though not a word of such extension was mentioned in any of the franchises. Mr. Johnson stated that, according to the company's claim, even where the city gave the company an extension of but a few blocks of track and then required the company to give transfers to and from the extension, the life of the grants of all the connecting lines is lengthened to the life of the last existing grant. The city claims the Woodland Avenue grant expires in 1904. The company has claimed that with the change from horse power to electricity, the life of the grant was changed to the expiration of the Lorane Street grant in 1908, because the Woodland line was connected with it. Now the company in its court petition further claims that as the combined Woodland-Lorane line issues transfers to the Willson Avenue cross-town line, the life of the Woodland-Lorane franchise is extended to expire in 1914, when the Willson Avenue grant expires.

The Mayor warned the Council that if it passed the Woodland Hills Avenue grant, and if the ordinance provided for transfers to intersecting lines, the life of each intersecting line, if the Cleveland Electric Company's claim holds good in law, would expire with the franchise of the new cross-town line. The courts, he said, might uphold the contention, and might not, but he urged the Council not to take the risk. As a result the ordinance was tabled.

## CHIHUAHUA ELECTRIC TRACTION PROJECT

Chihuahua, the capital city of the State of Chihuahua, Mexico, and one of the most important commercial and mining centers in the Southern Republic, will, it is expected, shortly start an up-to-date electric traction system. Advices just to hand state that S. L. Pearce, of Louisville, Ky., acting on behalf of American capitalists, has obtained franchises and options on the existing horse car systems which operate in and around Chihuahua. The *Campania Tranvia de Chihuahua* (the Chihuahua Tramway Company), which operates slightly over 6 miles of mule lines, and is controlled by Enrique C. Creel, the Chihuahua capitalist, who is well known in New York, will be converted into electric traction within a short space of time if present plans go through. The *Ferrocarril Mineral*, a steam system operating between Chihuahua and Santa Eulalia, has also granted an option on its property to Mr. Pearce. The Mineral road is about 15 miles long. Some 24,000 tons of ore are carried over its line every month. It is also intended to operate this line by electrical motive power. Mr. Pearce, who at the moment is in Chihuahua, is expected to pay a visit to New York about the end of the month.



## AN IMPORTANT TAX DECISION IN NEW YORK STATE

The Court of Appeals at Albany, in a suit against the Crosstown Street Railway Company, of Buffalo, N. Y., to recover certain moneys from the company in the way of taxes, has sustained the contention of the railway company that the sum paid by it to the city under agreement by which the municipality was to receive a certain percentage of the company's gross earnings, should be deducted from the city tax upon the company's special franchise as assessed by the State Board of Tax Commissioners.

This agreement was entered into in January, 1892. Under it the city collected \$13,480.45 for 1900 and 1901, the year preceding the levying of the special franchise tax. The tax amounted to \$44,740.05, and this is the sum Comptroller Heerwagen, of Buffalo, sued for in behalf of the city. The company expressed its willingness to pay the franchise tax, less the sum paid into the city treasury under what is known as the "Milburn agreement." In the Trial Term of the Supreme Court the city secured the full amount. The Appellate Division reversed this judgment. The Court of Appeals directs that the judgment of the Appellate be modified so as to reduce the judgment awarded by the trial court by deducting \$13,430 and interest.

The question that arose on trial was whether this payment could be considered as a tax and therefore deductible from the amount of the franchise tax under Sec. 46 of the Tax law. The Court of Appeals holds that it is not a tax, but rather in the nature of rent. Judge Cullen says: "It seems reasonable that the holder of a franchise burdened by an annual rent or charge should not be taxed as highly as the holder of a similar franchise unencumbered."

## NOVEL EXCURSIONS BY OHIO ROADS

The interurban roads centering at Dayton and Springfield, Ohio, are working up a great deal of extra business by means of special excursions to the several society institutions in that district. Last week the Dayton & Western Traction Company, in connection with the Dayton & Xenia Traction Company, had a personally conducted excursion to the Soldiers' Home at Xenia. The excursion was composed almost exclusively of farmers and harvesters between Kingsville and New Paris, and over 1000 people were handled. Guides conducted the excursionists to all points of interest around the home and provided other conveniences which tended to make the trip an enjoyable one. This month, in conjunction with the Dayton, Springfield & Urbana Railway, the Dayton interurbans will have excursions of Masons, Odd Fellows and Knights of Pythias, from towns as far as Cincinnati and Richmond, Ind. The delegations will visit the home of the respective orders in Springfield.

## PRESIDENT CLARK SAYS LOS ANGELES SHOULD NOT STAND IN HER OWN LIGHT

E. P. Clark, president of the Los Angeles-Pacific Railroad Company, upon his return to Los Angeles from a recent trip East after high-speed rolling stock for improved service over all lines of his company, said to a representative of the STREET RAILWAY JOURNAL:

"I am heartily in favor of broad-gaging all the street railway systems of Los Angeles, and I believe in time it will be done. Better service for both railroad and public can thus be obtained. While in the East (and I visited all the larger cities) I saw no street railway that could even compare with those of Los Angeles. We have absolutely the best here, excepting no place in the United States, if not in the world. Does the public appreciate that? For every move that Mr. Huntington or anybody else makes to improve, enlarge or better his system there is always a cry from a certain class of citizens that the city is being robbed."

"But the fear is that broad-gage tracks will mean freight cars," was ventured.

"Yes, I have heard that cry before, and that is another point I investigated in the East. I found that every street railway franchise in the city of New York carried with it the privilege of carrying freight, baggage, etc., to suburban points. The president of one of the companies there told me that there was no hue and cry ever raised about it, and that the public considers it a great convenience. Stand anywhere in New York, and about every hour or so an express car will come quietly along. If the stuff being hauled did not go in electric express cars, it would probably poke along, blocking up the thoroughfares.

"Los Angeles cannot afford to be narrow-gage on anything; it is growing too fast for pinching methods. The railroads are willing to pay for what they get, but the public must not stand in its own light."

## THAT ST. JOSEPH—DES MOINES LINE

F. S. Mordaunt, of Mordaunt & Company, of Chicago, Ill., has been in Iowa most of the summer, promoting a new line of railroad from St. Joseph, Mo., to Des Moines, Ia. The St. Joseph, Albany & Des Moines Railroad Company has been incorporated under the laws of Missouri to construct and operate the line. Mr. Mordaunt claims to represent New York capitalists before whom the scheme was laid by him and Pereival Steele, who is closely identified with the Goulds. Mr. Mordaunt states that the New York capitalists will furnish the capital to construct and equip the road, provided terminals can be obtained in Des Moines and St. Joseph, and the right of way secured between St. Joseph and Des Moines. The surveyors are now in the field and have surveyed the line from St. Joseph as far north as Creston, Ia. They will reach Des Moines some time during the latter part of August. Surveyor Terhune, who is in charge of the engineers, states that the route so far surveyed is entirely satisfactory, and that they will be able to secure a 1 per cent grade. Mr. Mordaunt has been visiting the cities and towns which will likely be reached by the line, and has been endeavoring to interest the citizens thereof in the project. Mt. Ayr, Creston, Arispe, Winterset and Macksburg have been visited and the matter of taxes in aid of the road and the granting of franchises and right of way have been presented to the business men of the respective towns. The business men and citizens of all the towns in Iowa, with the exception of Winterset, are heartily in favor of the project and will aid in providing right of way and voting taxes. Mr. Mordaunt states that the outlook for the construction of the line is really better than he anticipated. The line, if constructed, will reach a part of Iowa which is many miles distant from any line of railway.

## EXTENSIONS OF THE SOUTH SIDE ELEVATED RAILROAD CHICAGO

The stockholders of the South Side Elevated Railroad Company held a special meeting Aug. 9, at which they voted to rescind the action taken at the last special meeting, when an increase of \$7,000,000 in the capital stock of the company was authorized. In place of this it was voted to authorize an issue of \$8,000,000 in 4½ per cent bonds. Of this amount \$3,000,000 will be issued immediately, of which \$750,000 will be used to retire a like amount of present outstanding first mortgage bonds. The plans for extensions have been under consideration for a long time, so that they can be rapidly carried out. The present track mileage of the road will be almost doubled by the construction of branches to Englewood and the Stock Yards, and a third track between Fortieth Street and the downtown district, over which express trains can be run. The company is now paying 4 per cent dividends on its capital stock of \$10,323,800, and earning more than 6 per cent. Part of the bond issue will be taken by the Illinois Trust & Savings Bank.

## COUNTRY FAIRS ARE BONANZAS FOR OHIO ROADS

The management of the Western Ohio Railway Company has been largely instrumental in the successful formation of a fair association known as the Western Ohio Fair Circuit. A fair circuit has been arranged as follows: Mercer County at Celina, Aug. 15 to 19; Darke County, Greenville, Aug. 22 to 26; New Bremen Tri-County Fair, New Bremen, Aug. 30 to Sept. 2; Shelby County, Sidney, Sept. 6 to 9; Allen County, Lima, Sept. 15 to 17; Miami County, Piqua, Sept. 19 to 23; Auglaize County, Wapakoneta, Sept. 27 to 30, and Putnam County, Ottawa, Oct. 4 to 8. The lines of the Western Ohio Company touch nearly all of these points. It will give special rates and extra service for all of the events, and expects to derive considerable revenue by moving goods and live stock for parties who follow the circuit. The Cleveland & Southwestern Traction Company will have fairs at Wooster, Medina, Berea, Wellington and Elyria this fall. Through the Electric Package Company it has made arrangements with a number of parties to move their goods and horses to the fairs. Nearly all of the Ohio roads are making special efforts to cater to the country fairs this year, and the convenience of the traction lines in moving goods and people is giving new life to the old-time fairs. Many of the roads are advertising the fairs in the large cities, and attract a great deal of business from people who formerly lived in the country, and who, when their attention is called to it, are easily induced to attend the attraction in their native village.



## LOOKING OVER NEW YORK CENTRAL'S LINES IN CENTRAL NEW YORK

Several steam railroad men connected with the Vanderbilt interests, and electric railway men connected with the Stanley-Andrews syndicate, made a trip of inspection, Saturday, Aug. 13, over the West Shore Railroad between Utica and Syracuse, N. Y., and the Auburn branch of the New York Central, which operates between Syracuse and Rochester, with a view to the future running of electric trains over those lines, as outlined in the interview with Mr. Andrews in the *STREET RAILWAY JOURNAL* last week. The party included General Superintendent A. H. Smith, of the New York Central; Assistant Superintendent Fripp; Engineer C. E. Lindsey; Horace E. Andrews, of Cleveland, president of the Utica and Cleveland Electric Railways, and head of the Andrews-Stanley syndicate; First Vice-President John J. Stanley, of Cleveland; C. Loomis Allen, general manager of the Utica Company; Attorney F. J. Kernan and others, including many of the heaviest stockholders in the Utica Company. The start was made from Utica at 7 a. m., going to Fairport, near Rochester, over the West Shore, the road reported to be slated for electrical service first. From Fairport to Rochester the party went over the main line. From Rochester the party took the Falls road to Suspension Bridge and thence to Buffalo.

## TOLEDO COUNCIL TO EXAMINE TOLEDO RAILWAY & LIGHT ACCOUNTS

The committee on street railways, of the Toledo Council, after spending some time in going over the books of the Toledo Railways & Light Company, has decided to ask the Council for authority to employ an expert accountant to check up the books and report to the committee. This is done to verify the statements of the company tending to show that passengers cannot be carried for three cents with any profit.

## FIRST SINGLE-PHASE SYSTEM IN THE EAST

The Philadelphia, Lancaster & Harrisburg Electric Railway, now under construction between these Pennsylvania points, will be the first single-phase system to be built in the East. The Tennis Construction Company, of Philadelphia, is the contractor. C. J. Harrington, of New York, is filling the order for the overhead material—10,000 volt Empire type. The bonds will be of Chase-Shawmut type. Westinghouse equipment will be installed in the power station. The road will be about 40 miles long.

## NEW OFFICERS FOR NORTH SHORE ROAD, OF CALIFORNIA

Important changes just made in the personnel of the North Shore Railroad, of California, indicate that California Northern Railroad interests have become interested in the company and that the Southern Pacific Company also is interested. It is denied, however, that any merger of the companies is contemplated. John Martin is succeeded as president of the North Shore by Arthur W. Foster, who also is president of the California Northwestern. Other executive officers have all resigned with the exception of H. E. Bothine, who remains a director. Vice-President E. J. de Sahla is succeeded by P. N. Lilienthal. Second Vice-President Richard Hotaling is succeeded by A. W. Foster. These new officers and E. Scott, J. W. Pew, James P. Bell, Wyatt H. Allen, J. E. Doolittle and H. E. Bothine constitute the board of directors. Mr. Foster says that General Manager W. M. Rank, General Passenger and Freight Agent G. W. Heintz and the other officials of the North Shore Railroad are not to be disturbed in their positions.

## PHILIPPINES ELECTRIC RAILWAY PROJECT

The construction of a somewhat extensive electric railway system is contemplated in the province of Albay, which is located in the southerly portion of Luzon, Philippine Islands. The proposed route for the line will be from Legaspi through Albay (which has a population of about 15,000 people), taking in the towns of Daraga, Camaling, Guinobatan and Legao. The building of a road to Tabaco is also projected.

A. U. Betts, formerly governor of Albay, is now on his way to the United States in connection with the scheme. In all, it is intended to construct some 50 miles of road.

## THE THERMIT PROCESS IN GREAT BRITAIN

The English patent rights of the Dr. Hans Goldschmidt's Alumino-Thermic Process have been sold to a company registered in England under the style of Thermit, Limited, which will develop and operate them in the United Kingdom. The new company has taken offices at 11 and 12 Great Tower Street, E. C., and, besides selling the various compounds manufactured by this process, is open to tenders for rail-welding contracts.

## DES MOINES INTERURBAN TO BUILD LONG EXTENSION

The Des Moines Interurban Railway Company have definitely decided to construct a line from the present terminus of the Flint Valley line through the town of Grimes, to Adel, the county seat of Dallas County. The survey has already been made. The line will be about nineteen miles in length. The company has already purchased fifty acres of land in the neighborhood of the Flint Brick Works, which will be used for freight terminals. A bridge will be constructed over the Des Moines River, just west of the present terminus of the Flint Valley line. The actual work of construction will be started either this fall or next spring. It is the intention to make connection at Adel with the proposed line from Shelby, via Audubon, Guthrie Center, and Adel to Des Moines.

## A NEW CONTROLLER REGULATOR FOR ELECTRIC RAILWAY OPERATION

An interesting invention has recently been developed and patented by S. W. Williams, Lapeer City, Mich., for the automatic control of the operation of street car controllers when cars are being accelerated. The purpose of the mechanism is to so limit the operation of the controller handle as to prevent its being thrown around from the series starting notches into the parallel position so quickly as to start the car with a shock or jerking, and yet at the same time permit the propulsion current to be thrown off the motors instantly. This has been accomplished by an interesting mechanical movement interposed between the operating handle and the car controller staff, by which the handle is so restricted in its forward movement by an arrangement of ratchets and pawls that the motorman cannot possibly throw the power on fully at once; the mechanism permits him to throw the current on to the motors a notch at a time, a considerable delay between notches being made compulsory by the mechanism to permit the motors to accelerate properly. If, however, it is found desirable to throw off the current instantly, the arrangement of ratchets is such as to permit this to be done in the usual manner. Additional features are incorporated in the regulator which permit the controller to be instantly reversed and thrown onto the third reverse notch in case of impending danger; this is a very valuable provision, as in emergency stops the first or second notch of the controller is not sufficiently effective. An additional precaution provided for in this mechanism is that for locking the controller when it is desired to leave the car temporarily; this is very simply provided for in connection with the regulator mechanism.

## STREET RAILWAY PATENTS

UNITED STATES PATENTS ISSUED AUG. 9, 1904

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

766,906. Street Car Fender; Ernest H. Schulze, Kansas City, Mo. App. filed Dec. 23, 1903. Consists of the pivoted pick-up frame, a cross-bar carried thereby forward of the pivotal point, a swing-bar suitably supported, a rock-shaft journaled in the swing-bar and having arms pivoted to the cross-bar, bars secured to the pick-up frame and pivoted to the cross-bar, and a connection for holding the pick-up frame elevated and the swing-bar at its forward limit of movement.

766,935. Controller for Trolley Poles; Herman R. De Long and Rector Seymour, Warren, Pa. App. filed May 25, 1904. Automatic means for throwing a weight into action to draw or pull the pole downward when the wheel leaves the wire.

766,952. Electrical Contact Device for Intermittently Establishing Circuits on Moving Cars; Jefferson D. Keen, Cincinnati, Ohio. App. filed March 18, 1904. Provides contact pieces located exterior to the car in connection with pivoted arms carried by the car and having conductor wires mounted therein and metallic brushes re-

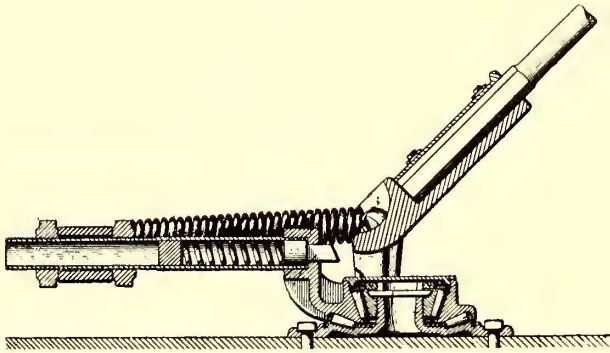


movably secured in said arms and adapted to make contact with said contact pieces in the travel of the car.

766,999. Car Fender; Henry W. Howe, Mexico. App. filed Feb. 24, 1904. The fender is mounted upon a vertical axis in such a manner that when a person is struck thereby the impact will cause the fender to swing laterally and shove the victim of the accident to one side.

767,000. Fare Indicator and Register; James H. Johnson, Dale, Ind. App. filed Jan. 21, 1904. Indicates the kind and number of fares for each trip and the total number of each kind of fares received; also provides for indicating the outgoing and incoming trips of the car.

767,018. Trolley Stand; Bruno Stenvall, New York, N. Y. App. filed Nov. 10, 1903. Means for exerting a constant tension upon the trolley pole in its different angular positions, consisting of a block, a trolley pole hinged thereto, a lever hinged to the pole, a lever hinged to the block and first-named lever, and a spring so connected to the first-named lever as to exert a constant tension on the pole in its different positions.



PATENT NO. 767,025

767,025. Trolley Base and Pole on Arm Therefor; Geo. Volker, Albert W. Goerlitz and August Goerlitz, Buffalo, N. Y. App. filed Oct. 16, 1903. The movable support to which the trolley arm is pivoted is supported between two sets of roller bearings, the set which sustains the weight having the rollers horizontal and the other having its rollers vertical in order to distribute the tensioning strain on the trolley pole.

767,144. Railway Switch; William E. Grumbine, Baltimore, Md. App. filed May 5, 1904. Comprises a vertically-movable revoluble stem, a shoe at one end thereof and spring wings integral with the shoe.

767,176. Automatic Switch; William D. Sumpson, Columbia, S. C. App. filed May 5, 1904. The device comprises a shoe having a pivoted toe-piece, a spring for normally holding the toe-piece in line with the body of the shoe, and means under the control of the motorman for shifting the toe-piece laterally against the force of the spring.

767,258. Brake; Joseph E. Berry, Cartersville, Mo. App. filed Oct. 29, 1903. Provision is made for the switching in of a storage battery or similar source of electrical energy should the car be cut off from the trolley wire.

## PERSONAL MENTION

MISS CLARA COGSWELL has been appointed auditor of the Springfield & Xenia Traction Company and the Springfield, Troy & Piqua Railway Company, with offices in the Bushnell Building, Springfield, Ohio.

MR. I. N. TOPLIFF, a well-known manufacturer of Cleveland, Ohio, and a director of the Cleveland, Painesville & Eastern Railway, died a few days ago, Mr. Fred S. Borton has been elected a director of the company to succeed Mr. Topliff.

MR. G. S. FIELDS, who has long been connected with the Oregon Water Power & Railway Company, of Portland, Ore., has been promoted to superintendent of transportation, and Mr. W. H. Tiffany has been promoted to the position of superintendent of construction.

MR. A. B. HOGUE, who has been superintendent of the Indianapolis, Columbus & Southern Traction Company since its beginning, has resigned from the company, and will be succeeded as superintendent by Mr. George M. Saylor, who has been interested in the road for some time.

MR. E. FILE COX, chief engineer of the Vincennes & New Albany Interurban Railway Company, of Vincennes, Ind., is dead.

Mr. Cox was one of the best-known men in his profession in Southern Indiana, and was engaged in running lines through Dubois County at the time of his death. He served several terms as surveyor of Greene County.

MR. GEORGE F. MARSHALL has resigned as treasurer of the Lowell, Acton & Maynard Street Railway Company, of Maynard, Mass., and Mr. John W. Ogden has been elected as his successor. Mr. Ogden also is superintendent, general manager and purchasing agent of the company, and holds similar positions with the Concord, Maynard & Hudson Street Railway Company.

MR. GEORGE C. CHADWICK has been appointed superintendent and chief engineer of the Santa Cruz Electric Railway, of Santa Cruz, Cal., to succeed E. S. West, who resigns on account of ill health. Mr. Chadwick was in the employ of the United Railways in San Francisco for seven years. He also was chief engineer of the San Jose & Los Gatos Interurban Railway at San Jose. Mr. Chadwick is to have entire charge of the operating department and maintenance.

MR. E. U. HARLAN, formerly general manager of the Ferrocarriles de Monterey y Topo-Chico, of Monterey, Mexico, of which Mr. S. W. Slayden, of T. B. Slayden & Co., 50 Broadway, New York, was president, has been appointed manager of the recently incorporated Monterey Electric Street Railway, Light & Power Company, Ltd., reference as to whose plans for the construction of an up-to-date electric traction system in Monterey was made in the STREET RAILWAY JOURNAL of Aug. 13.

MR. EDWARD F. WALKER, who last week closed the deal for the acquisition of the horse-car lines, etc., in Monterey, Mexico, on behalf of the Monterey Electric Street Railway, Light & Power Company, Ltd., which will electrically convert the lines, will be in New York the first part of next week. While in this city he will make his headquarters at the offices of T. B. Slayden & Co., 50 Broadway. As part of the lines, for the construction of which a concession was originally granted to Mackin & Dillon, of Monterey, will have to be in operation by December next, it is believed that Mr. Walker has decided upon the letting of some contracts for material, etc., while here.

HON. WILLIAM I. BUCHANAN, deputy chairman and a director of the British Westinghouse Electric & Manufacturing Company, Limited, and also a director of the other Westinghouse interests in Europe, arrived in this country on Wednesday, and will remain here several weeks before returning to London. He reports business in England and on the Continent as being quiet. The French Westinghouse Company's board has been lately reorganized, four new directors having been elected. The new members are among the most prominent and well-known business men of France. The new chairman of the French company's executive committee is one of these, the Marquis de Frondeville, one of the most widely known among French banking officers.

MR. HARRY S. KEMP, of the Standard Electric Company, of Norwalk, Va., is dead. He succumbed to typhoid fever. Mr. Kemp has been prominent in street railway work for some years. He was at one time connected with the Brooklyn Heights Railroad, of Brooklyn, N. Y., and with the Staten Island Electric Railway. Later he rebuilt about 75 miles of railroad for the Virginia Passenger & Power Company in Richmond, and since then has been employed by the Standard Company as superintendent of construction. Here his work extended to all branches of the industry. Mr. Kemp was about thirty-nine years old. His home was in Quincy, Mass., where his father and brothers reside. He was married about two years ago to Miss Ray Field, of Lynchburg, who survives him.

MR. SAMUEL A. SPAULDING has been appointed to the position of superintendent of power of the Brooklyn Rapid Transit Company, with headquarters at 168 Montague Street, Brooklyn, to succeed Mr. Franklin E. Morse, who died July 15. Mr. Spaulding has had an extended experience in this line, having been connected with the electrical engineering department of the Brooklyn Rapid Transit Company for seven years, and is thus familiar with the work and operating conditions upon the system. Mr. Spaulding was born in Danvers, Mass., and is thirty-two years of age. He was educated in the public schools and in Dean Academy, and in 1894 received a technical degree at Tufts College. In 1896 he entered the electrical engineering department of the Brooklyn Heights Railroad Company, in which position he remained until last year, when he was offered the position of transmission engineer in the new electrical department of the New York Central & Hudson River Railroad. This latter position he has resigned to return to Brooklyn, in order to take charge of the power generation and transmission system of the Brooklyn Rapid Transit lines, a system embracing five power plants generating a total of over 50,000 kw, and seven sub-stations.