MAINTENANCE ISSUE

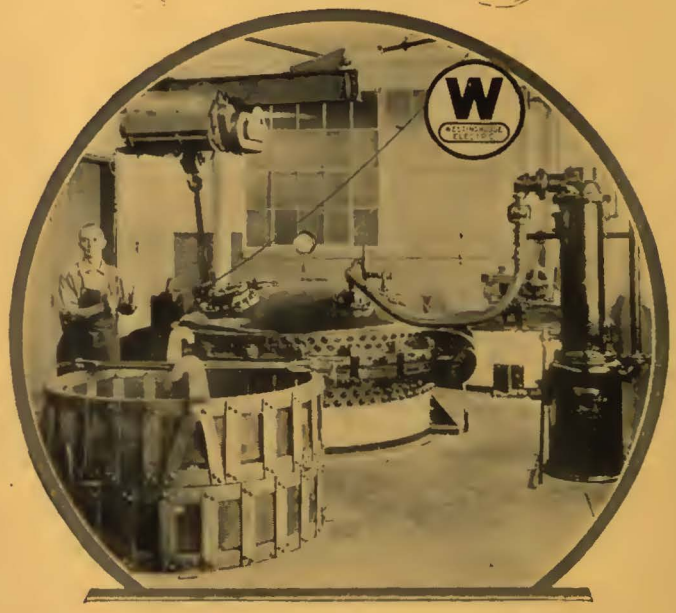
McGraw-Hill Publishing Company, Inc. August 21, 1926 20 Cents per Copy

ELECTRIC RAILWAY JOURNAL

- COILS -

Here is a Coil that is improperly impregnated. The gum penetrated only to the first few turns. Only the bare cotton insulation protects the main conductors. It has none of the dielectric, moisture, and heat-resisting qualities of a properly impregnated coil. Improper impregnation is a frequent cause of coil failure.

Here is a Coil impregnated by Westinghouse. It was taken from stock at random and cut. Note that the gum has penetrated every turn; that it has been forced into all of the insulation and filled all the air space between conductors. The entire coil is a solid mass, resistant to moisture. It has high dielectric strength. Because of its mass unity, it can better dissipate heat. It can better withstand the vibration and pounding incident to severe operating conditions.



And these are some of the precautions

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No. 8

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AUGUST 21, 1926

"Rut Insurance"

EVERY week in ELECTRIC RAILWAY JOURNAL there is a special department under the heading of "Maintenance Notes" containing suggestions primarily for the men in charge of that class of work. Once each month the entire issue is devoted to maintenance subjects.

Articles of this kind are intensely practical in their nature. They are intended to keep maintenance executives in touch with methods, practices and devices that have been found helpful on other railway properties.

Articles on maintenance practices are sought and encouraged by the JOURNAL. A minimum of $5 is paid for short items suitable for publication. Longer maintenance contributions receive compensation at special space rates.

It is an unwise executive indeed who does not encourage suggestions for improved methods from the men in the ranks of his own organization. But it is obviously an even greater oversight to disregard the methods and appliances on which some other shop has done all the development and experimental work. To the maintenance man, participation in such an exchange of workable ideas and careful study of the methods devised on other properties constitute the best forms of insurance against getting in a rut.

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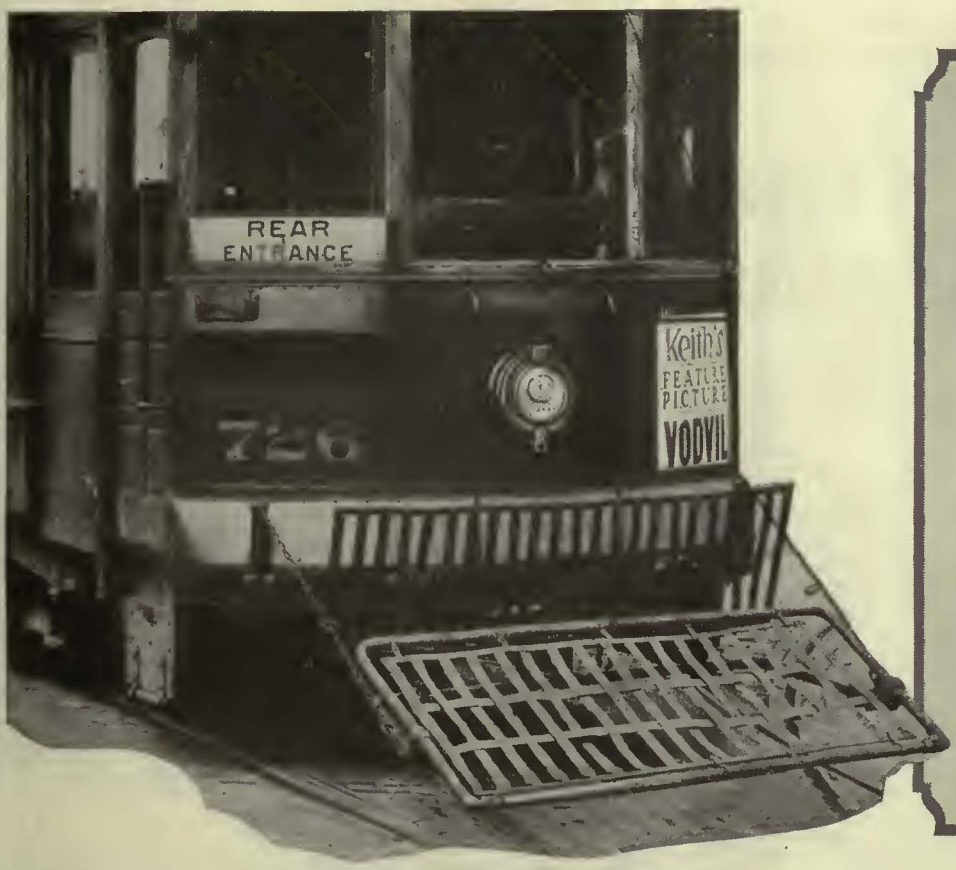

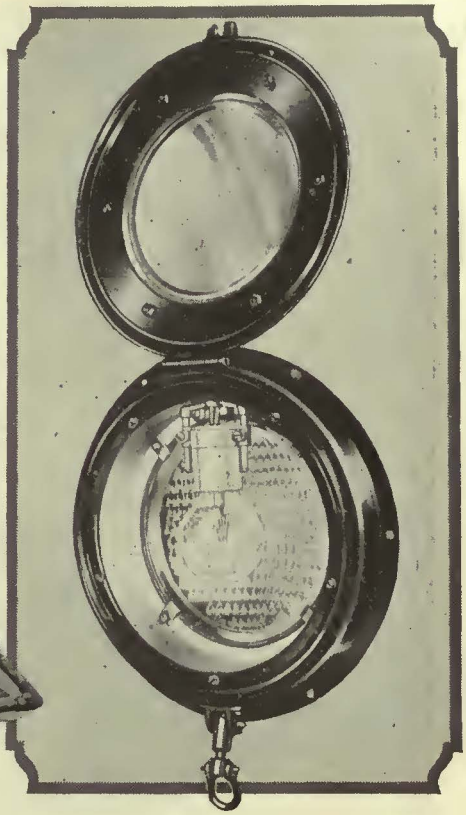

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4 miles with Twin Ties *on the P. R. T.*

One of the 30 odd installations of Twin Ties now in progress, or scheduled for the present season, illustrated above, is in Philadelphia.

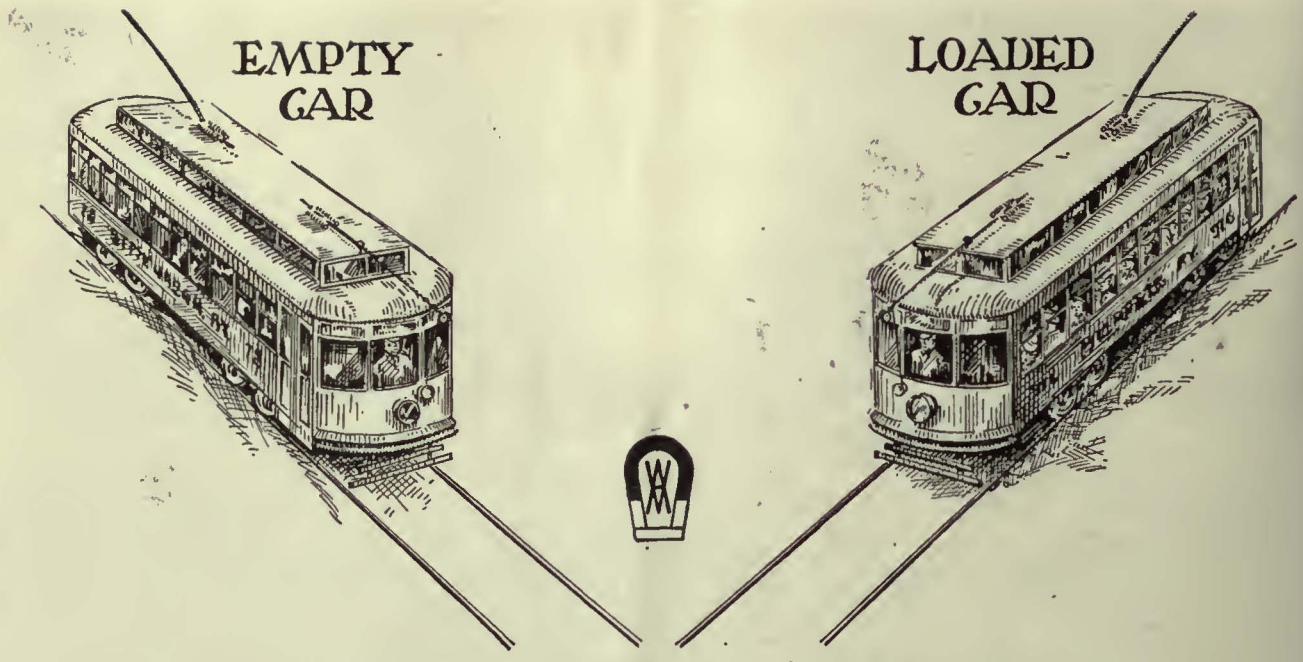
Several separate jobs using either Standard Twin Ties laid on a renewable base, or Renewal Ties being used to build new track over old concrete base, are now in progress there.

We have prepared a folder describing all details of this work, part of which was done under traffic with quick-setting concrete, which we will be glad to send all interested railway men.

THE INTERNATIONAL STEEL TIE CO.
Cleveland, Ohio

Steel Twin Tie Track

Renewable Track - - - Permanent Foundation



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—throughout the entire range of car loading means—

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—a precise and systematic movement of shopping and business crowds;

—seconds saved, that may collectively be counted as dollars;

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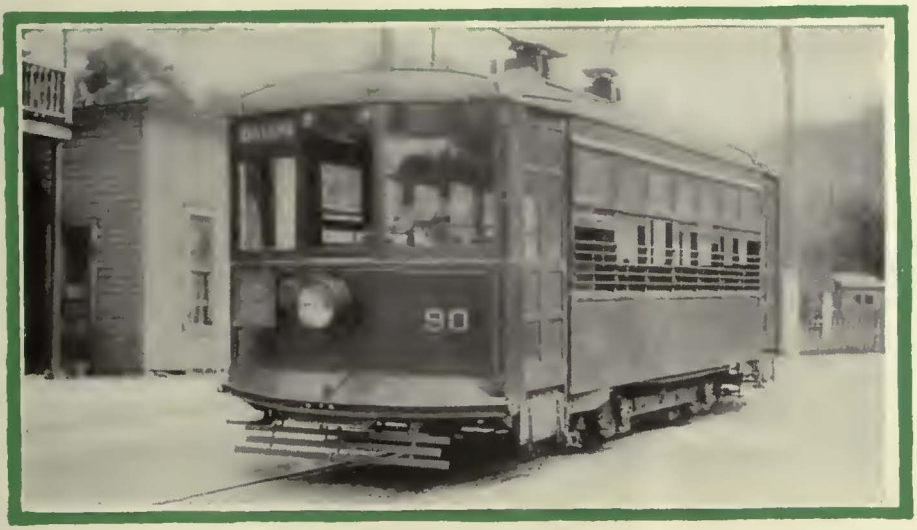
A city example

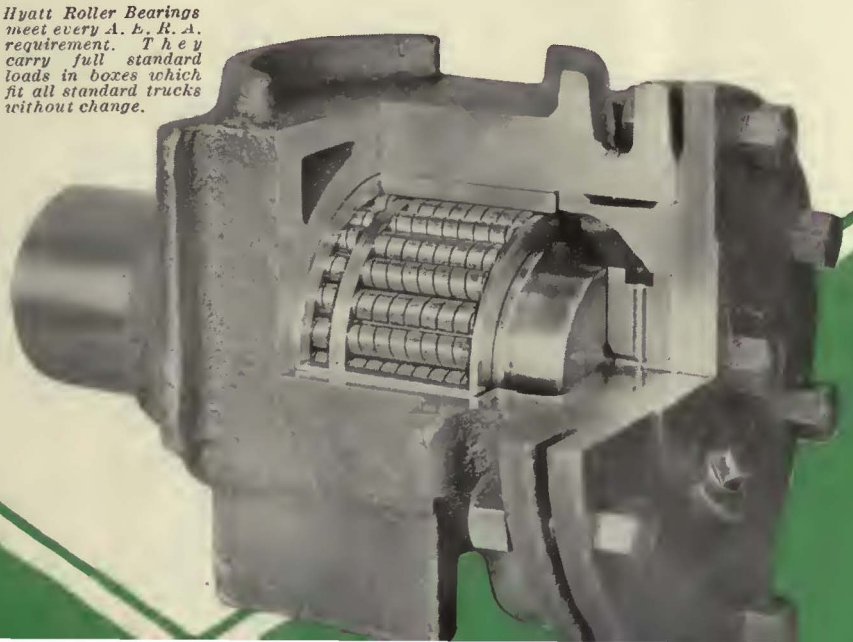


Oil City car achieves record on roller bearings

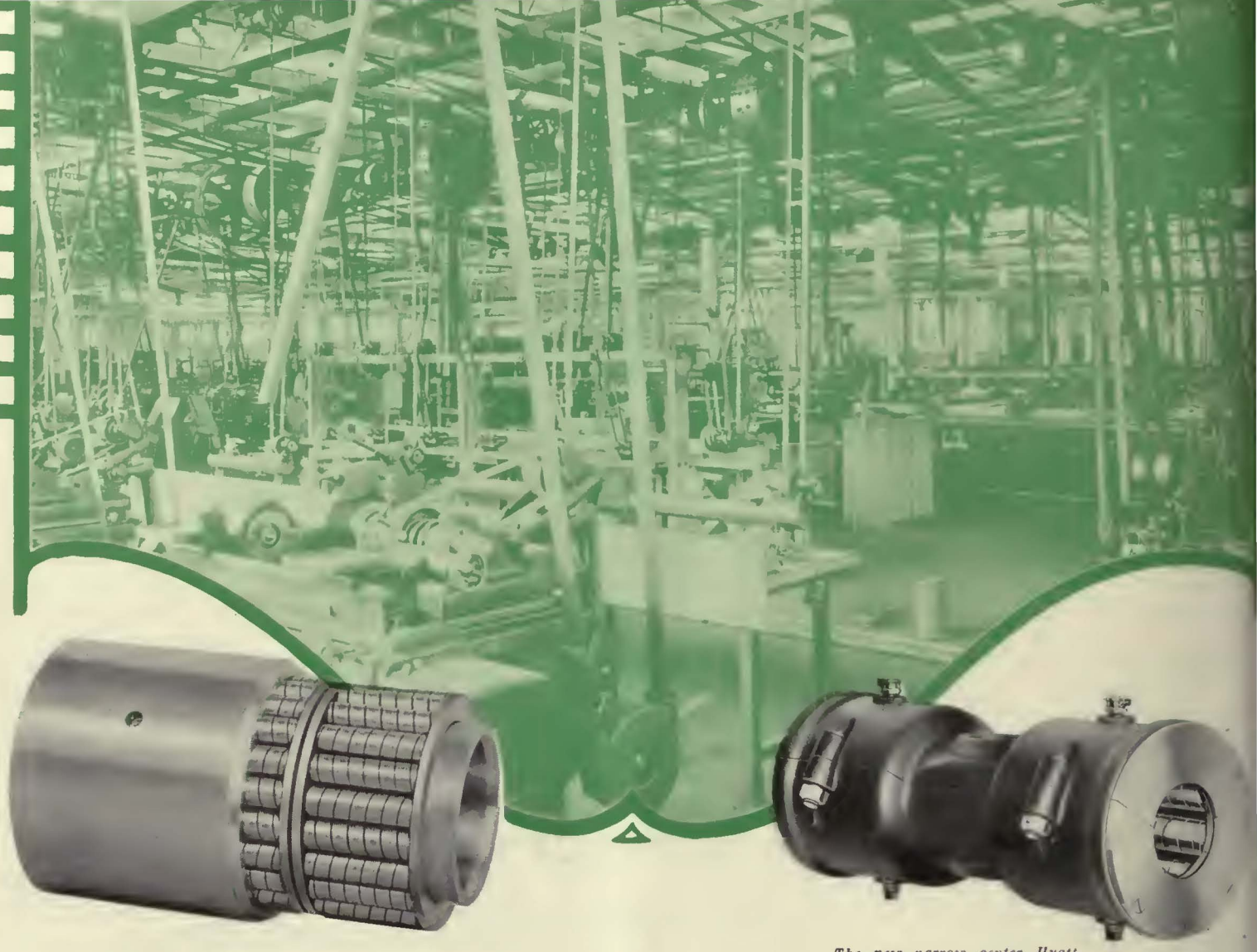
Four-wheel one-man car giving satisfactory service since July, 1924. Has made an enviable record for power saving and low upkeep expense. This Hyatt-equipped car is running in Oil City, Pennsylvania.

Proved- by more than a million and a quarter car miles

Hyatt Roller Bearings meet every A. E. R. A. requirement. They carry full standard loads in boxes which fit all standard trucks without change.



HYATT
QUIET ROLLER BEARINGS



Hyatt Roller Bearing as used in railway journal boxes.

The new narrow center Hyatt Line Shaft Roller Bearing.

A long-established factor in the Nation's industrial machinery

For more than thirty years, Hyatt Roller Bearings have been applied in constantly increasing numbers to line shafting and machines of every kind.

This long record of dependable performance in industrial equipment and the million and more miles of satisfactory service they have given in railway applications is due to Hyatt design and Hyatt construction. They are long lived bearings.

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improves public relations in several ways

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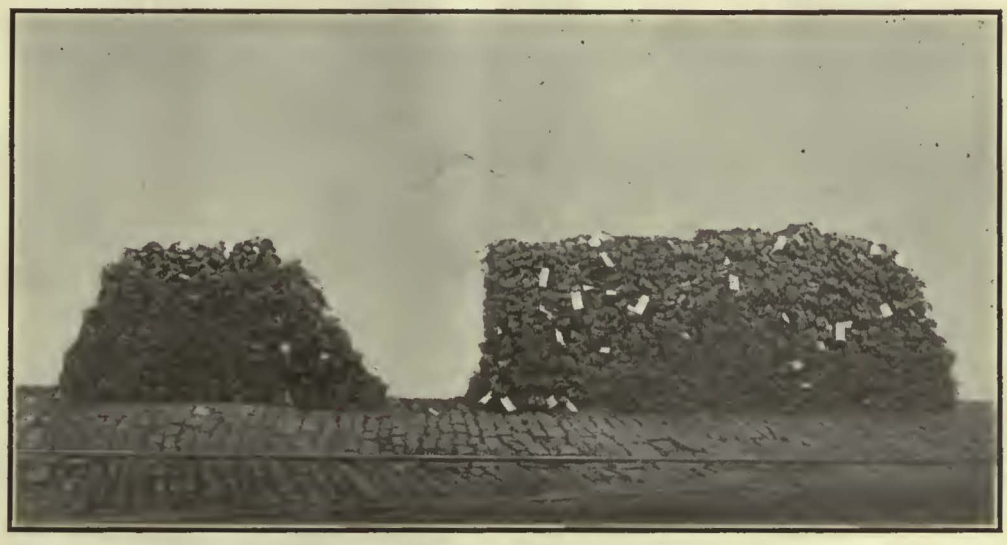

Do You Buy Brake Shoes On Price Or Ultimate Cost?

THIS photograph shows two piles of worn out Brake Shoes. The smaller pile did the same amount of work in the same service as the larger pile. The small one contains the American Brake Shoes and the large pile the ordinary Cast Iron Shoes required for the same work. The American Brake Shoes were 27% higher in price but their use resulted in a *net saving of* 31.8%. The American Brake Shoes, in other words, lasted so much longer and *did so much more work* that they not only wiped out the difference in price but saved the user almost one-third of his total brake shoe expense.

"Best by Test"

THE AMERICAN BRAKE SHOE AND FOUNDRY COMPANY

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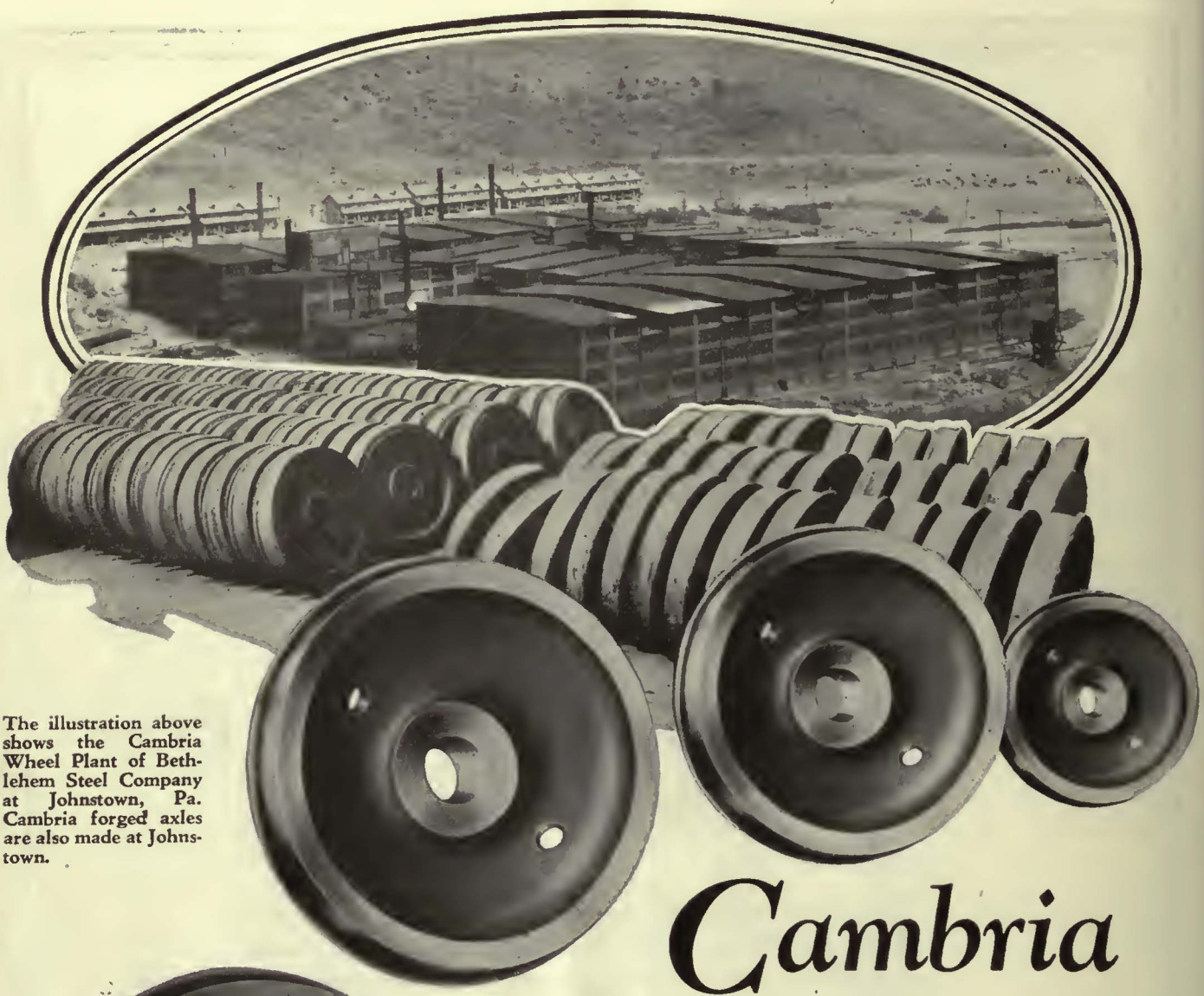

The illustration above shows the Cambria Wheel Plant of Bethlehem Steel Company at Johnstown, Pa. Cambria forged axles are also made at Johnstown.

Cambria

rolled steel wheels for Electric Railway Service

insure maximum mileage and safety

Other Bethlehem Equipment for Electric Railways:

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BETHLEHEM

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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CHARLES GORDON, *Editor*

Volume 68 New York, Saturday, August 21, 1926 *Number* 8

Deformation of Bearings Causes Trouble

WEAR on the sides and tops of journal bearings and on pedestal jaws and wedges permits the bearings to twist from their normal position. Light construction allows deformation under load and results in a non-uniform bearing surface. Loosely fitting covers for journal boxes permit water, snow and dirt to enter and the oil to leak out. These are some of the troubles that the German State Railways have attempted to overcome, as described in an article by Erich Schulze in this issue.

Probably the most interesting conclusion shown by the extensive investigations is the extreme variation in pressure on the bearing surfaces. It was found that the maximum pressure of the ordinary journal bearing was not at its center but at the two ends and that instead of coming directly on top of the axle that the line of greatest pressure was displaced about 5 deg. against the direction of rotation. When bearings run hot the heating was found to begin at the ends. Evidently a construction that will provide uniform pressure throughout the length of the bearing will decrease troubles from hot bearings.

The author states that investigation is being made toward producing a metal for bearings that will provide some lubrication even when hot. Tests with the new design show that the bearings will operate for a limited time even though lubrication is stopped. That is a material improvement over types of journal bearings now in use.

The Hand of the Blacksmith Seldom Produces a Work of Beauty

MANY shop-made devices and home-made improvements to electric cars and shop equipment are described in the issues of ELECTRIC RAILWAY JOURNAL. As a rule these are very ingenious and frequently they produce substantial savings in both time and labor. Few of them, however, have the finished and attractive appearance of a factory-made product. The advantage which results to the railway from the use of such devices is almost entirely utilitarian. Care should be used particularly not to apply these to some of the modern cars in such a manner as to detract from their appearance.

Everyone is talking about "de luxe" cars as a factor toward producing better public relations and increased patronage. If the modern car is to perform effectively in a competitive field it must wear good clothes without obvious patches. If there must be rough parts they should be covered or blended into the whole so that they do not appear patchy.

Of course on cars of older design, such shop-made equipment is less out of place because such cars were more a blacksmith job. But rough, exposed parts have no place on modern cars. While they may serve their purpose mechanically, they detract from the effect of the complete ensemble.

To obtain the proper balance between utility and beauty is only one of the problems of the equipment man. It is an important feature of ride selling. The vehicles used must perform in every sense of the word and a definite part of the performance is appearance.

Standardization May Be Carried Too Far

STANDARDIZATION is the order of the day. That it has resulted in enormous savings in industry no one can deny. It has reduced duplication and has paved the way for simplification of manufacturing processes, of sales methods and of storeroom practices. There is still a great field for further development of standards and reduction of waste, particularly in the electric railway field.

Like all good things standardization has its limitations. Adoption of a single standard for a property may lead to excessive costs, with continuing fixed charges that cannot be justified economically. An instance of this sort is in track construction. One large property, for instance, adopted a standard track design and has since used it for all new work and reconstruction. The design is excellent, and is suitable for the operation of the heaviest cars used on the system and the most frequent headways.

But there are suburban sections in and about this city where cars of a lighter type are used and where the headways are much less frequent than in the central business district. A much lighter track would be ample and it will be many years before the growth of the community would render it inadequate. Yet in order to maintain the standard, track suitable for the heaviest city traffic is laid.

Whether it is essential to carry a standard to this extreme is debatable. Of all parts of a railway, the track is one of the most permanent, and is disturbed the least after it is once installed. Unless the saving due to standardized design and construction methods is such as to bring the cost down to that of a lighter track, there is considerable justification in the adoption of at least two types—one for heavy traffic on congested thoroughfares, and the other for lighter suburban service.

The subject is of sufficient importance to make it well worth consideration. In the final analysis it is a problem in economics, and a definite solution can only be arrived at for each specific case. But a general treat-

This is the issue in August that is devoted essentially to maintenance subjects

ment can be made that permits of ready adaptation. Such a treatment would be a valuable addition to electric railway knowledge.

Underwriter's Label on a Completed Car an Asset

IT IS now possible to obtain an underwriters' label for a complete car. James S. Mahan, president of the Western Section, International Association of Electrical Inspectors, in a talk before the equipment men at Chattanooga spoke of the value of such a label to railway companies.

In discussion, it was brought out that the saving of insurance premiums per car would be from $7.50 to as high as $20 a year, depending on the conditions on the property. At least the saving is more than the initial cost of inspection and label, which is $5 per car. It would be difficult to find a better investment for $5 than this service will bring.

At least one car builder has said that the cost of car construction need not be any higher to comply with the Underwriters' standards than for any other good construction. It does mean, however, that the customer specifying materials must not insist on non-approved materials.

There was a time when the restrictions of the underwriters required certain types of construction that did not meet what many master mechanics believed to be good practice. Metal conduit was not entirely satisfactory. Condensation of moisture proved a nuisance. With the manufacture of new materials the underwriters have broadened their requirements to include flexible wire covering.

It is now quite possible to specify that the entire car shall be so constructed and equipped that it will pass the underwriters' inspection and still include the equipment and construction preferred by the customer with but very few exceptions. To gain the advantage of this approval it must be specified in advance.

New Truck for Electric Cars Offers Many Interesting Possibilities

CARS bought by electric railways during recent years have been largely of the double-truck type. The reasons for this lie in the demand for a larger car body than can be installed satisfactorily on the usual type of single-truck and to the easier riding qualities of double-truck cars. As far as the loads carried by electric cars are concerned, there is no reason why a car should have more than four wheels.

Tracks in city streets necessarily have many short radius curves, which limit the length of wheelbase that can be used under single-truck cars of the usual type. The length of the car body that can overhang the truck is another limitation that must be considered or the side sway and teetering action will be excessive.

An interesting development in car construction is the attempt made in Switzerland to provide a long wheelbase truck for electric cars and still retain the advantage of light weight which goes with a car having a four-wheeled truck. The construction is described elsewhere in this issue. In addition to providing a long wheelbase the experimental truck does not use the axle-hung suspension for the driving motors, but mounts them on a small four-wheeled truck located between the two driving axles. The motors are thus spring supported and their weight does not come as a dead load on the axles.

By use of a cardan drive through bevel and spur gearing from the motors to the axles several important results are accomplished. The gearing is inclosed in an oil-tight casing so splash lubrication can be used and there is no danger of dirt or dust getting in. Gears are located equidistant from the center line between the wheels, preventing any tendency for the axle to be forced out of alignment and reducing the wear of bearings and gearing. The axle for a pair of wheels is cut in two, each half being fitted with a spur gear, which in turn is driven from a jackshaft and bevel gearing. This allows each driving wheel of the corresponding axle to displace itself with regard to the other wheel and makes it easy to negotiate sharp curves. The tendency for one wheel of a pair to slip is also done away with so there should be less wear on rails and wheels. By using a gear ratio between motors and driving wheels about twice as high as with ordinary axle-hung motors smaller and lighter motors can be used.

The new truck construction has a flexibility that will appeal to the mechanical men of electric railways and presents many ideas in design that may suggest ways to improve on present trucks.

Revival of Hudson River as Traffic Artery Suggested

RIVER transportation, fed by crosstown buses, is suggested to the New York Transit Commission to relieve congestion in New York City as a result of a survey made for the commission during the recent strike of subway motormen on the Interborough Rapid Transit Company. The plan advanced contemplates the use of high powered boats to transport persons up and down the North River with bus lines feeding the boats at such points as 125th Street, 96th Street, 42nd Street and Rector Street, with a possible stop at or near 14th Street.

With the coming of the bridges over the East River and the tunnels under both the East River and the Hudson River, many of the ferries fell into disuse. However, the only means of communication with Staten Island is by ferry from New York, Brooklyn and New Jersey and a goodly business by ferry is still done on both the East and the Hudson Rivers by high-speed boats operated at frequent intervals. The suggestion now made, however, contemplates longitudinal traffic on the river from uptown New York to midtown and downtown New York. The likelihood of fogs and of floating ice in the winter are, of course, hazards, but they operate against the present ferries. Greater obstacles appear to be that the river is congested with craft at present and that the proper berthing accommodations might be difficult to secure.

Although the scheme might seem to be a throwback, it has several novel features. Paris presents an instance somewhat akin to the one the author of the present plan apparently has in mind. There, under the Department of the Seine, 130 surface car routes, 53 motor bus routes, 4 railroads operated over private rights-of-way and a steamboat line are all tied in together. On the Seine, in recent years, 40 boats, each of a capacity of 400 persons, were being run as part of the system in which all water and surface transportation facilities are a unit. It is not planned to extend the

river transportation, and reports state that when the present boats wear out they will not be renewed. Furthermore, they have been laid up for some four months the last few winters. This would indicate that in Paris the plan has not been entirely successful under modern conditions.

No matter what the obstacles may appear to be to the suggestion just made in New York, the problem of transporting the millions of the metropolis is too grave and the reputation of the author of the plan as an engineer is too good airily to dismiss the recommendation as impracticable or beyond the realm of realization.

Maintenance Men Have a Part in Creating a Friendly Public

GOOD maintenance as a valuable asset in the establishment of friendly public relations was the essence of E. D. Reed's talk before the Southern Properties' maintenance men at their recent Chattanooga meeting. Good maintenance, of course, helps to make service reliable—and this is essential. But clean cars and the quick repair of little things is what counts in gaining direct public approval. On many small lines, requiring only two, three or four cars, a loose window, a torn seat or broken hardware soon becomes noticeable. It becomes a distinguishing mark for that car. In the end, the part may be repaired or replaced, but delay creates a bad impression in the minds of many people.

If, on the other hand, repairs are made promptly, an eyesore is removed. This requires careful inspection and quick repairs. The result is not only better service but a better public impression. Public relations is a real, though intangible thing to which live maintenance men are giving attention. The operations of all departments affect directly or indirectly a company's relations with its public. But those charged with maintenance responsibility play a leading part in this work. Good housekeeping attracts riders. "A stitch in time" is an important rule of the good housekeeper.

Public Is Getting One-Sided View in I.C.C. Inquiry

FAULT is found with the steam railroads because the only side that the public is hearing in the I.C.C. inquiry into the bus and freight business is the bus and truck side. The *Railway Age* says that the industry it represents has responded nobly in answering the questionnaire and that this is perhaps the best possible witness, but it laments that so far as the picture is concerned that is being presented to the public at the hearings the questionnaire is silent. This criticism also holds true of the electric railways. They are understood to have replied liberally to the questionnaire, but despite persistent urging the hearings so far held, except the one at Chicago, give the idea that they, too, are largely content with the silent presentation of their case.

Of course it is imperative to convince the commission that the situation as it exists contains elements that the railways feel should be corrected, but it is highly desirable for the railways so to present their case that the public may know the full legitimacy of such suggestions as they offer. Electric railway men have attended the hearings, but except at Chicago they have been inarticulate. On the other hand, the public presentation of the side of the motor carriers goes on in a stream almost endless. It is not that the motor carriers are better fortified with facts than are the steam railroads and the electric railways, but that by the very nature of the business in which they are engaged the motor interests are able to judge better the value of their material in helping to create favorable public opinion through the newspapers and in sustaining such opinion once it has been created. They are shouting their case from the house tops. This may be a method in a proceeding of this kind not regarded by those in steam and electric railway work as consonant with their ideas of the dignity of the proceeding, but the railroads and the electric railways may well sacrifice some of their dignity in order to use as effectively as the motor interests are doing the opportunities offered to present their case to the public.

Philadelphia Gets After Bus Parked in Public Streets

LEXICOGRAPHERS may quarrel over the derivation of the word bus-caneers, invented recently in Philadelphia, but the menace intended to be described by the appellation certainly is a serious one. Buscaneer is said to have had its inception in the realization on the part of its originator of the likeness of the bus operator who hogs the street to the old-time buccaneer. Be that as it may, Philadelphia is up in arms against the buses engaged in sight seeing and in touring service that make a parking place of the public streets, and it has ruled against them to the extent that not more than one such vehicle shall be parked on either side of the street in any one block for loading at one time.

As many as eleven buses are said to have used one block at one time in Philadelphia. The idea of the police was that this was nine too many. And public sentiment appears to agree with that decision. Streets so cluttered up became almost impassible for other vehicles, and this is what happened in Philadelphia. So far the disposition of the owners of the vehicles affected has been to comply with the regulatory measure put into effect by the police, but it appears that the Department of Public Safety, as the police of Philadelphia are known, is prepared to make good its threat to compel the operators to observe a degree of order that shall take into account the rights of other users of the streets. In this connection it is interesting to note that Atlantic City, into which buses pour every day in an almost endless stream, has taken similar action.

In the past there have been a few sporadic efforts of this kind at regulation, but none that had behind it the apparent determination of the public officials shown in these instances. A nuisance may be merely a nuisance by inference. On the other hand, a nuisance may grow out of a practice which in its singleness has no earmarks that stamp it as beyond the realm of the reasonable, but becomes objectionable by mere numbers or by the repetitive process. This is what has happened in the case of the bus that parks in the public streets. It has become a nuisance and menace by its numbers. So again it may be said that the word buscaneer may not have its roots well grounded in good usage, but in the sense that the term is being used in Philadelphia it does personify a pest.

In the Foreground the Paving Base of Concrete Has Been Poured. Ahead of This Work Is the Twin Steel Tie Construction Thoroughly Tamped with a Dry Mix of Lumnite Cement and Traprock screenings

Modern Methods Used in Reconstructing Track Under Traffic

The Philadelphia Rapid Transit Company Recently Completed Three Blocks of Track Reconstruction Under Heavy Traffic Conditions, and with Vehicles Using One Side of Narrow Street—International Steel Twin Ties Supporting 7¼-In. Girder Tee Rail, Thermit Welded Joints, and Lumnite Cement All Helped in This Rapid Work

BY USING the old track substructure with twin steel ties supporting a 7¼-in. girder tee rail, the Philadelphia Rapid Transit Company was able to reconstruct three blocks of track on Eleventh Street, immediately north of Market, without interrupting traffic for longer than one period of from 30 to 50 minutes in each block. The street is very narrow, being used for one-way traffic only, with a single track in the center, and is normally greatly congested with vehicular movements, of which about half are of commercial vehicles. The city, desiring to keep the street open, had insisted before the work began that the roadway on the west side of the track should be left unbarricaded.

The work on these three blocks was done in three sections of one block each, one at a time, and was in the nature of a trial to determine the feasibility of two slightly different plans employed.

The old track was built many years ago. It consisted of two concrete stringers running lengthwise directly under the rails with a concrete paving base in between the stringers to support the paving. Imbedded in these stringers at intervals of approximately 5 ft. were cast-iron chairs, on which 9-in. grooved girder rail was supported and held in place by clips. The theory of this early construction was that new rail could easily be relaid by removing the clips and placing the new rail on top of the old chairs. With the passage of time, however, the entire track, stringers and paving base had settled under the weight of traffic in an irregular manner from 1½ to 3 in., depending on the density and nature of the sub-base in the different portions of the street. In order to use the old concrete stringers the new track had to be brought up to grade.

The differences in elevation due to settling, added to the 1¾ in. difference between old and new rail heights, made necessary the use of a tie that could meet the following specifications: extreme shallowness, satisfactory bearing area for the rail base, largest possible bearing area of the tie on the concrete, and reinforcement of the whole concrete structure. For this reason the company's engineers decided to use International steel twin ties.

The First Block

After the paving contractor had finished the work of removing the old granite blocks between the rails, and for a distance outside of the rails that would allow for the installation of ties, engineers took numerous elevations to determine the amount of chipping that would be necessary to install the steel ties. The chip-

ping of the concrete was done with pneumatic tools in a comparatively short time because the track had settled considerably in this block and only a few spots remained high.

The new rail, a 7¼-in. girder tee section, was then distributed end to end along the side of the street reserved for the track-work, and all joints were thermit welded prior to fastening the rail to the ties. Rail clamps were used to hold the rail ends for welding. At the end of each block of welded girder tee rail, a 5-ft. section of 9-in. girder rail was welded to make a compromise joint. The outer ends of the 9-in. girder sections were drilled for bolting to the old rail at the intersecting streets. When the welding and drilling were completed there were two continuous sections of rail, each as long as the block, lying on the shoulder of the street ready for placement.

After the trench was prepared and the rail welded, were laid on a dry sand and cement cushion on the old concrete stringers. At the same time that the blocking was in progress, the balance of the steel ties were hooked to the rails. Side blocking was also used to maintain the track alignment.

Holes were then made in the plates of the twin steel ties to correspond to the holes in the old cast-iron chairs, and bolts were placed from the chairs through the tie plates so that the track could easily be held down by tightening up on them. The track was then brought accurately to grade by wedging under the rail on the wood blocks in the cement and sand cushion and pulling down on the anchor bolts fastened to the chairs. All this was done under a traffic which varied from 56 cars per hour during the rush period to 40 cars per hour during the non-rush period.

Due to the uneven settlement of the old concrete stringers, there was a space under the bottom of the

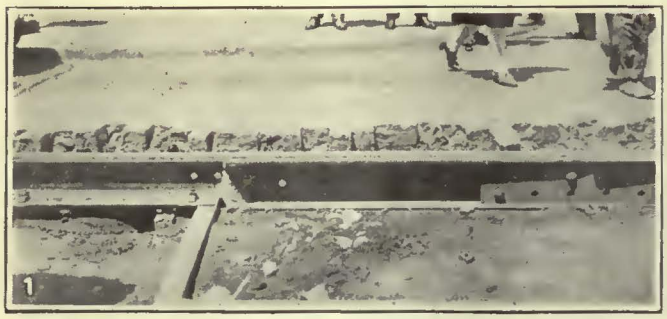
Rapid Work Characterized This Philadelphia Track Reconstruction

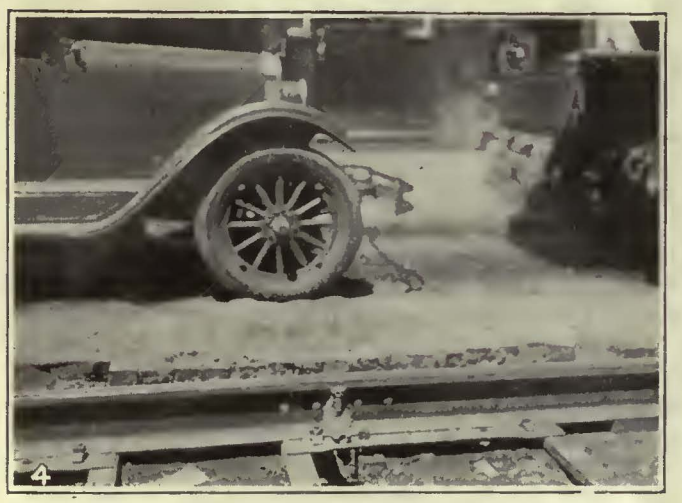
No. 1. The first block completed made an excellent job.
No. 2. No time to waste. After a car passes, workmen pick up their tools and proceed. Here men are removing a few remaining high spots with pneumatic picks.
No. 3. The third block stripped of paving between the rails and to the curb on one side, ready for the replacement of new rail.

preparations were made to cut in the new track at night, this being the only operation contemplated to interrupt traffic. At each end of the block the rail heads of the old track were saw-cut for the connection, the rest of the cut being done by torch. When the old rail was burnt into convenient lengths and removed, 4-ft. pieces of old wood ties were placed in the trench on about 20-ft. centers, and the steel ties placed on 5-ft. centers to correspond with the locations of the old chairs. The long sections of welded rail were then pulled by means of a chain attached to the draw-head of a street car, about 15 ft. up the street to a point exactly opposite the cut-in joints on the old track. They were immediately snaked into position to approximate gage, the short pieces of old wood ties acting as supports. As soon as the end joints were partially bolted and a few steel ties hooked to the rail to hold the gage, traffic was resumed. The balance of the construction was done under traffic.

At this point the short pieces of wood ties were removed, and in order to get approximate grade were replaced by wood blocking 6 in. x 9 in. and from 2 in. to 4 in. thick every 5 ft. under the rail. These blocks twin steel tie plates varying from 4 to 6 in., this being greater than desired for proper concrete tamping. In order, therefore, to provide a tamping pocket from 1½ to 2 in. deep under the plates of the tie and under the rail, a layer of concrete was poured on top of the old stringers and half way up the channel of the tie, mixture of 1:2½:5 being used. This concrete was poured at night from 11 p.m. to 2 a.m. and was made with Lumnite cement so that it could acquire its initial hardening under traffic on the night schedule of about a twenty-minute headway. At 9 o'clock that same morning, this concrete was apparently as hard and strong as portland cement would have been in two weeks, and, since it covered the bottom leg of the channel of the ties, it acted as an additional hold down for the track.

After carefully observing the track for any deflection due to imperfections in this partial concreting which gripped the tie, the tamping process was started. A 1:3 mix of Lumnite cement and traprock screenings was shovel-mixed and hand-sprinkled, wet enough to stick and pack hard, but not sufficiently so to puddle any free water when tamped. This tamping material was placed under the plates of the steel ties and under the





Extremely Shallow Ties Were Essential in Expediting the Reconstruction and Utilizing the Old Concrete Foundation

No. 1. Five-foot section of 9-in. girder rail thermit welded to the end of the new stretch of 7½-in. girder tee-rail, thus making a welded compromise joint.

No. 2. Method of holding down twin steel tie to cast-iron chair of the old substructure.

No. 3. Rebuilding a block of track under severe traffic. Every few seconds a car passes and a steady stream of vehicles is always moving on the open shoulder of the street, which was at all times open for traffic.

No. 4. Where a thermit weld, a cast-iron chair and an International steel twin tie meet. The tie plate was cut out slightly to allow the weld projection to drop below the plate.

rail itself throughout the entire length of the track. It was both hand-tamped and power-tamped. The tamping was a comparatively simple process, being immediately understood by the crews, who were familiar with the use of pneumatic tampers. The entire block was done between 10 a.m. and 5 p.m. despite heavy car and automobile traffic on the active side of the street.

The job was left in this condition for a day to observe any deflections that might take place, but none were found. After a final inspection the usual 1:3:6 mixture of foundation concrete was poured over the old concrete stringers and ties, and brought up to the level desired for the paving base, which was 6 in. below the surface of the rail. This base allowed for a 1-in. sand cushion and a 5-in. layer of granite block. A sufficient number of blocks were nose cut for use in providing a flangeway along the gage line. After the blocks were firmly set on the sand cushion, a hot mastic filler, 50 per cent asphalt and 50 per cent sand, was poured between the blocks and the job completed. Mastic filler was used instead of grout in order that immediate use of the street could be made by vehicular traffic.

THE SECOND BLOCK HAD MORE TRAFFIC

The second block adjoining the first had even heavier traffic conditions, as far as the frequency of street cars was concerned, and the transportation department again allowed only 40 minutes in which to remove the old rail and place new rail in position ready to run. The paving was removed from the track area in a manner similar to the first block. The new girder tee rail was previously thermit welded, compromise joint sections were made on the ends similar to those in the first block, and the whole block of rail thus made ready to be snaked into place.

Because the concrete stringers had not settled to such an extent as in the first block, the steel ties were constructed in a manner to give them less depth. This was accomplished by riveting the cross channels flat, instead of vertical, making a total depth of tie of only 1¾ in. This saved considerable chipping of concrete.

In order further to economize on the time allowed, and resume traffic at the earliest possible moment, full-length old wood ties on 20-ft. centers were used in this block for spiking the rails temporarily to gage. As another means to save time, the holding-down bolts on the old rail were burnt off and the rails snaked out in single lengths a block long onto the vehicular side of the road, which was closed for a few of the early morning hours. The rail was then cut with the torch into 30-ft. lengths and hauled away. Traffic was resumed at this point and the work of hooking on the steel ties, blocking up the track, removing the temporary wood ties, etc., was carried on as before.

As there was less settlement in this block it was not necessary to construct tamping pockets, since the intervening space between the top of the old concrete stringers and the undersides of the tie plates was about correct. Because of the lesser settlement in this block the tie channels of the steel ties were bolted to the plates on the flat side of the channels, thus making the depth of the tie only 1¾ in. In this way considerable chipping of the old base was avoided. As soon as the track was firmly bolted down to the old chairs and brought up to grade, power tamping of the Lumnite cement and traprock mixture was carried forward. After letting the track remain in this condition for a

day to observe possible settlements or failures, the paving base concrete was poured and the paving laid. In this block the paving base concrete was made of Lumnite cement instead of portland.

THE THIRD BLOCK

The third block was handled in the same manner as the second, as this method proved to be the faster and allowed for greater salvage of the old concrete base.

The foregoing experience in track renewal work has proved to interested parties that wherever there is an old concrete base on which track can be built of steel ties and Lumnite cement, economical reconstruction of track is possible under heavy traffic conditions without disturbing the operation of cars for more than one short period at night.

The several views reproduced show the work in its various stages and indicate the possibilities of such reconstruction methods under dense traffic conditions.

Accident Prevention Bonus for Brooklyn Trainmen

AN ACCIDENT prevention bonus plan under which motormen, conductors and safety car operators will receive a bonus of $5 for each 30-day working period in which they operate their cars without an accident has been established by the Brooklyn City Railroad, Brooklyn, N. Y.

The awards will be distributed to employees on Dec. 15 of each year, so that motormen, conductors and safety car operators with clear records for one or more 30-day working periods will collect Christmas dividends on their records for safe operation.

The rules governing the accident prevention bonus plan were announced by C. E. Morgan, vice-president and general manager of the company, as follows:

The Brooklyn City Railroad will on Dec. 15 of each year pay to each conductor, motorman and safety car operator in service on that date the sum of $5 for each 30-day working period complete on or before Nov. 30 of each year during which such employees operate their cars without an accident.

It is understood that the term 30-day working period does not mean a calendar month, but refers to days actually worked (excluding days off). To receive credit for a working day, conductors, motormen and safety car operators must work at least eight or more hours. Further, such employees will only be entitled to bonus money earned since last date of appointment or reappointment.

In case conductors or motormen or safety car operators have accidents occurring in, on or around their car and fail to report same as required by the operating rules, any conductor, motorman or safety car operator who becomes involved in such no report case shall automatically lose the bonus for the particular period of 30 days in which the date of the accident is contained, in addition to being subjected to other disciplinary action.

On two-man operated cars the conductor and motorman, as far as accidents are concerned, will be considered a crew. Any accident of any nature in which their car is involved during their tour of duty will be charged against both the conductor and the motorman in charge of such car.

All accidents of whatever nature occurring in, on or around their car will be charged to conductors, motormen and safety car operators except such accidents as can be clearly defined as not being the result of any action or lack of attention to duty of such conductor, motorman or safety car operator. This responsibility to be finally determined by the management after full investigation of the accident and contributing causes thereto.

It is therefore important in all cases that employees secure the names and addresses of all possible witnesses, as the statements of these witnesses will be one of the large factors in determining the responsibility for the accident.

Various Stages in the Rebuilding of the Track on North Eleventh Street, Philadelphia

No. 1. Old rail on North Eleventh Street, Philadelphia, ready for removal. On the right may be seen the new rail thermit welded ready to be placed. The change was made at night almost between two owl cars, the delay to street car traffic while the old rail was removed and the new rail installed being only 30 to 50 minutes.

No. 2. With the new rails and twin steel ties in place, the track was brought to line and grade. The tie plates were bolted down to the cast-iron chairs of the old construction, and held up by blocking and wedges every 5 ft. Alignment was obtained by blocking aginst the highway road shoulders. Due to the fact that this old street surface had sunk several inches, the steel ties channels were bolted to the plates on the side of the channels the normal construction of this tie.

No. 3. In this block the old street surface had not sunk so far, and the tie channels were bolted on the flat side to avoid excessive chipping of the old sub-base. The job as illustrated is ready for the tamping of the dry mix, under the steel tie plates to align the track.

Buffalo & Erie Demonstrates Magnetic Brake

Railway Executives, Public Officials and Manufacturers' Representatives Witness Tests on Single and Double-Truck Cars

DEMONSTRATIONS of the effectiveness of the new type magnetic brake which has been applied to all of its cars by the Buffalo & Erie Railway Company, were made in a series of tests on Tuesday, Aug. 17, at which approximately 60 railway executives, public officials and manufacturers' representatives were the guests of the Buffalo & Erie property. This brake, which is operated by direct trolley voltage in combination with the safety devices air equipment, was described in detail in ELECTRIC RAILWAY JOURNAL for July 17, 1926. The development is the result of an effort by the railway to increase the factor of safety in its operations while at the same time maintaining maximum possible speed with light, economical and comfortable equipment. On the Buffalo & Erie property, fast operation is complicated by numerous grade crossings and many miles of trackage either on or immediately adjacent to a heavily traveled highway.

Ability to stop a car in minimum distance and time without serious inconvenience to the passengers has been considered the most effective means of increasing safety without sacrificing the all important element of speed. Results obtained during a period of a month since the magnetic brakes have been applied to all of the company's cars indicate the value of the improved brakes in actually reducing vehicular accidents. During this period since all of the cars have been equipped, there have been only two such accidents—comparatively minor in nature. In the corresponding period last year, there were seventeen accidents of this character.

Three sets of demonstration tests were made for the visitors. In each case measurements were made of the stopping distance and stopping time for emergency air brake applications alone in comparison with the combination of air and magnetic brakes. The tests were carried out on a single truck car and on a double truck car of the company's standard type, weighing approximately 37,500 lb.; first, with normal rail and then with 1,075 ft. of both rails covered with oil. In all cases, reservoir air pressure was approximately 70 lb. Results of the test are as follows:

BUFFALO AND ERIE BRAKE TESTS

Car	Brake	Rail	Speed-m.p.h.	Time to Stop Seconds	Dist. to Stop Feet	Reduction Time	Reduction Dist.
Single truck	Air only (emergency)	Normal	21.4	7.4	141.0	....	.....
Single truck	Air and mag (emergency)	Normal	22.0	4.8	97.0	2.6	44.0
Double truck	Air only (emergency)	Normal	48.0	17.0	685.0	....	.....
Double truck	Air and mag (emergency)	Normal	47.1	12.2	493.0	4.8	192.0
Double truck	Air only (service)	Oiled*	47.1	32.5	1475.0	....	.....
Double truck	Air and mag (Service)	Oiled*	45.4	20.2	761.0	12.3	714.0

No sand used during tests.
*Both rails oiled for 1,075 ft.

At the completion of the tests, the visitors were entertained by the railway at the Shorewood Country Club. F. C. Bacon, vice-president of the International Utilities Corporation, owners of the property, and George MacLeod, vice-president and general manager Buffalo & Erie, acted as hosts. Commenting on the significance of the tests, Mr. Bacon pointed out that ability to control rapidly moving equipment at various speeds is a vital factor in the continued improvement of railway service. He explained that a careful analysis of accident statistics on the Kentucky Traction and Terminal property had shown that front end accidents could be reduced 72 per cent, provided the braking rate could be increased from 30 per cent to 35 per cent. It was this study, he said, which led to the present improvement. Mr. Bacon complimented the Cincinnati Car Company and the General Electric Company for their co-operation in working out the new equipment.

Some of the Electric Railway Executives and Manufacturers' Representatives Who Witnessed Demonstration of New Combination Air and Magnetic Brake Developed by Buffalo & Erie Railway

Reading from the left to the right: F. A. Nichols, general manager, C. G. & P. Railway; W. W. Oskert, Buffalo & Erie Railway; W. G. Stuck, superintendent of equipment Kentucky Traction & Terminal Company; A. L. Kasemeier, vice-president Cincinnati Car Company; C. M. Harrison, superintendent Northwestern Electric Service Company; F. W. Bacon, vice-president International Utilities Corporation; K. Connor, superintendent of equipment Jamestown, Westfield & Northwestern Railroad; A. Davis, air brake engineering department General Electric Company; J. P. Vernor, Westinghouse Electric Company; R. B. Miller, Stark Electric Railroad; R. W. Palmer, General Electric Company; C. J. Ellis, Cincinnati Car Company; W. R. Goodknight, master mechanic Buffalo & Erie Railway; E. W. Sweezy, Stark Electric Railroad; G. J. Baker, superintendent Buffalo & Erie Railway; P. J. Wood, master mechanic Erie Railways; Leon Johnson, general superintendent Jamestown, Westfield & Northwestern Railroad; George MacLeod, vice-president and general manager Buffalo & Erie Railway; Daniel Durie, West Penn Railways; Henry Bush, superintendent of transportation, Kentucky Traction & Terminal Company.

Choosing Materials for Railway Motor Commutators

Use of Hard-Drawn Pure Copper Bars and Mica Strips With a Dry Bond Are Two Essential Factors That Helped to Solve the Problem of Preventing High Bars

By Jesse M. Zimmerman
Renewal Parts Engineering, Westinghouse Electric & Manufacturing Company

IN THE early days of railway motor manufacture, a world of grief was experienced with commutators and commutation. When the motors were placed on test, some commutators developed high bars. Then the motor had to be dismantled, the commutator tightened, and the face "re-turned" before the machine could be put into service. Sometimes the commutator had to be tightened two or three times. The unfortunate part was that some of the motors developed high bars after they had been in service but a few months. Those who passed through these days of trial considered them as a real "Waterloo" for railway motor commutation.

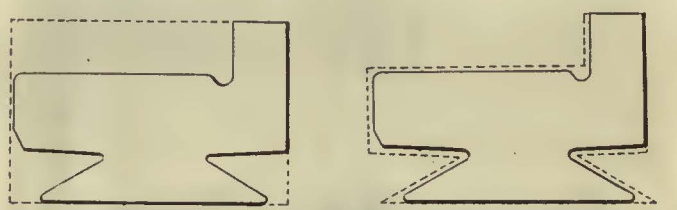
Our failures and difficulties made us search ways and means to overcome them. This search has resulted in five superior features in manufacture, namely, mica strips with a dry bond, hard-drawn pure copper bars, correctly molded mica V-rings, increased mechanical strength of the spider and details and an increased knowledge as to the accuracy required to machine commutator Vs.

Poor Mica Strips Caused High Bars

In the early commutators, the mica strips were made of mica plate having a high bond content. The mica plate was made of high-grade mica splittings, but the methods of making mica plate were less advanced. During this same period, the commutators were made arch-bound. When the commutator was going through the seasoning period, the bond oozed out from between the bars. This caused the mica to shrink, relieving the arch-binding between the bars. The seasoning process did not harden the bond completely. Therefore, the bond continued to ooze out when the motor went into operation. Due to the centrifugal force, the bars rose where the bond had oozed out excessively. It was evident that one of the difficulties was due to the mica strips.

Design engineers made a search for an insulating strip which was adapted for commutator service. Asbestos was one of the numerous insulating materials tried. It was found that a mica plate with a low bond content which was properly seasoned was superior to all other materials tried. The mica strips used in the present-day railway motor commutators should be made of mica plate described as follows:

The mica plate is made from selected pure white splittings, usually about 1 mil thick, free from clay spots, metallic spots, cross grains, heavy edges and heavy pieces. They are held together with a minimum quantity of dry bond, which will flow at a medium temperature. The advantage of the "dry method" is that it permits the use of a bond which does not contain alcohol as a solvent. Alcohol is dangerous because it does not evaporate completely. When mica plate containing alcohol is used in a commutator, the alcohol may evaporate and migrate to some part of the commutator and condense. This sometimes occurs at the point of the Vs producing a weak spot in this location.



Mica Strips as They Are Most Conveniently Supplied for Repair Purposes. At Left, Rectangular Piece Sawed to Length. At Right, Punched Mica Strip

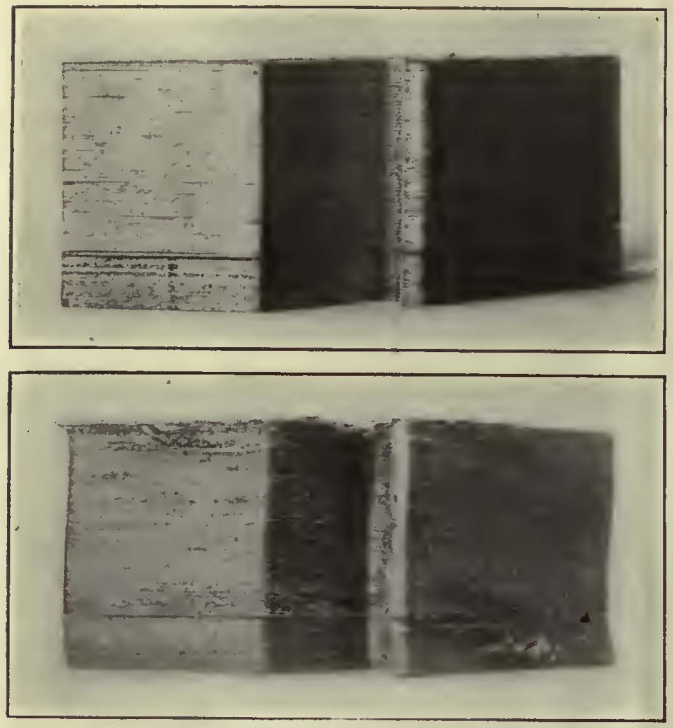
Great care is taken during the pressing operation to insure uniform density. Special pads are placed between plates to obtain this result. The mica plate must pass through a seasoning operation which serves to make the bond infusible. It is milled with an allowable variation of plus or minus 0.0010 in. If the variation exceeds this value, the distance from any bar to the corresponding bar under the next pole may vary more than plus or minus $\frac{1}{32}$ in. Mica plate will compress a certain amount when the assembled segments are heated and drawn tight with the clamping ring. This compression factor must be taken into consideration when milling the mica plate.

All finished mica plate should have a surface coat of pure orange shellac. It has the following advantages: (a) It prevents flaking and scaling of the mica splittings in handling and storage. (b) It keeps the mica plate free from dirt and moisture while in storage. (c) It tends to reduce oil and moisture absorption when the commutator is in service. The shellac cements the adjacent bars to the mica strip, thus reducing the creepage of oil and moisture along the copper bar. (d) It facilitates assembling. By heating segments before the Vs are machined the shellac glues the segments together. Therefore, when the banding wire is cut they remain in a firm body and will not fall apart. This makes it possible to assemble the parts of a V-bound commutator without skewing the bars.

Mica plate should not absorb more than approximately 0.75 of 1 per cent of its own weight of oil when placed between two commutator bars under working pressure and immersed in oil for 24 hours. It should

also stand a pressure of 10,000 lb. per square inch when heated to 150 deg. C. without showing a slippage of mica or squeezing of the bond.

A good means for testing mica strips, to determine whether the bond has been properly seasoned, is to place a dozen strips between two parallel steel bars which have a bolt at each end to exert a clamping action. The steel bars should be strong enough so that they will not bend. After the strips have been placed between the bars, under pressure, their thickness should be measured cold. Then they should be heated to at least 150 deg. C. A flame should not be allowed to strike the strips, as it will consume the bond. When they are thoroughly heated the bolts should be tightened to the same pressure as that originally used and the whole should then be allowed to cool. The thickness of the



Two Sets of Mica Strips After Having Been Heated and Pressed Under Identical Conditions

Those above show that the bond was properly seasoned and that the slippage of mica and the oozing of bond was negligible. Those below show visible signs of slippage of mica and oozing of bond. This is an indication that the bond was not properly seasoned.

assembled strips should again be measured to determine the amount of compression. Absence of slippage of mica or oozing of bond is an indication that the bond was properly seasoned. If the bond squeezes out, the strips are not fit to be used in a commutator.

A photograph was taken to show two groups of mica strips after they had been under identical tests. Group No. 1 shows no effect due to compression because the bond was properly seasoned. Group No. 2 shows the slippage of mica and the oozing of the bond. This is an accurate illustration of how the two types of mica plate will act after they have been in the commutator. It is well for railway operators to give mica plate the test outlined before it is used for repair.

The question of how to order mica strips for repairing commutators has been asked by many railway operators. The manufacturer of the original commutator will supply mica strips either punched to an unfinished size or in rectangular pieces. When the Vs and necks of the copper bars are punched for manufacturing purposes, the mica will be punched in the same manner. This mica die will leave ☆ in. material on each side of the V for finishing purposes.

When the mica strips are received in punched form, they can be finished very easily by pasting the strip to the copper bar with shellac. When the shellac is dry, the two should be placed in a vise with the mica strip toward the workman. The Vs can be cut to the same size as the copper Vs. In cutting, the stroke of the knife should be toward the copper. In this manner the mica will cut without tearing. It may be necessary to take a finishing cut with a knife file. If so, the file should be handled in the same manner as the knife.

When the sale of a certain commutator is small, it does not pay the manufacturer to make a die for punching the Vs and neck in the rough, for it is cheaper to make the commutator from the rectangular copper bars and mica strips than to make a set of punching dies. Where this condition exists the mica strips will be rectangular for repair purposes. When rectangular mica strips are received it is best to paste each to the bar with which it will be used. The V can then be cut.

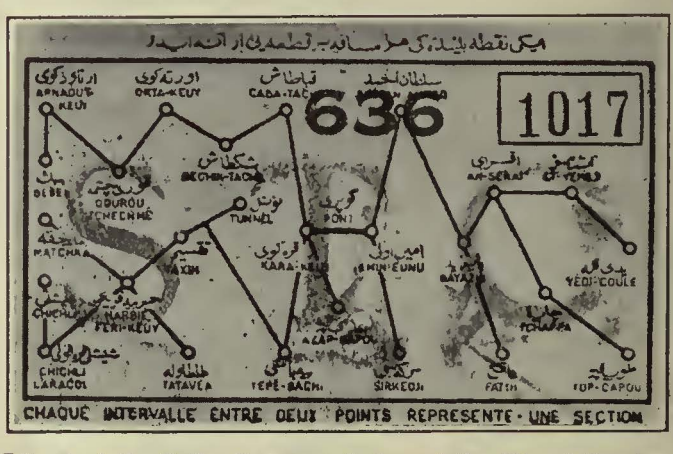
It is impracticable to finish the mica strips to exact size because it would have to be done by hand to template. Since the method of finishing them, when the finished bars are available for use as a template, is so simple, the extra cost for labor would not be warranted.

When a complete commutator is to be refilled. a set of mica strips will be required. It is best to purchase the mica in either of the previously mentioned forms.

After the Vs have been finished the mica strips should not be removed from the copper bars but assembled while they are stuck together. After the commutator has been assembled cold the bars should be aligned properly and the commutator heated to a temperature of from 125 deg. to 150 deg. C. While hot and under pressure the tightening can be done satisfactorily.

System Map Shown on Transfer

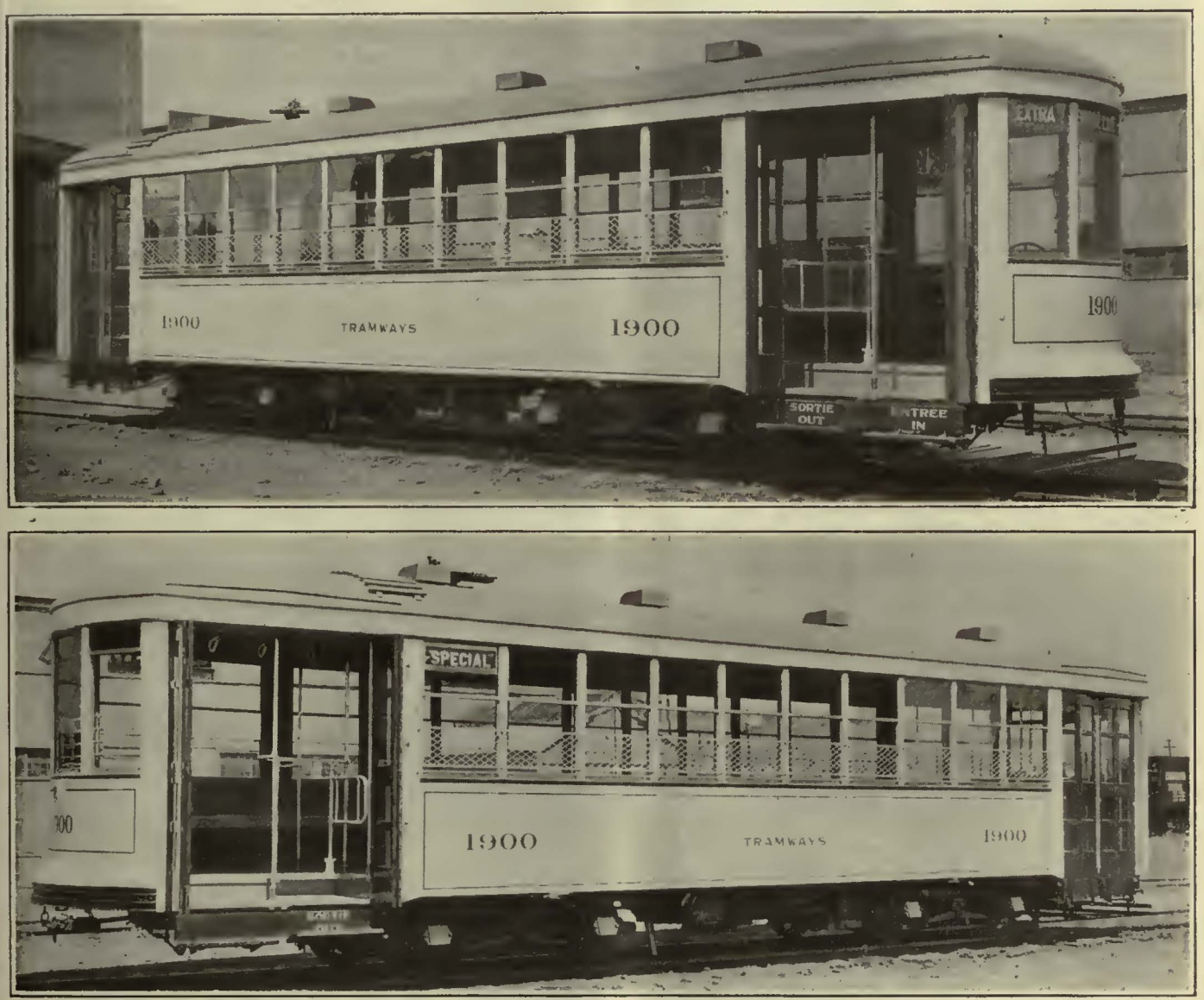
BECAUSE of the cosmopolitan nature of the population of the city, the Societé des Tramways de Constantinople, Turkey, has found it desirable to print on the face of its transfers a complete map of the system, rather than to rely solely upon a list of transfer points. Zone fares are charged as is common on European tramways, and the limits of each section are indicated on the transfer by small circles, as shown in the accompanying illustration. Names are printed in both French and Turkish.



Layout of the Entire Tramway System of the City of Constantinople Is Shown on the Face of the Transfers

Four-Door Single-Ended Car for Montreal

An Interesting Type of One-Man, Two-Man Car with Special Provisions for Operating in Very Cold Weather—These Include Side Construction with Steel Plates on the Inside and Plymetl Outside for Insulation, a Different Door Combination for Cold Weather, Etc.



Each Platform of These Cars Has a Door for Entrance and a Door for Exit, but the Rear Door on the Rear Platform Is Used Only with Two-Man Operation

FIFTY cars of a novel type for single-end operation are being put in service in Montreal by the Montreal Tramways. The first car of this order was completed by the Canadian Car & Foundry Company toward the end of last month and appeared on the streets in Montreal a few days later. Delivery of the other cars on the order will follow shortly.

The chief objects sought in this car were as follows:

1. Minimum weight, consistent with sufficient strength and rigidity for long life under general service conditions.
2. Minimum deterioration and low maintenance cost.
3. Large seating capacity with comfortable, sanitary seats.
4. Easy riding qualities combined with freedom from noise and vibration.
5. Automatically regulated heating equipment, full safety devices and automatically controlled braking apparatus.
6. Attractive external appearance with noticeable color feature to distinguish this type of car from others in service on the same route.
7. Full provision for one-man operation in regular service, with rear vestibule construction to permit of rapid, inexpensive adoption for standard two-man operation, if required.

The principal dimensions of the new cars are given in the table on page 294.

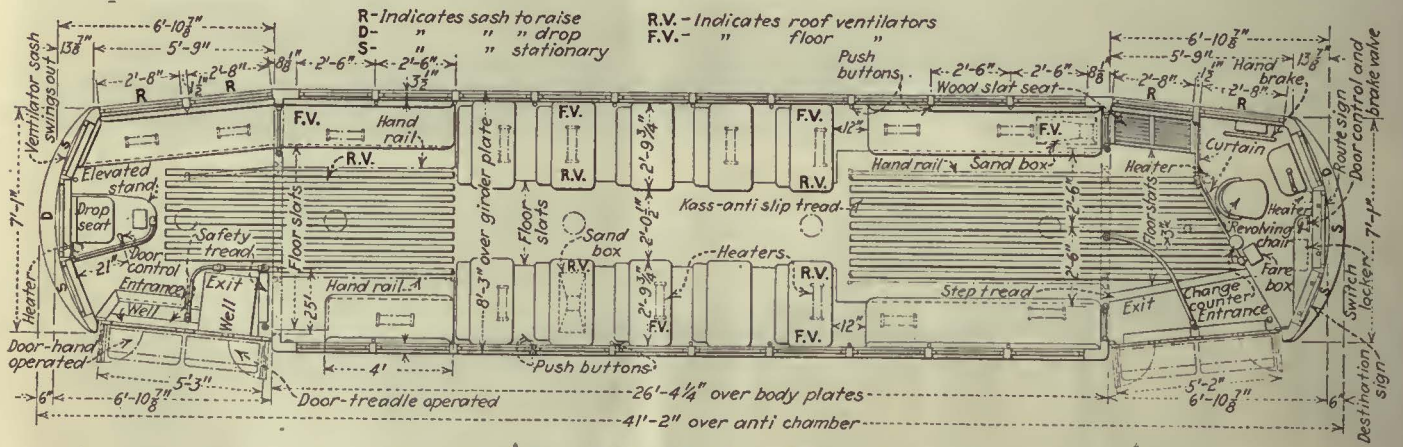
PRINCIPAL DIMENSIONS OF MONTREAL ONE-MAN, TWO-MAN CARS

Length over all	41 ft. 2 in.
Width over all	8 ft. 3 in.
Truck centers	17 ft. 7 in.
Wheelbase of trucks	5 ft. 4 in.
Diameter of wheels	26 in.
Distance top of rail to top of step	15 in.
Distance top of step to top of step well	11 in.
Distance top of step well to top of car floor	6⅝ in.
Height top of roof above top of rail	10 ft. 8⅝ in.
Weights:	
Car body	15,200 lb.
Trucks	10,000 lb.
Equipment	8,800 lb.
Total	34,000 lb.
Seating capacity:	
One-man	45
Two-man	44

UNUSUAL DOOR COMBINATION

The most striking feature of the floor plan of this car, which is single ended, is the use of four doors, two at each end, one for exit and the other for entrance. Three of these doors are air-operated, but the rear door on the rear platform is hand-operated, being limited in its use to providing an entrance only when the car is being operated by two men. At that time, the conductor occupies a position on the elevated stand shown at the rear of the car. A portable fare box is placed in the holder directly in front of him.

Since these cars will be known by their distinctive color as one-man front-entrance cars, passengers will be accepted at all times at the front end. At crowded corners where loading is heavy and time is of importance, passengers will be invited by a street supervisor or inspector to board the car at the rear end.



Plan of Four-Door Single-Ended Car of Montreal Tramways

The exit door on the rear platform is treadle operated at all times. The mechanism is so arranged that it cannot be operated until the air brake valve is in "door open" position. The motorman's light signal is controlled by the rear doors only, and if a motorman should attempt to start his car when a rear door is open the brakes are automatically applied in emergency position.

The aisles leading to the exit doors on front and rear platform are protected in each case by an outwardly swinging gate to be described later. All barriers are of aluminum piping with wood filler.

DESIGNED FOR ONE-MAN OPERATION

The company expects that the usual operation of the car will be by one man only. Two-man operation may be adopted for one or two trips per day during the rush hour on certain routes. The management believes that the only assistance that need be given to the operators of these cars when in one-man service is the use at four or five congested points of ground men or street supervisors, whose sole duty will be to invite transfer passengers to enter the car at the rear. Having no other duties to perform, such men can quickly and efficiently examine and collect transfers, relieve the operator of this work and provide a short-cut to that part of the car which is usually the least crowded. It is believed that such an arrangement will result in quicker handling of passengers than is now accomplished by regular two-man operation.

At terminals also where there is a prepayment area or where there are street collectors, passengers may be admitted to the car through the rear door. At other times, the rear door of the rear platfom is closed and passengers enter the car through the front door of the front platform. The fare box is on the barrier on the side nearest the operator. There is also an aluminum change plate on the barrier and a lamp to illuminate the change plate at night.

Passengers in one-man operation can leave through the doors adjacent to the body on either the front or rear platform. The latter, as already explained, is treadle operated. Each of these exits is protected by a light aluminum pipe swinging gate, as already mentioned. This gate is fitted at the bottom with a closing device with oil dashpots. The lower bar of this gate is 17 in. above the floor and the upper bar 14 in. above the lower bar. On the outside of the gates are the words, in three lines, "No passage defendu." This is to warn boarding passengers that this passageway is for exit only. Incidentally, it might be said that all car signs in Montreal have to be in both English and French, and in this expression the middle word, fortunately, belongs to both languages, so that it does not have to be repeated. On the inside of the gate are the words "Exit; sortie." All doors are of the double folding type and all except the rear door on the rear platform are pneumatically operated. The car framing is arranged so that this rear door can be equipped with a door engine later, if it should be found desirable.

The door control is entirely under the direction of the motorman and is interlocked with the motor control. The combinations possible are:

1. Only the front entrance door open. This is used when there are no alighting passengers.
2. All three pneumatically operated doors open. This is the usual combination with one-man operation.
3. The entrance door and rear exit (treadle) door open. This combination is used with a lightly loaded car during very cold weather as the car is less chilled with two doors rather than with three doors open.

4. All four doors open. This combination is used with two-man operation or with one-man operation only at the end of a route, at a prepayment terminal or when there is an inspector at the rear entrance door.

A special valve has been put on the door engine operating the rear treadle door so that the door will not close until the step is in a vertical position. This avoids any possible danger of the car starting when a passenger has one foot on the step but is resting most of his weight on the ground on the other foot.

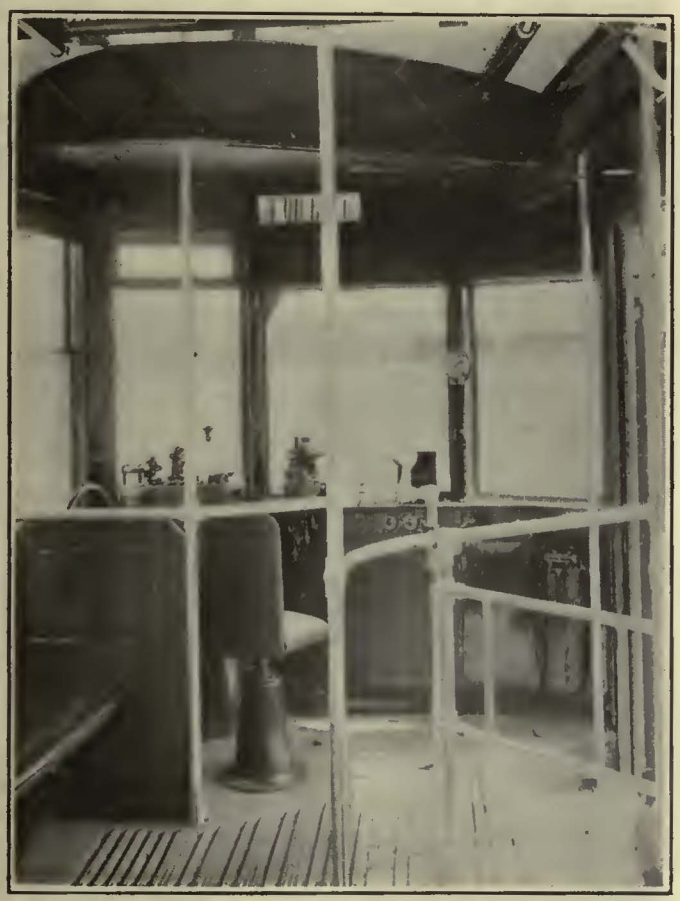
Interior Arrangements

The seating arrangement, as shown in the plan, provides for five cross seats on each side of the middle of the car and longitudinal seats at each end. The seats are of Hale & Kilburn make. The floor with the exception of the step wells is level from one end of the car to the other.

The flooring in the aisle and in front of the longitudinal seats is of maple strips, with Kass 2-in. anti-slip strip coverings over two of every three adjoining maple strips.

The motorman's seat is upholstered in leather and is of the revolving type. The piping and other operating equipment in the front vestibule are inclosed in a cabinet, leaving only the handles and switches visible. The hand brake is at the left so as to be entirely out of the way of entering passengers. A mirror above the center sash gives the motorman a full view of the car interior. The light switches are within easy reach of his position. One reason for this arrangement of light switches is that a number of the cars pass through a tunnel, and the motorman has to be in position where he can turn the lights on and off quickly.

The interior of the car is finished in cherry with green enamel headlining. The handholds are of the sanitary retrieving type. All steps have Kass non-slip treads. The sash is of brass and the ventilators are protected on the inside with a polished brass grill.



On the Front Platform All Piping Is Incased so as to Be Out of Sight. The Motorman Has a Comfortable Revolving Chair

With Exits at Each End This Car Unloads Very Quickly

Construction Details

The body construction is unusual because the steel side plates are on the inside instead of the outside of the car. The outside of the car is ply-metal sheathing and the space between this sheathing and the steel plates is filled with ½-in. Salamander heat insulation. The purpose of this form of construction is twofold. One object is to reduce corrosion, because with the low temperatures experienced in Montreal it was found that with the steel plates on the outside condensation would form on the inner side of the plates. The second expected result from this form of construction is that there will be less noise.

The color selected for the exterior differs from that used on the other Montreal cars, which is green with fawn-colored side posts and maroon trimming. The purpose was to make them more conspicuous and immediately recognizable as "front entrance" cars, so the body color selected was cream with maroon trimmings and light brown roof. The lettering on the exterior is kept to a minimum, as the only word used is "Tramways." As this word is the same in both English and French it answers for both languages.

Trucks and Equipment

The trucks used were built by the Canadian Car & Foundry Company and are very much like those on the previous Montreal cars, but with some modifications. The changes introduced have been directed primarily toward reducing the number of parts, especially the wearing parts, and keeping down the weight.

The cars have Westinghouse equipment, including variable load brakes, four 510-A 35-hp. motors and K 35-HH controllers. Other equipment, not already mentioned, includes Electric Service Supply Company's compensated lighting fixtures, Cleveland fare boxes, H. B. lifeguards, National Pneumatic door mechanism, Peacock hand brakes, Railway Utility ventilators, Faraday signal system, Rico grab handles, Whipple bump-

ers and Consolidated thermostatic control, with the latest type of visible thermostat. The heating equipment on forty of the cars will be the open coil type of heater of the Consolidated Car Heating Company. Five of the cars will be fitted with the new type of Consolidated inclosed heater with G.E. sheath wire heating unit and five cars of the 50 on order will be equipped with Chromolox heaters of the Railway Utility Company.

SPECIFICATIONS

The following are extracts from the specifications for these cars:

Body Construction.—1. The body construction throughout shall be such that no closed unventilated or undrained pockets or recesses will be formed where moisture can collect or water stand.

2. The surfaces of all wood or metal, whether exposed or hidden, in contact or otherwise, shall be thoroughly prepared and properly protected from rust and decay by the application of protective coatings in the manner called for in that section of these specifications covering the painting of these cars.

3. Both internally and externally the cars must have an attractive appearance. All external contour lines should be as nearly continuous as possible from end to end of car. Offsets should be avoided as much as possible. Roofs shall be plain arch design with hoods tapering gradually to give a pleasing appearance.

Care must be taken to see that main side girder is straight and true and that exterior ply-metal panels on sides present, after completion, a true and uniform appearance perfectly free from waves or buckles.

Front Vestibule.—As these are the first cars of this type to be operated in regular service on the Montreal Tramways system particular attention is to be given to the design of the front or motorman's vestibule with a view to the comfort of the operator who is to be called upon to perform extra duties. This part of the car shall have the following features:

1. Portion of vestibule floor as shown by one of the drawings shall be on the same level as car body floor, the remaining portion being 8 in. lower, forming a well at both entrance and exit doors.

2. A comfortable revolving seat shall be provided for motorman and so located that he shall have perfect vision and can, if necessary, comfortably and efficiently discharge all duties of his position without rising from his seat.

3. All piping, valves and hand brake apparatus in front vestibule shall be completely inclosed so as to obtain a neat clean appearance and so that only operating levers, gages and other necessary apparatus shall be visible.

4. All electric switches shall be completely inclosed in suitable steel fireproof box. Switches shall be fully insulated from the box and from each other and properly marked.

5. Provision must be made for sufficient heating in this part of the car to enable the operator to discharge all duties in comfort.

6. Center front and right front windows shall be fixed and all windows of front vestibule shall be permanently weather stripped.

Bottom of pockets for drop sashes fitted with rubber cushions for windows to stop against.

Rear Vestibule.—Rear center sash drop into pocket to facilitate handling trolley from inside of car. All other sashes shall raise.

Headlining.—Headlining to be ¼-in. Agasote regular lining in one piece from advertising molding on one side to advertising molding on opposite side and in sections in car length.

Headlining of vestibules shall be in one flat piece from top of door engine box to opposite side of vestibule.

Inside face of headlining shall be painted before erection.

Seats.—Seats shall be Hale & Kilburn stationary, pressed steel, with 10-in. pedestal rattan covered, to meet the following requirements:

(a) Rattan must be of best commercial quality obtainable.

(b) Springs shall be of first quality, steel, uniformly tempered, properly and accurately spaced and securely fixed so as to exert a uniform pressure at all points on the covering.

(c) Filling and rattan must be carefully placed and securely fastened with uniform tension.

(d) A uniform even appearance of car seats is required and the manufacturer shall agree to guarantee the seats supplied for a period of two years of regular service from date of their going into operation.

(e) In order to assure comfortable seats, the angle of the back and shape of seat for all longitudinal and semi-circular seats shall be carefully determined and approved before seats are fabricated.

Car Lighting.—Cars shall be lighted with one circuit of five 94-watt type "K" compensated lamps in series.

Route and destination signs and front steps shall be lighted by one circuit of five 36-watt lamps in series.

Heating.—Cars shall be heated by electric heaters with thermostatic control. There shall be three circuits of six heaters each located as shown on blueprint. Each heater shall have a capacity of 400 watts with a rating of 4.4 amps. at 90 volts. The equipment shall include thermostatic regulators and knife switches and fuses in enclosed box on slate panel.

All heater cases shall be properly grounded.

Insulating Lining.—Between ply-metal outside sheathing and steel side girder there shall be a two-ply thickness of Salamander car insulation securely fastened to suitable supports.

All wiring shall be installed in galvanized steel conduit except the following:

Cable from trolley base to line switch which shall be in flexible galvanized steel conduit where necessary.

Push button wiring in post grooves.

All conduit and condulet fittings shall be of approved type and perfect in all respects.

All conduit shall be grounded with approved clamp terminals.

All conduit must be securely fastened accessible at all points and capable of being quickly and easily disconnected. It must be installed to permit proper draining.

Splicing of cable will be allowed at junction boxes only.

Motor leads must be securely cleated to body of car as close as possible to bolsters.

Motor leads shall be soldered into brass sleeves which shall fit into screw connectors of approved type.

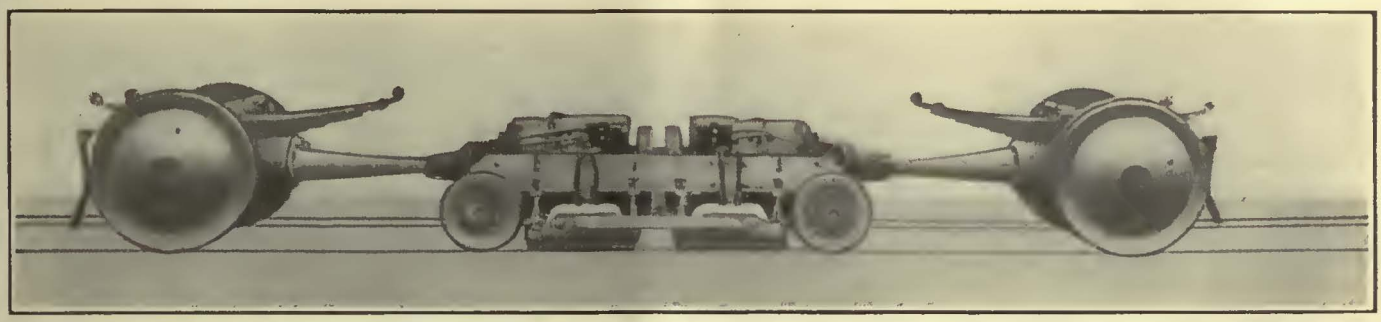
Favorable Publicity from Red Cross Drive

DURING a recent Red Cross Drive in Saginaw, Mich., the railway company took a prominent part with the camouflaged car shown in the accompanying illustration. As a result of this participation in the community activity much favorable publicity and comment was obtained.

On the whole, the work of preparing the car was

Water Colors Were Used to Prepare This Camouflaged Car for a Red Cross Drive in Saginaw. Afterward the Paint Was Easily Washed Off

comparatively inexpensive. A double-truck passenger car was used. This was brilliantly painted in water colors as shown in the illustration. After the parade the car was used by Red Cross workers as a recruiting booth. When the drive was completed the water color paint was easily washed off and the car returned to regular service.



New Type of Electric Car Truck with Cardan Drive

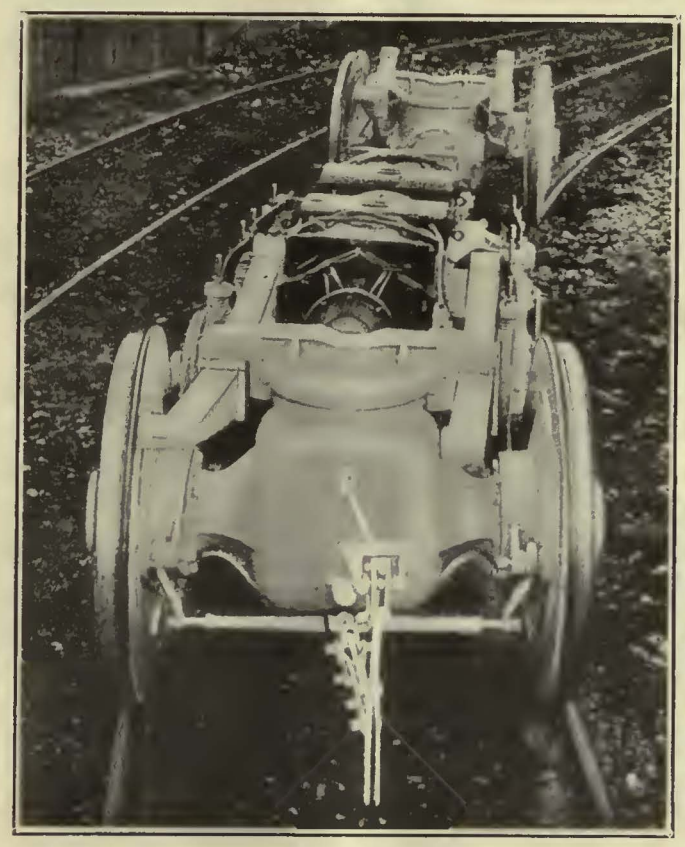
New Theories in Truck Design for Electric Cars Being Tried

The Motors Are Mounted on a Small Four-Wheel Truck Located Between the Two Driving Axles—Cardan Drive Is Used—Axles Are Divided in the Center so a Wheel Can Revolve on a Curve Slightly More than Its Mate

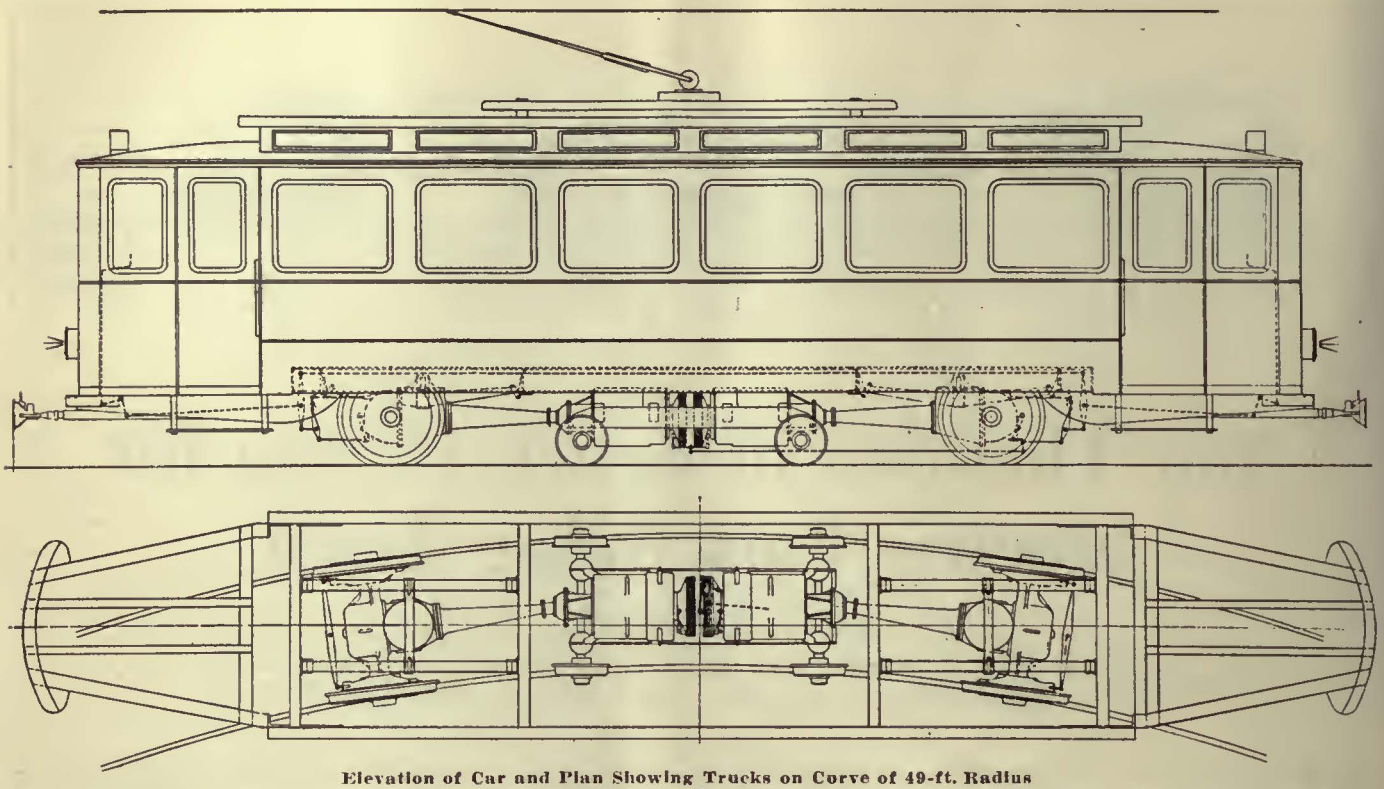
A NEW truck for electric cars recently placed in service by the Städtische Strassenbahngesellschaft of Zurich, Switzerland, was described in the *Tramway and Railway World* for June 17, 1926. The wheel axles and guiding trucks were built by the inventors, the Swiss Locomotive & Machine Works. Motors and other electrical equipment were furnished by the Oerlikon Machine Works. The car body was built by the Swiss Coach Works at Schlieren. The truck, which has but two driving axles, is provided with cardan drive. A small four-wheel guiding truck is inserted between the two driving axles. This guiding truck supports the two driving motors with a spring suspension. The motors are bolted securely to two longitudinal beams which rest on helical springs arranged above the axle of the truck. The outer motor-bearing shields form a ball-and-socket union together with the radial arm of the driving axles. Small wheels are used on the guiding truck.

With this arrangement the driving wheels accommodate themselves to curves to a degree not possible when motors are suspended from the axles themselves. In addition, wheel flange pressures on the guiding truck do not develop to any appreciable extent as they are compensated mutually when curves are negotiated. It is obvious from the construction that the total wheelbase can be increased as desired. As constructed it is 17 ft. 7 in., whereas the wheelbase for the usual type of four-wheel truck seldom exceeds 9 ft. This type of truck is somewhat heavier than the usual four-wheel design, but the total weight when equipped is no greater as the increased weight of the truck is compensated for somewhat, since on account of the higher ratio of transmission between the motor and the driving wheels a considerable reduction in weight of motors is obtained.

Transmission of torque from motors to drivers is accomplished by means of a double gear inclosed in an oil and dust-proof cast-steel casing which bears on the driving axles. The casing is provided with a radial arm connected with one end to the adjusting or guiding truck by means of a ball-and-socket joint. All of the parts subject to wear, such as ball bearings, gears and articulated joints are so cased in as to be absolutely dust-proof. These are lubricated continually by special devices which insure minimum wear of these driving parts. The gear ratio between motor and driving wheel is 9 to 1, which is about twice as great as with the ordinary axle-hung arrangement of motors. All of the supports for the driving axles as well as for the gear wheels and carrying rollers of the guiding trucks are provided with roller bearings of ample size..



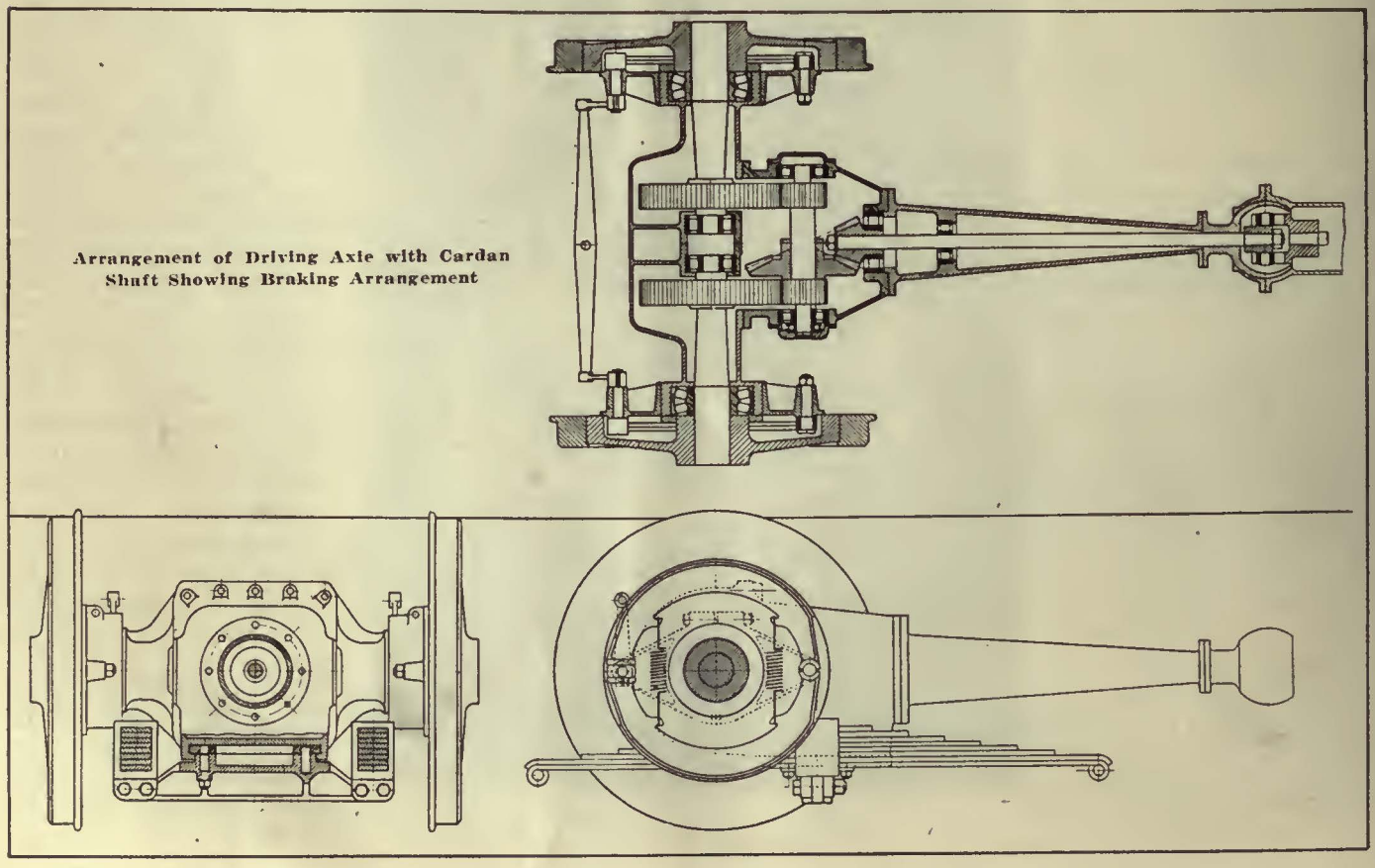
End View of Trucks Showing Spring Supporting Arrangement for Car Body

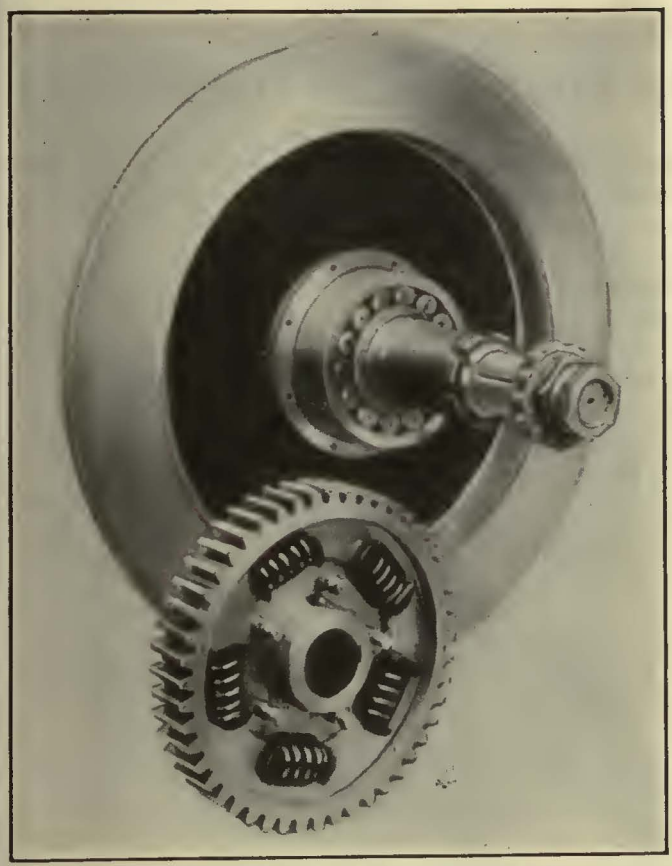


Elevation of Car and Plan Showing Trucks on Curve of 49-ft. Radius

An interesting detail of this new truck is the construction by means of which each driving wheel of the corresponding axle is allowed to displace itself with regard to the opposite wheel. This displacement, however, is limited to a certain angle in the sense of rotation. The idea of this construction is to do away with shrill noises which result when rounding curves and to prevent development of grooves on the wearing surfaces of the rails. Obviously this result would be attained best by the adoption of a differential gear. The intricate arrangement of this gear and its disadvantages which involves full independence of the two wheels in rotation and the resulting adhesive capacity are reasons for the adoption of a resilient displacement gear. With this device the driving axle is cut in halves, each fitted with a resilient spur gear, which in turn is driven by bevel gearing on a jackshaft supported by the radial arm. The resiliency that results is such that

Arrangement of Driving Axle with Cardan Shaft Showing Braking Arrangement





Driving Wheels Are Provided with Roller Bearings and the Drive to the Spur Gear Is Through Coil Springs

short sections of curves can be negotiated without forcing the wheels to skid on the rails.

The truck is braked at six points interconnected by an absolutely equalized brake rigging. Four out of these six points are inside the driving wheels and two on the ends of the motor shaft. Distribution of brake pressure among these six points is balanced so that no braking forces are transmitted by the gearing; that is, the inertia of the rotating parts is absorbed by the motor brakes alone.

The design of the brake equipment conforms somewhat to automotive practice. By means of a lever and key, the two brake blocks which pivot on the axle are pressed against the inner surface of the wheel. Thus gentle, uniform, but very effective braking results. Brake blocks have ample dimensions and are covered with "Chekko" linings. This material has given particular satisfaction and is subject to much less wear than cast iron, in addition to producing a higher braking effect. These linings can be replaced easily. By unscrewing a setscrew, displacing a bow and removing the release springs the brake blocks readily can be taken out and replaced. All of the essential braking details except the rigging are protected from dirt. Distribution of brake pressure upon the six points and protection against dust and dirt by tight casings result in a minimum wear of the linings.

The car body rests on two large pivot centers which are submerged in an oil bath and are also well closed in a dustproof casing. The top portion forms a cross-carrier, the ends of which are rigidly connected to long resilient laminated springs, which in their turn are connected to the body by means of eight pairs of pendulum links. The idea of these suspension links is to compensate for the slight reduction of wheelbase when curves are negotiated. They also act as a resilient means for transmitting jerks and kicks imparted to the body lengthwise by the trucks. This feature is of pronounced advantage in providing uniform and easy starting.

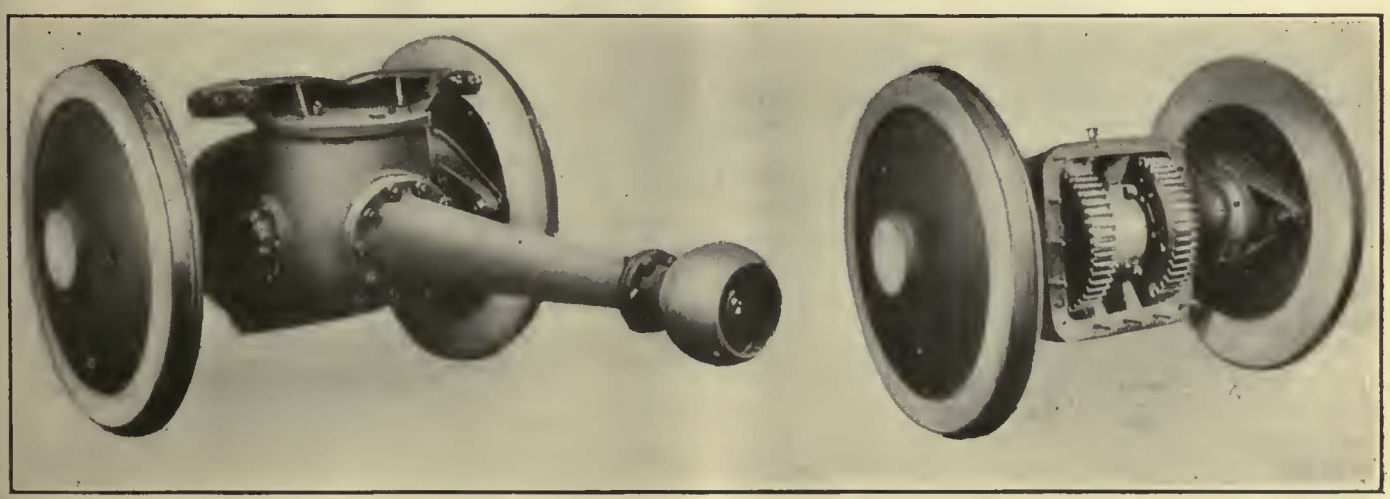
The axles are provided with solid roller bearings arranged inside the driving wheels. These are cased in effectively.

Ductile Welds Developed

TWO methods for producing ductile welds have been developed by research scientists of the General Electric Company. In both processes, air is excluded from the metal by means of a bath of hydrogen or other gas. The formation of oxides and nitrides in the weld metal is thus prevented, and the fused metal is as strong and ductile as the original metal.

One method developed by Dr. Langmuir in Schenectady is to pass a stream of hydrogen between two electrodes. The heat of the arc breaks up the hydrogen molecules into atoms. These combine again a short distance in front of the arc into molecules of the gas, and in so doing liberate an enormous amount of heat, so that much higher temperatures can be obtained with this than with the usual welding methods.

The second process developed by Mr. Alexander makes use of the chemical and physical properties of hydrogen and other gases in their molecular state. This process aims primarily at the prevention of the formation of the nitrides and oxides in the arc-deposited metal.



The Gearing at the Axle Is Provided with an Oil-Tight and Dustproof Steel Casing

The Driving Axle Is in Two Parts, Each Fitted with a Resilient Spur Gear

Causes of Hot Journal Bearings*

An Investigation Was Made in Germany to Determine How Periods between Oilings of Journal Bearings Could Be Lengthened—How Deformation and Displacement of Bearings Could Be Prevented and What Were Some Causes for Hot Bearings

By Erich Schulze
Chief Consultant German State Railways, Berlin, Germany

WITH the beginning of general standardization of German freight cars early in 1909, attention was centered upon the car journal bearings because the two-part bearing then generally used gave most unsatisfactory performance. A section of this old journal bearing is shown in Fig. 1. The bearing had top and bottom lubrication, most of the lubricant coming from above, while the lower pad acted chiefly as an emergency lubricator. Theoretically this bearing was well designed. Its only, but grave, fault was that frequent jolts, particularly in yard service, loosened and soon broke the lower part of the journal bearing. In 1909 the German railroads had to replace some 200,000

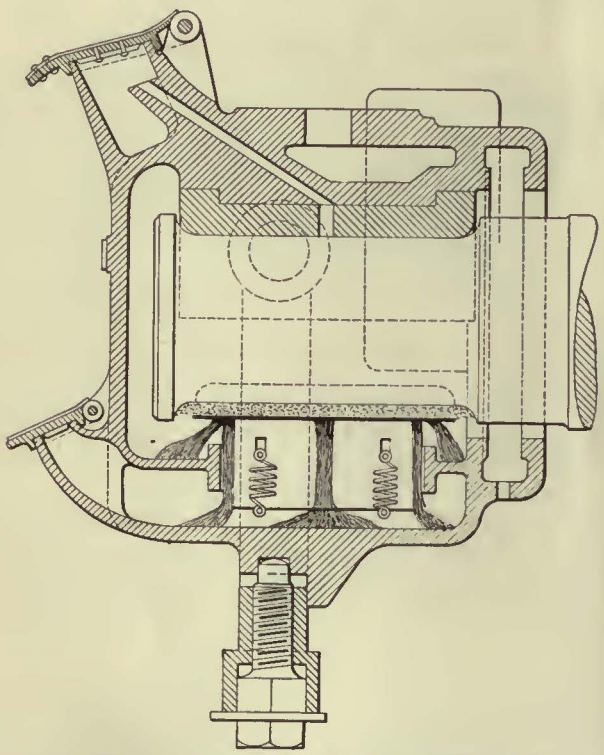


Fig. 1—Old-Type Journal Bearing Construction Used on German Freight Cars

of these lower parts. Much oil was lost, dust and sand entered, and the train crews were kept busy tightening the bolts, which usually turned very hard.

Passenger coaches then used a bearing shown in Fig. 2, which was copied from American practice. It gave excellent service, was made of one piece, and was readily replaceable. This journal bearing can no longer be kept on German roads, due to the present method of yard shifting. The bearing surrounds only about one-third of the upper part of the axle, so that every time the car wheels are blocked suddenly considerable shock is exerted upon the bearing. A further disadvantage of this type is that the cover of the journal box is not entirely tight against rain and snow. This construction, therefore, requires continuous attendance, which it may receive on passenger cars, but which is entirely out of the question for freight cars in German service.

After long study, a new journal bearing construc-

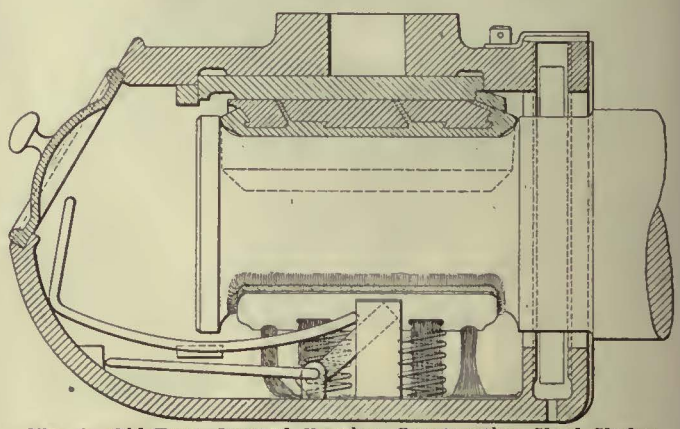


Fig. 2—Old-Type Journal Bearing Construction Used Under German Passenger Cars

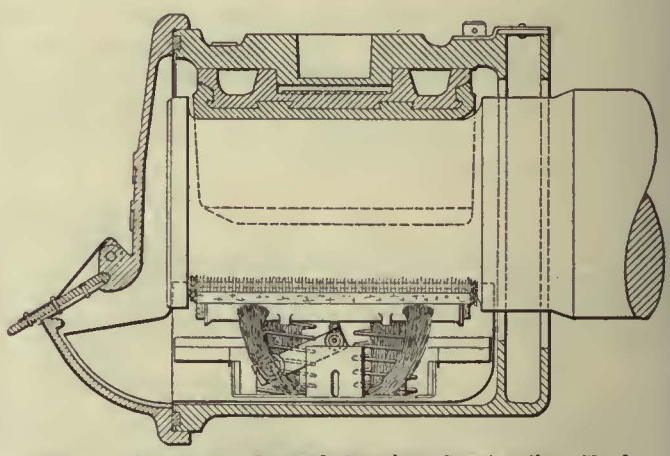


Fig. 3—New-Type Journal Bearing Construction Used Under Freight Cars

tion has been adopted. This is shown in Fig. 3 and is now in very wide use, there being approximately 25,000 freight cars on German roads with this journal bearing construction. In spite of great opposition, the journal bearing was made out of cast-steel rather than cast-iron. During the years 1914 and 1916, it developed that under certain circumstances the internal parts of this bearing could be twisted around, so that in many cases the bearing was fond underneath. This was no doubt partly due to the yard service becoming more and more severe. These observations have led to a redesign of the bearing, with its edges reinforced, and the bearing lengthened at both ends, so that it now reaches well beyond the horizontal center line of

*Abstracted from an article in *Verkehrstechnik*, June 25, 1926.

the axle. During the copper and tin scarcity of 1916, the bearings had to be made temporarily of iron. This new bearing, called C2, was a considerable improvement over any previous bearing, and it proved to be quite unaffected by even the heaviest jolts. The journal box and bearing consists of but few parts, and all of these parts are interchangeable. Contrary to the original construction, shown in Fig. 1, a lining is provided, which can be replaced readily when its bearing metal is worn out. The former disadvantage of this type of bearing, that when made solid it does not permit ready inspection, did not hold, because it was such a great

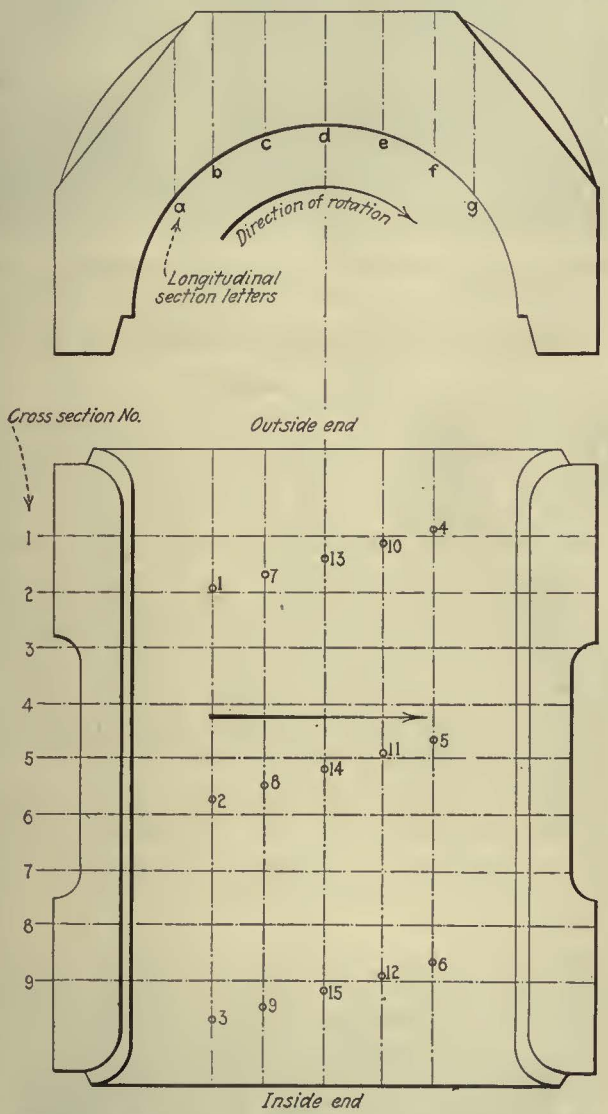


Fig. 4—Construction of Bearing Used for Test Purposes

improvement over the old bearing that such inspection was not necessary, or at least it was necessary only after long periods. Practical experience showed that hot-boxes occurred very rarely.

With increased weight of equipment faults began to develop even with this bearing, particularly on the heavy 20-ton cars. As already mentioned, iron bearings had to be introduced during the war, and these caused considerable trouble. When the bearing metal melted out, the axle ran on the iron and caused rapid wear of the journal. In some cases the damage was so severe that the end of the axle broke off. These troubles led to extensive research in order to determine what the weak points of this bearing were, and how they could be best overcome. In particular, the following points were investigated:

1. Possibility of introducing a lubricating system which would give three-year service with one lubrication of the journal.

2. Methods necessary to avoid deformation and displacement of the bearing.

3. Improvements desirable for all details of the bearing.

It was found that a mechanical lubrication method has so far not given fully satisfactory service. Experience with lubrication from the bottom only does not seem to lead to the desired goal. It may be that top and bottom lubrication will have to be taken up

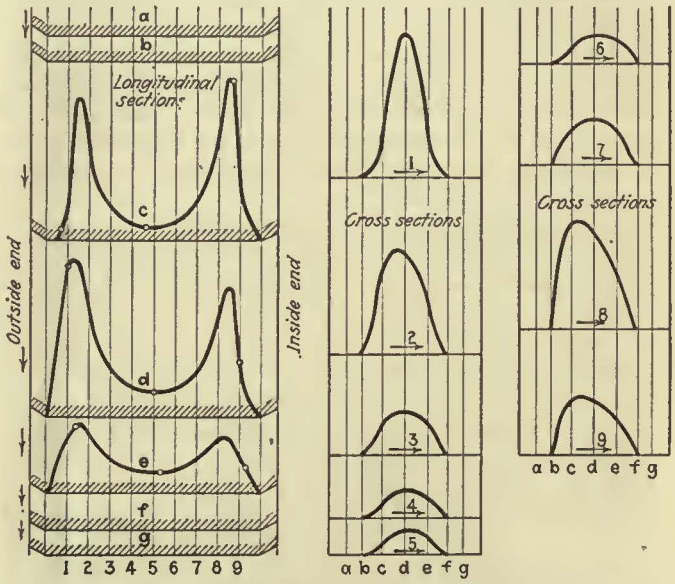


Fig. 5—Graphical Representation of Test Results for Bearing Shown in Fig. 4

again, and it is not improbable that in the near future a new, totally different, bearing may have to be devised.

An oiltight construction of the journal box has been sought by many investigators since 1919, and no fully satisfactory method has as yet been found. It is desirable that under no conditions shall even the slightest amount of oil be permitted to leak out of the bearing. It is probable that a material will have to be found which can give emergency lubrication for the journal where the bearing is neglected to such an extent that it becomes dry.

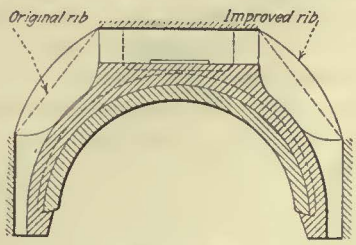


Fig. 6—Improved Bearing With Rib Reinforcements

Very extensive investigations have been made, recently in the railroad shops in Göttingen, to determine the exact nature and cause of hot-boxes. A special test arrangement was set up, and a bearing lining of alloy such as is being used now by the railroads was provided with fifteen small holes, distributed on its bearing surface as shown in Fig. 4, and each of those little holes was connected by a small copper tube to a pressure indicator. The bearing under test was lubricated from underneath, just as in actual service, and a

mechanical oil conveyor supplied 186 gm. of oil per minute. For comparison with this bearing, a standard pad-lubricated bearing, consuming 0.25 gm. per minute, was tested. Some of the results found were rather surprising. For example, the maximum pressure of the bearing is not in its middle, but is at its two ends, and the maximum pressure was also found to be displaced 5 deg., depending on the direction of rotation.

Fig 5 shows graphically the data obtained. During these tests, the bearing was loaded with 7,000 kg. (15,400 lb.), and the wheel was rotated at a speed corresponding to 45 km. per hour (28 m.p.h.). The pressure resulting was 40 kg. per square centimeter (700 lb. per square inch) assuming the width of the surface as 9 cm. (3.546 in.). The shape of the oil pressure curve is due to the fact that the bearing apparently rests on the axle only at its two ends, while its middle is bent out. The results also indicate that the bearing is wrong theoretically. The location of the maximum

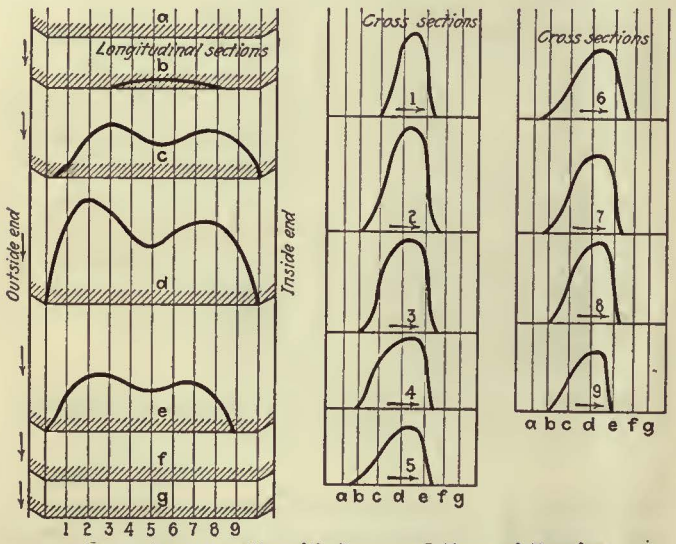


Fig. 7—Test Results with Improved Type of Bearing

pressure explains why the bearings run hot frequently, as the heating always begins at the two ends.

The construction of the present bearing will not permit changes necessary to improve the bearing surface. Other ways, therefore, will have to be followed. The strength of the alloy decreases with the temperature and this may result in serious damage. Deformation of the bearing occurs also in its cold condition. For this reason weak parts were improved by providing heavier ribs, as shown in Fig. 6.

All these conditions seem to indicate that a new bearing metal should be found which will give a certain amount of lubrication even when red hot. This resulted in trial of a cast-steel bearing with inner alloy shell. Tests with this new construction were made in a way similar to the previous tests and results are shown in Fig. 7. The results are not yet ideal, but the flat character of the curves show a considerable improvement.

Artificially introduced hot-boxes gave the following results: With a load of 7 tons on the wheel, the bearing became red hot 45 minutes after its lubrication was stopped. In this red-hot condition the bearing ran satisfactorily for three-quarters of an hour longer, after which time the axle became cherry red. From this moment on no further change took place, because apparently the heat generated was equalized by the radiated heat. After the test the bearing metal was found to be worn off 2 mm. (0.08 in.).

New Baggage Carrier Opened to Allow the Placing of Hand Luggage in the Compartment, Under the Rear Seat

Improved Baggage Carriers on New P.-O. Coaches

BUILT-IN baggage carriers are a new feature on the Pennsylvania-Ohio coaches recently purchased. Previously a carrier known as the "bustle type" was hung on the rear end. In these latest de luxe coaches the space under the rear seat has been made available through doors in the rear end.

An accompanying view shows an operator in the act of storing a customer's bag in this compartment. Another view shows the doors closed, ready to go. One of the views is taken in front of a typical suburban coach station, showing the illuminated sign, built in the form of a shield, typical of all P-O rail and coach operations.

Particular attention has been given in the design to provide an attractive rear end. A recessed aluminum frame is provided for the tail light, and state license plate and rear end stop lights have flush aluminum fittings.

Doors in New Style Baggage Car Closed, and Ready to Move. Note the Recessed Aluminum Frame for the Tail Light and State License Plate

The Readers' Forum

Operation of the Straight Air-Brake

LOS ANGELES, CAL., June 23, 1926.

To the Editor:

Nowadays there are really only two different general methods taught motormen in manipulating brake valves: (1) the once to service position with three subsequent releases; and (2) the split application and release method.

In the first method, the motorman is required to get sufficient air to make a stop the first time the handle is placed in service position. A second movement to service position is discouraged. This is very good in theory, but in practice there are numerous disadvantages, so many, in fact, that only one street railway on the Pacific Coast teaches it. Advantages of this system are that the air is applied the hardest when speed is at maximum. A stop is made in the shortest possible distance, with, it is claimed, a corresponding reduction in brakeshoe wear. The disadvantages are that it is too hard on standing passengers, particularly when the car is equipped with large service port brake valves; and is dangerous on slippery rails. The motormen soon get into a rut. It requires more skill than the average motorman possesses and causes too many flat wheels, because many motormen form the habit of admitting too much air so as to avoid a second movement to service position.

About the only way this system can be operated without discomfort to passengers is to make a mild application and drag up to the stop. This, of course, is impractical in most cities, where the schedules require a motorman to use from 30 to 45 lb. of air to make a stop from speed. There are too many variations of equipment, rail conditions and gradient to tie a motorman down to any absolute method. If this is done the accident and flat wheel record is sure to suffer.

In the second system, the motorman is instructed to move the brake valve handle to service twice from lap, splitting the application, so to speak. This avoids causing the brakeshoes to come up against the wheels with a nasty snap, which is objectionable to standing passengers. Using this system, about 25 or 30 lb. of air can be admitted the first time and then 10 or 15 lb. in the next movement. It is extremely important, however, to impress on motormen that the second movement to service should be made within about five seconds of the first one. If this is not done motormen soon form a habit of letting in a little air at a time, with the result that there is a high cylinder pressure when brakeshoes are taking hold the hardest, and this results in sliding wheels.

The simplest way to teach this system is to instruct the motorman to apply sufficient air to make a stop before the front end of the car has passed the prospective stop, and make graduations near the end of the stop. The first graduation must be made before the sliding point has been reached. Too many motormen believe that graduated releases will start the wheels after they are once locked. This is wrong. An almost complete release is necessary, depending on the condition of the rail. The graduated releases in the second system are the same as for the first system, with the exception that no fixed number is recommended.

Advantages of this second method are that it is easier on standing passengers; does not kill momentum so quickly that an early release is necessary; safer on slipping rails; easier to spot car; easier to teach to new motormen. It is not an absolute system, therefore it meets the thousand and one variations of speed, equipment, grade and brake equipment. It is widely used by street railways in the United States. It has been used in Seattle, Tacoma, Oakland, San Francisco and Los Angeles with good success. The Los Angeles Railway believes in it implicitly, and its smoothness of operation is hard to beat. This railway has in effect a rigid follow-up system for new men, and any improper operation of brake valve is checked. "As the twig is bent, the tree will incline"; it never fails.

Disadvantages of this method are that it will cause as many, if not more, flat wheels than the first system, unless motormen are taught to apply air the hardest when speed is near its maximum. Some motormen will make second movement to service after speed has been greatly reduced, which will lock a pair of wheels. There is a tendency in some motormen to fan the handle. These three disadvantages can be easily overcome by proper instruction and a follow-up system.

There are many variations in brake valves and equipment. Electric railways teaching motormen the first system will find it works the best with old-type brake valves and outside-hung brake rigging. The old-type Christensen, Westinghouse and National brake valves work the best. The fast schedules of today, however, have developed brake valves such as National P.V., Westinghouse S.M.E. and M.-18a and General Electric that will admit about 30 lb. of air a second in service position. These are generally used with inside hung brake rigging, which makes a pretty severe brake. This system is at its worst with that equipment.

The following few points should never be overlooked in teaching new motormen: Proper braking is 50 per cent good judgment and the rest proper instruction. When applying air, always be governed by the speed condition of the rail and comfort of passengers; use as little air as possible. Apply air hardest when speed is at maximum. The holding power of brakeshoes is greater at low speed than high. Coast up to all stops as much as possible. Never fan the brake handle. Don't imagine you can operate the brake valve exactly the same for every stop. Never use sand for service stops in street railway service. Running on lap with power on is a sign of ignorance. Don't forget the wheels; if they are flat it is a sign of some one's inefficiency, usually the motorman's. An application is from the time the brake is first applied until the first release. There are few excuses for second applications. The only time they should be used is when approaching dangerous places.

GEORGE W. BOOTH,

Motormen Los Angeles Railway; formerly Motorman the Connecticut Company and Interurban Motorman, Portland Electric Power Company.

To simplify the work of instructing new employees in the transportation service, R. B. Hill, superintendent of operation Los Angeles Railway, has prepared a book of information to students. This begins with a statement on courtesy and continues with information about equipment, uniforms, safety and accidents.

Maintenance Notes

Flexible Track With Steel Ties

BY NELSON R. LOVE
Chief Engineer Denver Tramway Corporation, Denver, Col.

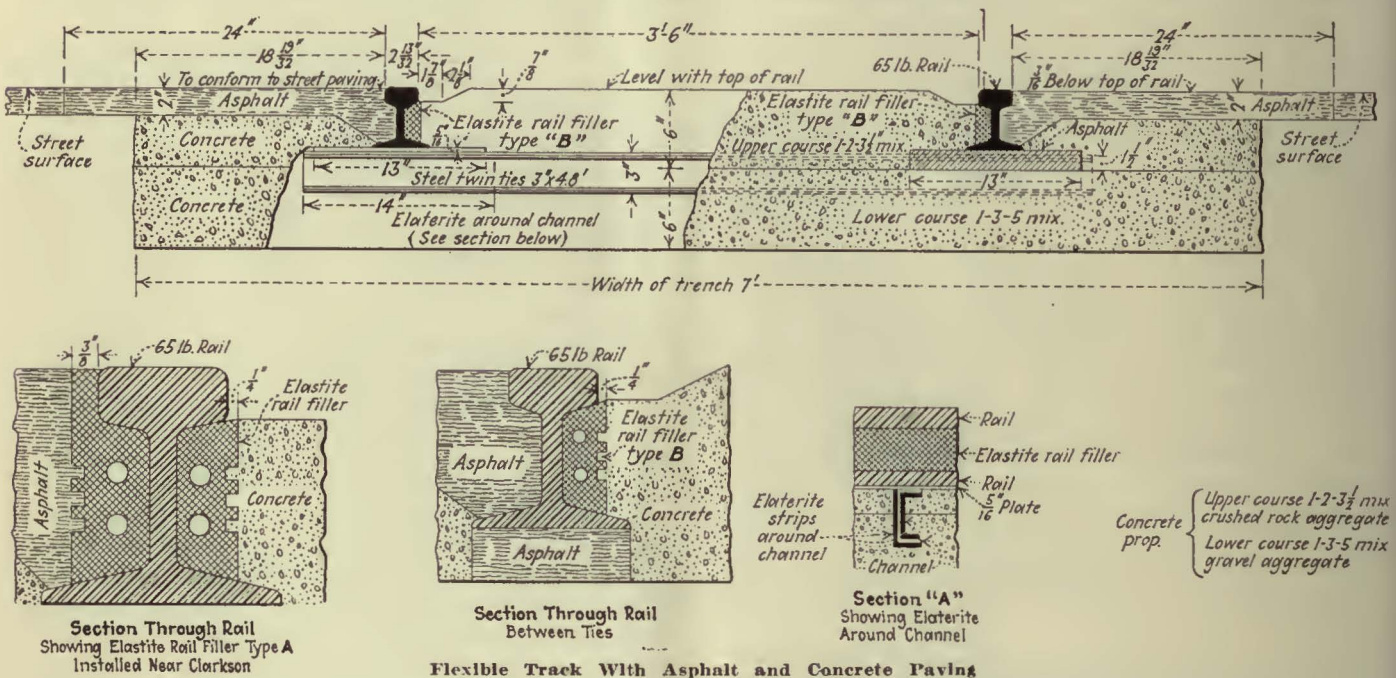
IN A paper presented before the annual meeting of the Midwest Electric Railway Association, Denver, Col., June 8, 9 and 10, 1926, a special cushion track construction was described. This design, which is illustrated herewith, uses concrete and asphalt together with the steel ties exclusively. It will be seen that the steel ties function only in a horizontal direction in order to maintain gage and proper tilting of the rail. Vertical loads are sustained entirely by the ordinary paving asphalt, which is tamped solidly underneath the rail and ties by means of electric tampers. This track was installed on Colfax Avenue, Denver, a year ago and has proved an ideal type of flexible track.

In the illustration showing a section through the track it will be seen that the concrete paving does not come in contact with the rails at any point, although concrete is used to pave between the rails. A special type B elastite rail filler is placed between the rail and the asphalt paving. Asphalt paving is used outside the rail and this is laid directly against the rail.

One of the lower sections in the accompanying illustration shows a type A elastite rail filler installed between the rail and the asphalt. A stretch of track has been tried with this construction and further experiments in regard to this flexible construction will soon be tried.

Canting of the rail to a slope of one to twenty-five is a feature of this construction, the steel ties being bent so as to provide for this. Inspection of the track after a year's service shows that the rail has worn very smoothly and there is no sign of corrugation. The cost of this type of construction is approximately the same as for the standard type of track previously used, which employs wood ties on a 9-in. concrete ballast and paving. The surface appearance of this special track is more pleasing, primarily because the rails themselves constitute the only joint in the paving. The asphalt is continuous from the track to the curb and the concrete is continuous inside the track.

No expansion joints were placed in the concrete, which runs in a continuous stretch of approximately 1,200 ft. Inspection shows only a few hair cracks.



Flexible Track With Asphalt and Concrete Paving

Metal Used Almost Exclusively for Car Sheathing

IN MAKING extensive renovations on a number of cars in the Holyoke Street Railway shops recently it was decided to use all metal sheathing in renewing the sides of the cars. The pieces are welded together, making a continuous strip of sixteen-gage metal sheathing. It was found to be simpler to adopt this practice even on the older wooden type cars, since the fitting and welding of the metal may be accomplished with considerably less effort than it required for constructing a wood sheathing.

On the dashers of the cars three metal strips are used, since the front and rear-end collisions which are such frequent occurrences may at times only result in one section of the dash being damaged. With the sectional metal strips it is possible to replace one or two sections without renewing the entire dasher.

Metal battens are used instead of wood, for it has been the experience of the company that trucks and other vehicles scraping the sides of the street cars will invariably tear off a wooden batten. The metal battens seem to fare considerably better under similar treatment than those of the wooden type.

Dick Prescott's Promotion Is Discussed

And Trouble Brews

ON THE same evening that Dick Prescott spent at home contemplating the opportunities before him in his new position of assistant to Tom Mullaney, superintendent of equipment, his promotion was the subject of a discussion far less pleasant in character.

At one of the battered green-topped tables in a backroom rendezvous for the idlers of the neighborhood, not far from the Consolidated Railway & Light Company's shop, Pete Welcher, shop inspector, swapped grievances with three of his cronies. "Slowfoot" Lewis, "Lefty" Kooms and "Shorty" Green knew well the import of Inspector Pete's announcement that Dick Prescott had been made Mullaney's assistant. It was obvious that the new appointment was a setback for the inspector's personal ambition, and at the same time promised seriously to disturb the arrangement whereby Pete traded a willingness to overlook obvious defections from maintenance rules for active support by a small clique among the men.

Under the stimulus of his sympathetic audience, Pete dropped his customary caution and gave way freely to his bitterness.

"This new manager downtown sure must have Mullaney buffaloed all right," he told them in a confidential tone by way of indicating the reason for his own failure to win the promotion. "Think of making a guy like this bird Prescott assistant superintendent!"

"What does he know about a railroad anyhow?" questioned Slowfoot, who knew more about the tricks for avoiding an honest day's work than any man in the shop, and who never lost an apportunity of cultivating inspector Pete's favor.

"Nothin'!" declared that offended individual with a sneer.

"What do they want to go messin' things all up for?" piped "Lefty" Kooms. "We was all goin' along all right and nobody had to work too damn hard at that. Who started all this fuss anyhow?"

"Well, I got a notion this guy Prescott's been nosin' around ever since he's been here, and has spilled a lot of stuff in the office. It's up to us boys to show him up quick or this shop won't be no place to work at all."

"What's his game, do you suppose?" asked "Shorty" Green, also catering to the wisdom of Pete:

"Oh, he's got a lot of schemes to make every guy in the shop think they're salesmen, or some such bunk. You can bet your bottom dollar if somebody don't stop him, some of you guys will find things awful unhealthy 'fore he's done."

"They ought to 'a made you assistant superintendent," ventured "Slowfoot," quick to grasp the opportunity to get in a good word for Pete. "This would be a real joint to work in then."

"Keep your trap shut and use your head," snapped Pete by way of covering up his pleasure at thus having his own case stated so frankly.

"What are we goin' to do?" again questioned "Shorty" Green.

"You guys keep your eyes and ears open, and we'll soon put the skids under him. All we got to do is get him out on a good trouble job some one of these days and he'll fall down so hard we won't need to worry about him much."

In the past few weeks, Dick Prescott had sensed something of an undertone in the shop that was not in accord with the new spirit of the management. On the whole, most of the men and foremen began to feel the satisfaction which comes from membership in a hard fighting team. The old shop began to take on a new importance in winning back public favor for the railway. Each man's job was becoming more a part in the game and less of a mere task for a day's wage. But little did Dick suspect how soon he was to learn that in any such group of men there are always a few who are more interested in dodging work than in getting satisfaction from a job well done; that there are some always jealous of progress in others, and quick to put obstacles in the way of accomplishment.

A Letter to Dick Prescott

EDITOR'S NOTE—Many unusual letters come to the desk of an editor. Some carry blame, some praise and some a challenge. Ordinarily an editor pays no attention to an anonymous communication. He may or may not read through such a message, but that is usually the end of it. This is an exception to the rule. Dick Prescott is a fictitious person. So there seemed to be justification for publishing the anonymous letter signed "An Ardent Admirer," not because "An Ardent Admirer" sounded sweet, but because we were the provocateur in creating the fictitious Dick and because the letter tickeled our risibilities, as it probably will yours. The ethics of journalism require that the editor keep confidential the names of his correspondents where they so request it. Our correspondent apparently did not know this. With this assurance from us we hope that "An Ardent Admirer" will disclose his identity so we may be permitted personally to congratulate him. We certainly pardon "An Ardent Admirer" for addressing us as Dear Dick. We admonish him, however, to come out into the open if he expects again to make the editorial grade.

July 25, 1926.

Dear Dick:

Please pardon my familiarity in addressing you by your first name but I am inspired so to do through the pleasure given me by your promotion as noted in the ELECTRIC RAILWAY JOURNAL for July 17. I tender you my congratulations and would ask you to congratulate for me your little playmate, Tom Mullaney, who was given a promotion at the same time.

"Merit tells" and "You can't keep a good man down" and all that rot, you know.

However, this letter is meant to be optimistic, cheerful and constructive, so I'll lay off of any of the chronic pessimisms and blind adherence to obsolete methods so dear to the heart of the electric railway employee. We are living in a modern age, and all around us are evidences of changing methods and a realization that the seller must give the buyer what the latter wants, especially when he is ready and willing to pay for it. The fact that your superior officer, Mr. Milburn, your playmate Tom, and you seem to be imbued with a progressive spirit leads me to believe that you three have acquired or will acquire that realization and thereby become a Faith, Hope and Charity combination alone by yourselves.

But don't be downhearted—some of the rest of us are with you in spirit but we don't dare say so out loud.

The fact that you "visualize the opportunities that lay ahead because of the very difficulties in the present railway situation" and "street cars can be made more attractive through improvement in design and better maintenance" is very comforting, and "everything's going to be all right" if you are not about ten years too late. Of course you can't be blamed if your predecessors and their colleagues, while riding in automobiles equipped with comfortable seats, were so dumb as to figure that slat or cane seats in a rattling trolley car were good enough for everybody else. Neither can you be blamed for their attitude that people must ride in trolley cars because the railway owners had been good boys and faithful to their trust in pioneering the transportation facilities (whether *now* good, bad or indifferent)—such cry-baby attitude being directly responsible for driving away business. It is not your fault that the railway operators who are using buses look upon them with the same admiring complacency that guests at a lawn party would at the advent of a skunk. This is not said in derogation of a skunk because that animal really has some good qualities—on the surface at least. I admire your "new ambition and enthusiasm."

AN ARDENT ADMIRER.

Stringing Trolley Wire by Improved Methods in Cleveland

BY JAMES SCOTT
Superintendent of Overhead Lines, Cleveland Railway, Cleveland, Ohio

RAPID removal and restringing of trolley wire has been made possible through the use of a new trolley wire stringing truck which has just been placed in service by the Cleveland Railway, Cleveland, Ohio. The use of this truck permits many radical changes in wire-stringing methods. The super-structure and equipment for the reel truck were built by the mechanical department of the Cleveland Railway. They are mounted on a 45-hp. White chassis. This truck is provided with two carriages for holding trolley wire reels. These are mounted by means of a specially designed shaft which will fit practically any make of reel. Drums of pressed paper are mounted on each end of this shaft, and a brake band lined with standard automobile brake lining is fitted around these drums. Two rods joined to a common crossbar are attached to the brake bands.

In the accompanying illustration showing the reel truck, the braking arrangement can be seen at the bottom of the reel. With this braking apparatus an equal pressure is applied to both sides of the reel shaft by simply screwing down upon a wing nut that is placed in the center of the crossbar. Thus any tension desired for the trolley wire may be secured readily. When starting to string wire this nut may be set and the reel will not require any further attention. The equipment of both reels is the same and these are designed so as to allow handles to fit the reel shaft, the handles being used to rotate the drums for reeling in of worn trolley wire.

Inside on the top of the truck a chain fall and runways are installed that permit the loading and unloading of reels by one man. An opening in the body framework above the driver's cab allows the trolley wire to be reeled in. This opening is equipped with a roller.

At the present time four laborers are used in the operation of reeling in old trolley wire, but further improvements are planned which will make the operation entirely mechanical and so eliminate the laborers. The platform running the length of the truck folds up when the truck is not in actual use. The picture of the truck reproduced herewith was taken before the wheel guards were installed on it.

With this equipment old trolley wire can be taken down and new wire installed at the same time without any interruption of traffic. This double operation requires two tower trucks and the reel truck. The first tower truck removes the trolley wire from the span and it is then led through the opening above the cab and wound up on the reel. Before stringing, the desired tension on the reel of new wire is set, and the new wire is led over the top of the rear tower truck and tied in upon the span wires.

By Use of the New Reel Truck Together With two Tower Trucks, Trolley Wire Can Be Taken Down and New Wire Installed at the Same Time without Interrupting Traffic

While in the tracks in the operation of stringing, the trucks are spaced about 70 ft. apart to allow the men to tie the wire in. When a street car approaches they pull to one side and close up. The car then coasts by. The trucks can then turn back into the track and proceed. A third tower truck comes along behind the others and attaches the ears and aligns the wire. By this method a mile of trolley wire may be strung, taken down, and practically all insulated for service in 2¼ hours.

The tension obtained by means of the reel-braking apparatus is such that it is necessary only to pull the trolley about every 1,500 ft. Due to the fine performance of both reel brake and truck there is practically no vibration at all in the line.

New Trolley Wire Stringing Truck Just Placed in Service by the Cleveland Railway

By use of this equipment, in an emergency two tracks may be strung at the same time if desired. The truck is also equipped with ladders, located alongside the driver's cab. These lead to the truck roof, which is designed to permit linemen to work from it. This method of wire stringing has resulted in great economy and a large saving in labor. One foreman can control all the trucks used and it is not necessary to disturb overhead equipment.

Shop Made Anti-Climber Bumper

A COMBINATION draw pocket and anti-climber bumper has been developed and made by the West Penn Railways. The view shown is one of these units just installed on a Wheeling Traction car that is being overhauled in the Wheeling shop.

Constructed from a section of standard 9-in. channel, the piece is first bent to conform to the car end. Then the corners of the flange are burned off by the acetylene torch and forged to shape. The center section is cut from a steel plate of the same thickness as the channel flanges and curved to fit the inner flat face. This center section is then electric welded in place, making a three leg anti-climber.

On top of each angle flange an additional crescent-shaped piece of steel plate is cut and welded to form the continuous face shown, thus increasing the depth of the channel flanges in the center of the bumper.

This extra flange depth serves two purposes: First, it provides a more certain lock to prevent telescoping in case of a severe end on collision and, second, it allows the drilling of an adequate draw pin hole and the use of a draw bar in case of pull-ins.

The entire device is mounted on an oak plank and bolted firmly to the steel floor and platform members, so that stresses due to collision are transferred to the steel work forming the floor members. As noted in the view this bumper is inserted in a standard anti-chamber, the center of which was first cut out.

Combination Anti-Climber Bumper and Draw Pocket Installed at Center of Standard Anti-Climber

One Man Handles Heavy Casting with Hand Truck

FOR transporting heavy parts about the shops, the Department of Street Railways, Detroit, Mich., makes use of standard platforms under which Cowan trucks are placed

Hand Trucks with Separate Platforms Are Used for Moving Heavy Parts About the Shops of the Department of Street Railways, Detroit, Mich.

to move these about the shop. These platforms have a top of planking 10 in. above the floor and strap iron supports at either side so as to provide a light construction. One man can run a hand truck underneath such a platform and, by ratcheting the handle, raise the platform free from the floor, so that it rests only on the truck and so can be moved about readily.

Journal Bearing Designed to Take Axle Thrust

END thrust is taken on the axle bearings instead of on thrust collars in cars of the Wheeling Traction Company, Wheeling, W. Va. This design originated on the West Penn Railways, the parent company.

The bearing is cast with an end and has a bearing on nearly half of the axle as shown in the accompanying view. The bearing itself is locked in place by its projecting above the journal housing. When new bearings are placed in cars the end thrust bearing is also replaced. This is much simpler than to place a new axle collar on the axle inside the truck frame. Furthermore, the thrust surface is always lubricated in this arrangement.

Bronze Journal Bearing Used in Wheeling
This bearing is cast with an end surface on which the axle thrust is taken instead of on thrust collars. When new a bronze-to-steel bearing is used, but when this surface becomes worn so that too much play exists a babbitt surface is applied.

When the thrust surface becomes worn the end is given a babbitt surface at the same time as the bearing is rebabbitted. When new, no babbitt is used on the thrust surface. A special babbitting form is used that allows the thrust surface to be cast coincident with the curved surface.

Blacksmith's Shop Kept Clean

ONE of the cleanest parts of the Chattanooga shop of the Tennessee Electric Power Company is the blacksmith shop. No cinders are allowed to accumulate around the forge and only the day's scale can be seen around the anvil. Stock is seen against the rear walls. There is a place for all tools and at night they are put away so that the floor of the shop can be swept clean easily.

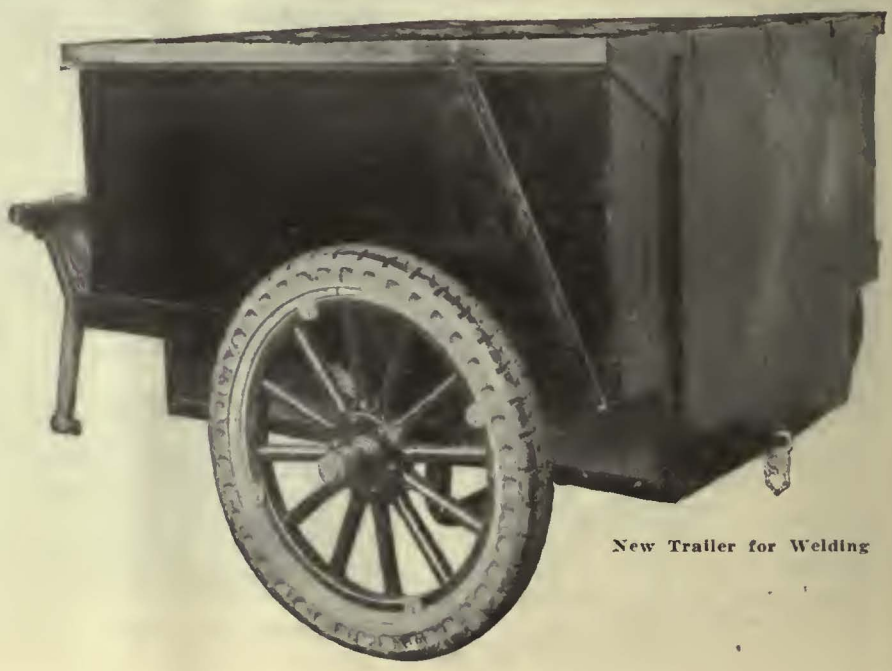
One of the Cleanest Blacksmith's Shops Can Be Seen on the Chattanooga Railway Division of the Tennessee Electric Power Company

New Equipment Available

Cushion Tired Trailer for Welding Equipment

FOR transporting resistance type track welding equipment on city streets, the Eectric Railway Improvement Company, Cleveland, Ohio, has recently developed a bonding and track-welding equipment mounted on a cushion-tired trailer. This is strong but light and has a sturdy metal frame. Two generous tool boxes are provided for carrying equipment, and space for placing the welding rheostat is also arranged. One cover is equipped with a folding rear panel which covers both the rheostat space and the tool boxes. A single lock at the rear protects the trailer from entry by unauthorized persons.

By raising the cover the welding rheostat can be operated in the usual manner. Ample ventilation is provided for the removal of heat. This equipment has been given type No. SRT-2. It weighs approximately 500 lb. complete, and particular care has been given to balancing the weight so that it can be handled by one man.



New Trailer for Welding

Association News & Discussions

Publicity and Equipment Problems Discussed at La Crosse

At a Meeting of the Electric Railway Section of Wisconsin Utilities Association Specific Subjects Valuable to the Operator Were Considered

LA CROSSE, WIS., was the scene of the annual convention of the Electric Railway Section of the Wisconsin Utilities Association, held on Aug. 12-13 under the leadership of Chairman Nels C. Rasmussen of the Wisconsin Valley Electric Company, Wausau. Specific subjects that have a direct bearing on departmental work received major consideration. C. R. Phenicie delivered an excellent paper, abstracted elsewhere, on opportunities of a transportation man for establishing good public relations. In his paper, and particularly in the discussion by B. W. Arnold, a note of caution was sounded against being too obvious in attempts to please the public. Care should be used to avoid having the public feel like animals in the Zoo where they must know they are being "worked on." Mr. Phenicie further said that public relations might be defined as human nature diplomacy applied to human nature.

H. M. Pauley, local manager Wisconsin Gas & Electric Company, Kenosha, said that improvements should often be made without undue publicity, allowing the public to realize the good work of the company through observing the facts, rather than observing the publicity of those facts.

C. M. Larson, chief engineer Wisconsin Railroad Commission, offered his opinion that many utilities have failed to convince the public that they are straight shooters and it is necessary for them to establish this condition before they can expect the best results from the public.

J. P. Pulliam, vice-president and general manager Mississippi Valley Public Service Company, spoke of the value of having the employees know the business of the company and be familiar enough with the policies so that they may tell the company's story among their friends and to the public that come in contact with these employees. Mr. Pulliam believes that the city railway business is improving but has serious doubts as to many interurban roads in Wisconsin.

NOISE MEASURED GRAPHICALLY

Perhaps, the paper of greatest interest, because of its distinctly new material, was that of Kent Wooldridge who is now with the Chicago Rapid Transit Company of Chicago. Mr. Wooldridge, electric railway fellow of the Wisconsin Utilities Association at the University of Wisconsin, spent the year developing an apparatus that would measure and analyze the noise made in street car operation. In his report he outlined briefly the principles used and gave enough of the results obtained on several properties in the state to indicate there were great possibilities in the use of this type of test equipment. The principle of the apparatus was an inversion of the usual radio receiving set. The sounds were picked up by the use of a loud speaker, which acted as a transmitter and produced a varying electric current, which caused a movement of the needle of a microammeter in unison with the sounds. Use of this equipment has indicated possibilities of segregating the different types of noises. While this first year has been devoted largely to the development of the equipment, it is to be hoped that the apparatus will be perfected and that considerable data will be obtained for different types of car and track construction.

Mr. Wooldridge gave it as his opinion, based on the studies he made this year that on straight track 30 per cent of the noise originates from the roadbed; 20 per cent from the wheels; 15 per cent from gears and pinions; 20 per cent from the truck brake rigging; 10 per cent from the car body; and 5 per cent from the trolley. A more complete description of this equipment and the early results obtained which are indicative of the possibilities of this kind of a study will appear in a subsequent issue of this paper.

Chairman Nels Rasmussen is an optimist. One could see this from his annual address. However, he believes that increased speed and better facilities are required to produce riders under modern conditions. The automobile has taught the public luxury of travel and the railways must offer comparable facilities. Mr. Rasmussen believes in the future of common carrier service operated under proper conditions.

B. W. Arnold, manager motor coach department, Chicago, North Shore & Milwaukee Railway Company, read a paper on accident prevention from an executive viewpoint, which is published elsewhere in this issue.

R. M. Howard, vice-president Mississippi Valley Service Company, Winona, Minn., for years has kept accident figures for the electric railways in Wisconsin. From the table of accidents reproduced herewith, automobile collisions have decreased from the high of 1923, while the increase in automobiles registered in the state in each year since, has been 69,500 per year. Mr. Howard saw in these figures an improvement in the accident situation and stated that the transportation companies have been successful in improving equipment and operating methods that would successfully meet the situation. A large share of these collisions occur on business streets served by car lines. Suitable parking restrictions would not only reduce accidents, but greatly relieve the congestion on the streets. Association members, he felt, should use their influence to improve their local situation and recommended that recent traffic surveys be used to indicate to merchants that the elimination of parking on business streets would not injure, but rather improve their business.

F. R. Coates, president American Electric Railway Association, prepared a paper but due to his inability to be present in person, it was read by Captain Leslie Vickers, economist of the association.

COMING MEETINGS OF *Electric Railway and Allied Associations*

Sept. 17-18 — Mid-West Claim Agents Association, sixth annual convention, Elms Hotel, Excelsior Springs, Mo.

Oct. 4-8—American Electric Railway Association, annual convention and exhibits, Public Auditorium, Cleveland, Ohio.

Oct. 10-15—Congress International Tramway, Local Railway and Motorbus Association, Barcelona, Spain.

Oct. 25-29—Annual Congress and Exhibit, National Safety Council, Detroit, Mich.

Nov. 16-18—Society of Automotive Engineers, National Transportation and Service Meeting, Boston, Mass.

November 16-19—American Welding Society, fall meeting and International Welding and Cutting Exposition, Buffalo, New York.

ACCIDENTS AND COLLISIONS IN THE STATE OF WISCONSIN

Year	Car-Miles Operated	Total Transportation Accidents	Automobile Collisions
1918	34,028,371	9,438	3,497
1919	30,870,393	9,636	3,997
1920	33,694,023	12,247	5,662
1921	32,831,916	11,257	5,522
1922	34,469,690	11,279	5,780
1923	35,011,123	13,818	7,422
1924	37,917,230	13,502	6,811
1925	37,651,771	13,958	6,775

WISCONSIN AUTOMOBILE AND TRUCK LICENSES ISSUED DURING THE YEARS 1918–1925, INCLUSIVE, HAVE INCREASED RAPIDLY

Year	Registration	Increase
1918	196,844	.....
1919	236,881	40,137
1920	293,298	56,317
1921	341,741	48,443
1922	387,848	46,107
1923	457,271	69,423
1924	526,814	69,543
1925	596,386	69,572

Mr. Coates likened the electric railway industry to the farms of Wisconsin when Abraham Lincoln once advised the farmers to "plow deeper" for greater crops. Mr. Coates does not believe that the surface has been scratched as far as common carrier transportation is concerned. His paper is abstracted elsewhere.

Door control and the circulating load method of car operation were discussed by P. W. Gerhardt, assistant superintendent of transportation The Milwaukee Electric Railway & Light Company, and Oscar A. Broten, western manager National Pneumatic Company. These papers are abstracted elsewhere. Both are firm in their belief that this method makes possible one man operation of relatively large cars in heavy service.

In discussion of these two papers, Henry Cordell, master mechanic Chicago, North Shore & Milwaukee Railroad, considered that the automatic door devices operated by a pneumatic engine are eminently successful. R. M. Howard believes that this plan of operation with one man, using the treadle device on the rear door, operates under crowded conditions and adheres to schedules better than two-man cars.

Use of the foot valve aroused considerable discussion, some claiming that good operators do not use it to any extent and others claiming that the safety devices would be impossible unless some provision were made so that a man could remove his hand from the controller handle on long runs.

Earl F. Harra, master mechanic Wisconsin Power & Light Company, Oshkosh, said that he makes a practice of blowing out all air pipes in the fall with high-pressure air. He washes the air engines at the same time and re-oils the moving parts with a high grade thin oil to avoid sticking in the winter. He claims that blowing out small particles of dust and scale each year prevents the freezing of air pipes due to condenser moisture in the compressed air.

Mr. Broten in discussion said that practically all of the trouble due to freezing could be eliminated by avoiding the use of pipe that was too small. If necessary to use small pipe, it should be run on the floor inside of the car.

C. M. Larson, chief engineer Wisconsin Railroad Commission, spoke for Commissioner Andrew R. McDonald. He said that the Wisconsin Railroad Commission was unanimously in favor of repealing the law requiring electric railways to flag railroad crossings, now requiring either a watchman or two men on each car. This law was originally passed in Wisconsin through the urgency of the Milwaukee city council and which was determined to defeat one-man operation in that city. As shown in Mr. Gerhardt's paper, these difficulties have been largely overcome and the commission is convinced that there is no more reason to flag electric cars over railroad crossings than buses.

At the present time, the commission has little jurisdiction over buses in the state. An applicant must file schedules and rates of fare but the commission has no jurisdiction over the application except to see that adequate insurance is carried. Mr. Larson believed that this law should be amended to allow the commission the right to determine the necessity for bus service applications before such operations be allowed to start. The commission would not only welcome increased jurisdiction but believes that this is necessary to assure adequate service to the public and for the protection of the company now providing service.

Mr. Larson pointed out the fact that the electric railway service offers an opportunity of providing personal contacts, that is not possible in any other form of utility. He likened this to the personal contact method of sales of other commodities versus the less efficient method of mail or telephone selling. To accomplish this, trainmen should be educated in the policies of the company, and their attitude toward the public should be developed so that they will be good salesmen, as well as good operators.

The table that Mr. Larson presented, which is reproduced herewith, indicates that in the face of decreasing passenger revenues during the past five years an increased number of seat-miles during rush hours has been given, the capital invested to provide the service has gone up 38 per cent, and due to more economical operations the return on the capital has increased 42 per cent since 1920.

H. G. Monger, The Milwaukee Electric Railway & Light Company, delivered a paper on the co-ordination of street railway and motor bus transportation.

TREND OF ELECTRIC RAILWAY OPERATIONS IN THE GREATER MILWAUKEE METROPOLITAN AREA, PER CENT OF 1920

	Revenue Passengers	Car-Miles Operated	Maximum Number Seats Operated in Rush Hours	Revenue per Car-Mile	Expenses per Car-Mile	Utility Capital Invested	Return on Capital Invested
1920	100	100	100	100	100	100	100
1921	92.7	93.5	98.4	102.7	100.4	105.6	112.6
1922	93.6	94.0	105.5	104.1	96.3	119.4	126.1
1923	98.0	96.6	124.7	106.6	97.3	125.8	129.6
1924	96.0	94.5	129.2	106.6	98.6	134.7	141.1
1925	95.4	96.0	143.4	103.4	96.3	138.2	142.8

Oliver Wynn, an east side high school student of Madison, Wisconsin, gave a talk on why he was interest in transportation from the standpoint of choosing this as a vocation.

Clyde Hedges, Mississippi Valley Public Service Company was unanimously elected chairman of the electric railway section for the coming year. John Lucas, The Milwaukee Electric Railway & Light Company was elected vice-chairman.

Following the sentiment developed in recent years some thought was given to a change in the name of the section. A motion was made and passed that the question of changing the section name to Transportation Section be referred to the executive committee.

The entertainment provided in part by the local hosts, the Mississippi Valley Public Service Company, included pleasure and inspection trips in the surrounding territory of La Crosse and to the company's carshops. On Thursday evening, Aug. 12, an informal dinner followed by dancing was held at the Pioneer Club. On the afternoon of Aug. 13 three choices were available, golf at the La Crosse Country Club, an automobile trip to Coon Valley or a fishing trip to Galesville.

Safety Appliances on Electric Freight Cars

THOROUGH study concerning the safety appliances which should be installed on traction freight cars will be made by the Central Electric Railway Master Mechanics' Association. A circular recently sent out by the secretary relates an experience of the Indiana, Columbus & Eastern Traction Company. Ten box cars were built for this company at Chicago Heights, Ill., and shipped on their own wheels over the Big Four Railway. An Interstate Commerce Commission inspector found one of these cars in the Springfield yards of the Big Four Railway and discovered that it was not equipped according to the U. S. Safety Appliances Standard, being short several end grab handles, all four ladders and the running board. At first he refused to permit the Big Four to deliver the car to the traction company until these devices had been put on. F. J. Foote, superintendent of motive power and equipment of the I., C. & E., took up the subject personally with the inspector. He explained that the running board would be a menace to the men rather than a safety device on account of the danger of men on top of cars coming in contact with live trolley wire. Moreover, on traction lines trainmen have no occasion to be on the roof of box cars and are not required to do so, he said. From this it followed that there was no need for running boards or ladders. It was finally agreed to cancel the matter of running boards and ladders for the present and install a full set of grab handles.

After further consideration of this matter the I., C. & E. decided to equip all its cars as called for by the Safety Code with the exception of the running boards and ladders. As a result of this experience, Mr. Foote suggested that the subject be taken up for consideration at the September meeting of the Central Electric Railway Master Mechanics' Association.

In the Words of Lincoln—Plow Deeper*

Some Important Problems of the Industry Are Better Service, Better Employee Understanding, Traffic Regulation and Tax Reduction

BY FRANK R. COATES
President American Electric Railway Association

DURING the last year I have had the great dual honor of serving as President of the American Electric Railway Association and the Central Electric Railway Association. In discharging the duties of these two offices, I have traveled somewhat extensively, and had an opportunity to observe first-hand many local transportation situations. This address which you have done the honor to request will probably be the last that I shall make prior to my final talk before the annual convention of the American Electric Railway Association in Cleveland, Ohio, on Oct. 4. Therefore I am going to try to summarize for you some of the outstanding conclusions that I have reached in my year of observation in the electric railway field.

More than 67 years ago, in an address to Wisconsin farmers Abraham Lincoln, then merely a country lawyer from down in Illinois, uttered some advice which I think might well be adopted today by local transportation men. "Plow Deeper," was the crux of Lincoln's remarks. The soil, he added, never has been pushed to half its capacity.

That statement, "The soil has never been pushed to half its capacity," seems to me to fit the local transportation situation today. While it is true that there are more forms of vehicles than ever before, it also is true that people are riding as they never have previously. Admittedly, despite the best efforts of rubber heel manufacturers, the people have practically forgotten how to walk. It is a commercial fact that because of this lack of walking, in great part, the shoe manufacturers of this country are producing only half the number of shoes of which they are capable. The situation has become so serious that shoe manufacturers have recently introduced a light summer shoe and are urging people to use different weight shoes in different seasons.

You need only to look around you to see that the riding habit is increasing. The number of automobile riders alone proves this. In fact, the figures of our own industry also prove it. In 1902, when there were practically no automobiles, the average number of street car rides annually taken by each individual in the United States was 61. In 1925, with approximately 20,000,000 automobiles, the average number of electric railway rides per inhabitant of the United States was 115.

People can be made to ride more just as Lincoln said land could be made to produce more, but only by "Deeper plowing." I am not so unmindful of the great differences in various local transportation problems to say that one scheme of intensified plowing for business is applicable to all of them. At the same time, I will say that most of the recognized principles of such plowing will fit anywhere. Let me suggest just four kinds of plowing which, if done assiduously, will, I am sure, bring better business crops to the great majority of local transportation companies in this country. They are these:

Plow deeper for better service;

Plow deeper for better employee understanding;

Plow deeper for traffic regulation;

Plow deeper for fair tax reduction.

I have placed service first in this plowing schedule because without good service, no local transportation company can or should survive. It is an old saying, but a very true one, that transportation companies must regard themselves merely as merchants dealing with rides and that they must make their goods attractive or they cannot sell them.

GOOD SERVICE INVOLVES ALL DEPARTMENTS

Good service covers a multitude of things. It extends all the way from the activities of the head of the local company to those of the most minor employees. It particularly touches the kind of equipment which a company furnishes. It involves clean cars, a comfortable ride, courteous service and a thousand and one other similar things. It is the one big thing that companies have to sell.

So much has been said in recent years at electric railway meetings about good service, that many companies have come to regard the term in an abstract manner. Speakers chant about good service and the pleasing financial results that it brings, but all too often the whole subject is handled in a very vague manner. Men go out of meetings saying good service is quite necessary, but wondering just what all the shouting is about.

I want to be a little bit more specific. I want to point to a company that is making good service pay. It is not the only company in the country or in Wisconsin that is bringing about this much desired result but it is one of the activities that is very pertinent to this meeting. It is pertinent because it refers to the company managed by Nels Rasmussen, who was chosen chairman of the meeting in which we are now participating. I take the story of the activities of his company not from him, but from a copy of the *Wausau Daily Record-Herald*, for Friday evening, July 30, which recently came into my hands. That paper said in part about the service of his company:

> Street car patrons of the city are elated these days over the riding comfort of several of the smaller city cars which have been remodeled on the interior. Four of the small cars, which have a capacity of 28 persons, have all leather upholstered seats with springs that add greatly to the riding comfort. The leather seats, together with the rubber flooring, give the car a cleaner and more sanitary appearance on the interior. The rubber flooring is ¼ in. thick and has good wearing properties. The new floor coverings are easier to keep clean than the lumber flooring that had begun to show wear.
>
> According to Nels Rasmussen, superintendent of railways for the Wisconsin Valley Electric Company, the cars were remodeled at a cost of $600 per car. He also stated that all the cars owned by the local traction company would be repainted on the interior and exterior within a few weeks. The remaining three small cars will be remodeled with leather seats and rubber flooring in the near future.
>
> The electric company operates eight large cars, with a capacity of fifty-two persons each, in addition to the seven cars of the smaller type. The railways superintendent announced that more transportation equipment will be added to the service next fall.
>
> Few persons in the city realize the number of street car patrons the local company serves daily. The number of fares for the city last year up to Jan. 1, 1926, totalled 2,629,000. The electric company enjoyed the greatest business last year since the inauguration of the surface lines and the number of fares for the first six months of the present year shows a substantial increase over the same period of last year, the railways superintendent declared today.

The success of the company to which I have just referred must be due in great part to improved service. And that improved service was supplied at no great cost, about $600 per car according to the newspaper statement.

This is the most eloquent answer to the numerous electric railway managers in many parts of the United States who say that they would give good service if they had the money. The cheapest things in the world to provide that will produce the largest returns are clean cars and courteous service. The difference between good and bad local transportation service often is, to the eyes of the customer, just the difference between dusty and wormy prunes in an open bin offered by a grouchy clerk, and clean sweet inviting fruit packed in a well labeled Del Monte can and sold by an obliging salesman.

SELLING PRUNES AND RIDES

If all of the hundreds of millions of words that have been printed regarding what good service is have not sufficiently educated the local transportation industry, it needs only to visit the stores of successful and unsuccessful local merchants in order to grasp the fundamentals. There is not one iota of difference between properly merchandising a prune and a ride. It is all a question of making the thing for sale attractive to a prospective customer.

It is especially gratifying to me to note that the plowing for employee understanding has been much deeper in transportation circles during recent years.

Progressive managements in all lines of business endeavor have come to realize that two of the first essentials to business success are honest endeavor on the part of the company, and a thorough understanding and sympathy with that endeavor on the part of employees.

Employees cannot be expected to delve deeply into company problems unless they are encouraged by the management.

There is no one thing that will carry a man farther in business today than the ability to get along with the public. Certainly the electric railway employee has a most unusual opportunity to show his capability along this line.

*Abstract of a paper before the Electric Railway Section, Wisconsin Utilities Association, La Crosse, Wis., Aug. 12-13, 1926.

Perhaps there is no better illustration in the history of the world of a man making a success through understanding human nature than the life of this same Abraham Lincoln, who told the Wisconsin farmers to plow deeply. The basis of Lincoln's whole success in life was his understanding of the masses of the people. He understood them primarily because he was one of them, but also because he endeavored always to understand and sympathize with them. What a conductor or an executive he would have made!

Some Problems to Solve

The traffic congestion problem, caused chiefly in cities by parking, is one which is going to require deep plowing by local transportation men. They have side-stepped it for years in many communities, but the time is rapidly coming when they no longer can ignore its presence or try to get the matter handled by some other agencies than their own.

It is daily becoming more apparent that the local transportation managements must make a fair, upstanding open fight against traffic congestion in behalf of the majority of local travelers who are their patrons. Four out of five persons who use any kind of vehicle in city streets, ride street cars, and the progress of this 80 per cent is being seriously impeded by a very small minority. Incidentally, this is hurting the business of local transportation operators, and will continue to hurt them until adjustments are made which will accord fair treatment to street car riders.

The tax situation is one that has been grossly neglected by the industry generally, and here is need for more deep plowing. There has long existed a lack of agreement among electric railways as to what constitutes a fair tax, and as a result today this industry is taxed more unfairly perhaps than any other in the United States. In round numbers 10 cents out of every dollar of revenue goes for taxes.

The cure for this situation is intensive educational work by local transportation managements. It is not enough for them merely to say that taxes are too high or unfair and seek legislative relief. They must dig down deep into the facts and prove the unfairness. The story must be carried back to the individual who, in the end, is the controlling factor with state legislatures and the power that must eventually give the industry relief.

The gross-net tax seems to be a fair tax. If the industry can agree on this as a fair tax, then it is the duty of every electric railway man to get behind it and urge its general adoption by all legislatures.

I have touched only the high points of problems confronting the industry. There are many more which I have not touched. Just as Lincoln said of farming, "Every blade of grass is a study," so I say that every blade of grass in the transportation field—the rider, the employee, the cars, the taxes, the parking problem—are each a study. They offer an exceptional opportunity for the keen-minded, ambitious man who wants to overcome obstacles and make a monument of his work. They offer a discouraging prospect to the drone.

Opportunities for Good Public Relations*

Five Ways by Which a Transportation Company Can Improve Its Status in This Respect—Personal Contact with the Purchaser Is a Valuable Asset

By C. R. Phenecie
Vice-President Wisconsin Public Service Corporation, Green Bay, Wis.

PUBLIC utilities have extended and enlarged the scope of human powers and apparatus to a point where humanity, as viewed from the standpoint of hundreds of years ago, has become composed of supermen and women. I do not mean wholly improvement in material welfare, but also in the spiritual welfare as well, because we have a happier, fresher, fuller and more altruistic life today, if we as individuals take advantage of the opportunities which we have before us. The amazing growth of the public utility industry is proof that the public who use gas, electric and street railway service, recognizes its value. Do they also recognize its cost, its problems, its responsibilities continually to progress and develop and serve?

The great problem of public relations is the problem of this understanding. This involves continued telling and retelling the public in attractive and interesting ways and by the more convincing and forceful way of providing good service, the needs and conditions which are constantly before the public utility industry. A street railway or bus line, because it transports persons, has a privilege of inestimable value in this great problem of public relations, not enjoyed by any other public utility to the same extent. When viewed from the standpoint of the satisfaction of the customer, that method of selling which brings about a personal contact of the customer and the sales representative, stands out pre-eminent. Advertising, direct by mail solicitation or any other method of transacting business than that of personally conducting the transactions, may be successful but never to the same extent as the earnest, honest, straightforward, courteous, personal, face-to-face methods. This then, gentlemen, is the privilege of your business.

Thomas A. Edison once said that nobody was doing a really good job until everybody recognized it as a good job. This certainly is true of the public utility. To understand the public involves on our part a better understanding of how the public thinks and why it thinks as it does. We must understand the motives and desires and purposes of our people, and when we do we understand those things which sway peoples opinions. We have but partially solved the problem of public relations.

The problem still remains for each of us to work out how this much-sought-after good public relations can be obtained. In my judgment, the first and most necessary step to obtain good public relations, is good public service. Of course we all realize the practical limitations imposed by the earning capacity of a property or the riding potentialities of its people, and we cannot offer a service not justified by the conditions. Offering advanced and progressive service will tend to promote the business and will do more than anything else to keep before you a constant, encouraging, kindly attitude on the part of your customer. Clean equipment, courteous conduct and reasonable attention to the incidental things which the rider likes are also necessary. All of these things go to make up good service.

The second thing that I feel is necessary for good public relations, is public understanding. To obtain public understanding we have to tell our story to the public, and we have to tell it many times and in many different ways. If your business is a clean, legitimate business, then as a public utility operator without competition, you have no need of any secrets from your customers. Make this fact clear and be prepared to give any facts to your public that it may desire. Advertising, as you know, can be very ingenious and subtle, and in my humble opinion, such advertising is oftentimes tremendously more effective than the bald solicitation of business. Make up each year an advertising budget as a part of your regular legitimate operating expenses. You will find it a good investment.

The third step towards obtaining good public relations in a practical way, is I believe, to have every utility executive, and to encourage every employee, to take an active part in all community affairs, simply as good citizens. The company may support a reasonable amount of the expenses which might be incurred by employees or executives in this work.

The fourth point towards good public relations, is to be sure that your own organization, your own employees give out such utterances of loyalty and understanding of the company as will reflect to the company's credit. Gentlemen, nothing can do your company more harm in the public eye than to have your own employees go about the streets knocking your policies and misstating your problems. Therefore, you must sell your organization to its company and the personnel of your company if educated to your problems and equipped to talk them in a proper way, can be through these added points of contact with the public of tremendous value to you. A man on a car or in a bus can make or break you.

The fifth point that occurs to me as of vital importance for good relations, particularly to a transportation agency, is the handling of your claims. This is one of your great opportunities to bring about good public relations. One might think that the trying circumstances under which claims are often handled and the necessity for an unsympathetic reception of some recital, would make it far from pro-

*Abstract of a paper before the Electric Railway Section, Wisconsin Utilities Association, La Crosse, Wis., Aug. 12-13, 1926.

pitious for good public relations. On the contrary with proper and honest attention towards claims, the best of public relations may be obtained. When a claim is presented to you by letter or in person, try to get the other fellow's point of view first before you impress him with your point of view. Remember that 90 per cent of the people are essentially honest and if a claim is presented to you, no matter how little at fault you may be, at least understand the loss or damage or suffering that the claimant may have experienced, even if entirely through his own negligence. Some of the rules that I believe should be followed in handling claims in a practical way are these:

Never decline a claim as soon as it is made. Take it under advisement and inform the claimant that every fact and circumstance cited will be investigated. Listen courteously and patiently to every claim. Keep constantly before your claimant your continuous efforts for safety, make him understand that every man and woman in your employ hears in some way or other about safety constantly. In accidents involving collisions or injuries around cars or buses, make the claimant understand in a tactful way, that his claim is a direct thrust at the operator of that vehicle, and will mean a direct personal loss to that operator if justified. And last, settle all claims in a broad, sympathetic and kind way. If at all possible make your position clear and justify it always to your claimant. You will find that by taking this extra pains and trouble in settling your claims that you will sow your community with understanding people, and you will find your towns full of open minded and fair people who may be called to sit in judgment as jurors.

Circulating the Load Through the Rear Exit*

By P. W. Gerhardt
Assistant Superintendent of Transportation
The Milwaukee Electric Railway & Light Company

EFFORTS to extend one-man operation to larger units and to lines of heavier traffic met at first with considerable opposition on the part of the public. In general their arguments could be summed up as follows: One-man cars are not as safe as two-man cars; one-man cars are slower in operation and slow down traffic; one-man cars are more congested at the entrance and exit doors.

The first argument, that of safety, was met by the superior safety devices with which the one-man cars are now equipped.

The second and third objections could not be successfully met, however, as we had to admit that there was a small slowing down in schedule speed and there was undoubtedly congestion on the cars. For even though we might persuade our passengers to "move to the rear" there would yet be the problem of aisle friction or the annoyance of one stream of passengers moving toward the rear and another moving toward the front. Moreover, the short-ride passenger would not move away from the doors as he expected to get off within a few blocks and did not care to be caught in a jam. Then there was also the problem of "street friction," due to the would-be passengers massed about the exit and entrance doors. All of this combined to slow down passenger movement and consequently the schedule speed.

Then came the treadle door to solve our problem and make the one-man car really operative on any route. The one-man operator on a car performs the duties of both motorman and conductor, but not simultaneously. While the car is standing he acts as a conductor collecting fares, making change, issuing transfers and assisting passengers on and off the car. This done he ceases to be a conductor and takes up the duties of a motorman, starting, operating and stopping his car, ever with his attention focused on the track ahead to avoid accidents. Thus he is always busy and does not have the alternate periods of rest that a motorman or conductor on a two-man car has. It is essential, therefore, that everything possible be done to assist him in his work and keep him free from worry or annoyance.

With a car equipped with the modern safety devices, air operated front doors and automatic treadle door at the rear, we believe that we have gone a long way in assisting the operator to better perform his work and to insure safety of passengers.

On first though it might seem that the best results from the treadle door one-man car would be had by requiring all passengers to leave through the rear exit. In Milwaukee, however, we provide a front exit also and permit the passenger to choose which exit he shall use but we recommend the rear door. The front exit, being in view of the operator, is not treadle equipped. As all of our passenger stops are near-side we find that some passengers prefer to use the front exit except when the car is well loaded, in which case both exits are used. At transfer points there is, of course, an advantage to the transfer passengers in using the front exit and in general we believe that our patrons prefer to exercise a choice of exits rather than to be required to use one end or the other.

Some study has been made to determine the proportion of passengers who leave by either door, also of the time required per passenger, but as yet we have not sufficient data from which to draw final conclusions. We did, however, make a very exhaustive study of boarding passengers on our Walnut Street Line from which we found that of all stops made to pick up passengers the following was the distribution:

Number of Passengers	Per Cent of Stops
1	36
2	22
3	13
4	8
5	5
6	4
7	3
8	2
9	1
10 or more	1

From this it will be noted that more than 84 per cent of all stops were for groups of five or less. It is probably safe to assume that passengers will leave the car in about the same grouping in which they board.

The advantages of the treadle door and other improved operating methods in Milwaukee can best be shown by a brief review of the history of one-man operation there. On July 19, 1921, one-man cars were started on the 35th Street Line and on Aug. 1, 1921, on the 27th Street Line without very serious opposition. On Aug. 1, 1923, one-man operation was started on the Center Street Line, after considerable opposition had been voiced against it. These three lines provide cross-town service and do not enter the downtown business section. The cars used on these lines were equipped with the standard safety devices but did not have treadle doors, all passengers boarding and alighting at the front end.

One-man cars were ordered on the Clybourn Street Line Jan. 1, 1925, after considerable protest had been made at the public hearing held by the Wisconsin Railroad Commission. A large share of this protest came from patrons of the 27th, 35th, and Center Street lines who testified that one-man service on those lines was less satisfactory than the former two-man service. The Clybourn Street line runs through the down town business section and the commission in its order for one-man cars specified that they must be equipped with treadle doors which were new and untried devices at that time.

The next line on which the company sought to operate one-man cars was Walnut Street. This is a fairly heavy line running through the downtown business section and into a high-class residential section. The hearing of this proposal brought out some very bitter protests from the city officials as well as residents along the route. The commission considered the matter for several months, then ordered one-man operation to start March 1, 1926. A number of protest meetings were held and the common council ordered the city attorney to request a rehearing of the matter before the commission. The rehearing was granted and the action of the commission in granting the company permission to operate one-man cars on Walnut was severely criticised. Some of the objectors went so far as to threaten rioting if the company should attempt to operate one-man cars.

It was significant that the only witnesses whose testimony was favorable to the company were patrons of the Clybourn Street line. These testified that the service on their line was satisfactory. The commission then amended its order to grant a trial operation of one-man cars for six months, beginning May 23, 1926.

*Abstract of a paper before the Electric Railway Section, Wisconsin Utilities Association, La Crosse, Wis., Aug. 12-13, 1926.

So successful has been this operation and so well do the people think of it that all opposition has been withdrawn. When the commission recently held a public hearing to consider a proposal to operate one-man cars on the Wells-Downer line, the heaviest line in the city, not a single person appeared in protest.

Our Walnut Street one-man line operates over the same tracks as the 12th Street—a two-man line—for 2½ miles and there is no difficulty in maintaining the same schedule speed. As a matter of fact there is a much closer adherence to schedule time under one-man operation than there was under two-man operation.

We firmly believe that through the circulating load we have so thoroughly sold the one-man car to our patrons that there will be no serious objection to further extension of their use.

Accident Prevention from the Executive's Viewpoint*

Humanitarian Attitude Is Needed to Obtain Highest Degree of Success—Investigation of Accidents to Determine Causes and Prevent Their Repetition Has Reduced Them Materially

By B. W. Arnold
Assistant General Manager
Chicago, North Shore & Milwaukee Railroad

NO EXECUTIVE can question the fact that safe operation contributes as much to a good or bad showing on the balance sheet as could any branch of his business. The title of this paper is so broad, and gives such an unlimited amount of food for thought, that no executive can help but appreciate the necessity for its application to his own property.

I am not certain, however, that all men holding executive positions with smaller utilities in the State of Wisconsin, have as clear and definite a viewpoint as I do upon this subject. The larger utilities, which employ thousands of men, are able to make exhaustive studies of the real causes and costs of accidents and the necessity for safety. They can set up safety departments in their organizations that will be just as important as the transportation, accounting or traffic departments.

Accidents Are Expensive

When the manager of some small utility reads accident figures and costs compiled by the larger companies, he is no doubt somewhat impressed, but nevertheless does not realize that the same figures, in ratio to size of property, apply to his own. I have had brought to my mind forcibly a great many times during the past twenty years, the real meaning of safety and the tremendous cost of failure to apply it.

All too often companies embark on safety campaigns which, like a display of fireworks are beautiful to look at, but all too soon fade away. Unless we are able to convince the public who are our patrons, that we are sincere in our endeavors for safety and accident prevention, and unless we continue these efforts 365 days in every year, the one day that we vacation may prove our undoing.

In a great many companies the formerly much talked of claim agent has combined his duties as claim agent with those of safety director and in his new line of work has been able to save much more money for his company and build for it better public relations than he ever did when his one thought was to secure the names of the injured, along with the proper witnesses, on the dotted line on the bottom of the release blank.

In the United States we have an organization unlike any other organization in the world. If managers of small properties would fully realize and appreciate the value of the National Safety Council (the membership fee in which is nominal) they would undoubtedly reap tremendous rewards. Just at present the National Safety Council is headed by a member of the North Shore family, Charles B. Scott, head of the bureau of safety, which serves in an advisory capacity over all the utilities known as the Insull properties. These utility companies are distributed over some twenty different states and give service of one kind or another to over two thousand communities. About fifty thousand employees are thus within the scope of the safety activities of this bureau. While I hesitate to bring to this meeting experiences of my own property I cannot refrain from giving you the results accomplished by this bureau and then allow you to decide in your own minds whether safety and accident prevention should have an active place in your organization.

During the first five months that the bureau of safety started the accident prevention work on the Chicago, North Shore & Milwaukee Railroad there were 82 accidents to the public. During the same period in the second year of accident prevention work there were 36 accidents to the public, or a reduction of 56 per cent. During the first five months there were 49 employee accidents. After a year of accident prevention work, for the corresponding period this figure was lowered to 36 employee accidents, or a reduction of 27 per cent. Accidents of all classes during these same periods were reduced from 190 to 99, or 48 per cent.

Safety Work Pays Large Dividends

Can there be any doubt that organized safety work will pay large dividends on any property? While electric railway people are mostly concerned about accidents to the public, emphasis must also be placed upon the responsibility of a company with respect to the safety of its employees. It has been proved conclusively that a company which realizes this responsibility and fulfills its entire obligation, has a much better accident report and much better public relations than one which is concerned only in the prevention of public accidents because they seem to be more expensive.

Notwithstanding many companies have been engaged in active safety work in a more or less definite and systematic manner for eight or ten years, there are still many executives who look at the question as purely a financial one—and all too few look at it from the humanitarian viewpoint. The highest degree of success will be attained by those who are able to view both sides. The average trainman is a man of intelligence; otherwise he could not operate a train successfully under present-day difficulties. He should be treated as such and as far as possible taken into confidence of the company and made familiar with its many problems, financial and physical, as well as its policy with respect to the public.

All this is safety work. No one man can do effective safety work alone. The first necessity is to have the executive fully sold so that he in turn can secure the confidence and the sincere support of his superintendents, foremen and employees.

Prevention Better Than Cure

Who can doubt the wonderful results accomplished in the short time that utility companies have been permitted to have representatives make safety talks in the public schools. Between 1905 and 1910 far-sighted executives began to realize that accidents were wasteful, that they interrupted production and destroyed confidence of the public. They began to study accidents asking, not "Whose fault was it?", but "How could it have been prevented?"

On the North Shore we have an accident investigation board which is required to investigate accidents in a great deal the same manner as in a court. Its members take testimony and make a report to the president, not on the proposition of who was at fault, but on how it could have been prevented and what safeguards are necessary to prevent a repetition.

To give a correct viewpoint of accident prevention to the executive we have only to show the economic aspect of the safety movement.

Ask any mother and father to put a dollars-and-cents value on their children. You couldn't buy them if you could offer billions. But human beings have an economic value—a worth to society as a whole which has been set by states at from $5,000 to $25,000. That is the compensatory value of a human life as reckoned by economists and lawmakers.

If we compute the average value of a human life from these figures we would find that $10,000 is generally reckoned to be compensation for death. At this figure, the 85,000 lives destroyed last year by accident in this country are worth $850,000,000. In the last five years there have been over 400,000 persons killed in accidents. At least 75 per cent of these accidents were avoidable. That is, with the exercise of a reasonable amount of caution on the part of the person killed or some other person or persons, the accident would not have happened.

We do not reckon the price of death

*Presented before the Electric Railway Section Wisconsin Utilities Association, La Crosse, Wis., Aug. 12-13, 1926.

rightly in all cases. What of the boy and the girl who have their lives ahead? An avoidable accident suddenly scoops their heritage from them. It is generally accepted to be true—or is it?—that life is the most valuable possession we have. But that is an intrinsic value, like a family heirloom, of little value to others.

All of Us Pay for Accidents

But we all pay for accidents. The annual loss per person in the United States is estimated at $50. Every year we pay as much for accidents as the much-discussed French debt. Insurance rates depend on accident costs. Automobile drivers in New York City, for instance, pay an average liability insurance premium of $119, while drivers in Portland or Denver pay only $27. In Chicago the rate is $45, in Boston $56.

I believe to the railroad man the automobile has presented one of the most serious hazards. Have you ever read the sayings of Abe Martin? They are sparkling with wit and wisdom. The other day Abe, having in mind the dangers of our modern traffic, said, "It's getting to be so that the only safe way to cross the street is with a cow." The average automobile driver is very careful about taking any chances with "Bossy." "Many cows have been sacrificed to teach motorists to drive carefully when they meet up with her, but the sacrificial lesson has been taught." Now you hardly ever hear of a driver having a collision with our friend the cow.

A cow is less conspicuous, with her quiet manner and poise, than the nervous wig-wag shimmying and blinking of signal lights and noisy bells to warn a driver that a high-speed train is approaching. She is less colorful than the striped gate extending across the highway. She is less forbidding than a crossing watchman with a warning sign in his hands.

We wonder why this greater respect, upon the part of drivers, for the cow, when so many lives are being snuffed out each year because of disregard for the wig-wag, gate or watchman.

Grade crossing accidents will continue to occur, mark you, we say occur and not happen, until the drivers of automobiles learn to respect the warnings provided by railway companies to the same degree that they now respect the cow.

In conclusion may I say that out of gatherings of this kind with expressions from many, a great good can be accomplished. The executive whose viewpoint does not embrace safe operation of his property is destined to failure. My thought is first, to make safety popular; second, to investigate carefully, thoroughly and intelligently every accident and set up proper safeguards to prevent its repetition: third, to be sincere in the work for safety. Only in this way can conditions be improved.

Pneumatic Operation Facilitates Traffic Movement*

By Oscar A. Broten
Western Manager National Pneumatic Company, Chicago

CONTROLLING and expediting passenger traffic has been given very careful and continued study since the first days of transportation. This has a direct bearing upon the increase or decrease of net revenues; therefore it is absolutely necessary to treat this subject with utmost care. In the method of controlling the passenger movement in loading or unloading, method of fare collection, distribution of load, etc., it is the final result of maximum speed and safety for which we are all striving.

One-man operation is rapidly increasing in all parts of the country with various types of cars and with it comes the decided reduction in operating expense. Successful and satisfactory operation of cars in one-man service is dependent upon the installation of proper safety devices and proper passenger control. The one-man safety car, originating with the Birney type car, was indeed a Godsend to the industry as it started the trend of operation in the right direction. From an operating point of view the main objection was the congestion of loading and unloading passengers through one small front door. On several properties this was partially overcome by fitting the car with separate entrance and exit doors at the front platform; however this did not solve the problem of evenly distributing the passenger load or eliminating the cross friction in the aisle.

Later one or two properties started the circulating load method of service, with front entrance and rear exit of passengers, the rear door being actually opened and closed by the motorman from his position on the front platform. This, although a step in the right direction, did not meet the requirements of the industry, as with this method the rear door is in the open position much more than necessary thereby inviting the stranger or car ride cheat to enter through the open rear door instead of the front entrance door. Furthermore during winter months an excessive amount of cold aid is admitted into the car. The greatest objection however, is the possibility of accidents caused by the motorman closing the door on an outgoing passenger.

Treadle Door Overcomes Objection to One Man

The problem of overcoming these objections and difficulties was solved with the development and distribution of the automatic treadle exit door, which insures an entirely safe and fast car operation with the circulating load method of passenger for all types of cars in one-man service.

Although the treadle door has been before the industry only a short time approximately 2,500 devices are either in operation or on order at this date, which is proof that this device, together with the circulating load operation, has been accepted by the industry at large, and in all kinds of climatic conditions.

It is important at this point to mention that the folding step has decided advantages over a stationary step in that the folding step insures the best operating conditions with treadle door operation, and also eliminates foreign matter, such as snow, ice and dirt, on the step.

For the past 25 years then has been a continuous effort to improve the methods of handling passenger traffic and it is our belief that the automatic treadle exit door together with the circulating load service completes for the industry the cycle of safety improvements which started with the one-man safety car.

A brief explanation of the operation of the treadle door is in order.

After the brakes have been applied and the car stopped the motorman moves the handle of the rear door control valve to a "Released Position." This is impossible until the air brakes have been applied. The passenger steps on the treadle plate which is set flush in the floor directly in front of the door, the door opens automatically, the passenger or passengers step out and when entirely off the step the door closes automatically notifying the motorman through a door signal light. The motorman releases the brakes, which automatically returns the handle of the rear door control valve to a door-locked position. At each stop the same operation would be duplicated. The treadle door is arranged to operate in conjunction with the approved one-man safety car devices.

Treadle Door Applicable in Bus Service

The circulating load idea with rear exit treadle door has been adopted by several bus operators, particularly those controlled by street railway properties. This method of operation is equally as necessary for city bus service as in street car operation of the same type due to the fact that the general body construction of buses includes only one small door at the front through which the passengers must both enter and leave. In addition to this the aisle space on buses in general is considerably narrower than on street cars. Therefore aisle friction is proportionately increased and can be practically eliminated, through use of the circulating load system.

It has been found desirable to use this method of operation on both single and double deck buses operating in one-man service and in your further consideration of bus operation this question should be given careful attention.

Various manufacturers have developed new apparatus or made refinements in present design equipment to secure quicker acceleration, faster car speeds, better braking, etc., and therefore it is up to the operating companies to keep the cars moving on faster schedules by increasing the speed and efficiency of the passenger movement and the elimination of excessive car standing time.

*Abstract of a paper before the Electric Railway Section, Wisconsin Utilities Association, La Crosse, Wis., Aug. 12-13, 1926.

Co-operation in Accident Prevention

Pacific Claim Agents Association Convention Considers Methods of Reducing the Number of Automobile Accidents

MEETING at the Clift Hotel, San Francisco, on July 22, 23 and 24, the Pacific Claim Agents Association listened to an interesting series of papers dealing with the subject of accident prevention.

Speaking on the subject of compulsory insurance for automobiles, Arthur L. Levinsky, claims attorney Stockton Electric Railway, said that at the present time in California there are some 1,494,891 licensed motor vehicles and an additional 54,202 which are exempt from payment of fees. Of the total of 1,549,093 motor vehicles somewhere between 15 and 25 per cent carry insurance. Assuming that the latter figure is a proper basis for computation there are approximately 386,523 insured and 1,159,590 uninsured. Opinion is divided, he said, as to whether or not the passage of a law making it compulsory to carry accident insurance would cause motorists to be more or less careless.

Organization of a commercial drivers' club as a method of enlisting the cooperation of motorists in accident prevention was explained by B. F. Boynton, claim agent Portland Electric Power Company. The club in Portland now has 600 members, and in the six months' period since its organization commercial drivers' accidents have been reduced 50 per cent, he said.

Thomas G. Aston, claim agent Spokane United Railways, spoke on how to enlist the aid of employees in claim department work. He said that the idea must be removed from their minds that the claim department man's sole duty is to criticize their mistakes. An attitude of general interest in them and in their work should be fostered, he said. The claim agent should know where every employee of the company lives. The Spokane United Railways has a large map with a pin located to show the home of every employee. When an accident occurs the map is consulted and any employee living in the vicinity is questioned.

When the railway company has a strong case it should not compromise with a claimant in the opinion of W. H. Moore, claim agent San Diego Electric Railway. In the case of claims the merits of which are debatable on the other hand litigations can sometimes be avoided by mutual concessions.

At the conclusion of the meeting officers were elected for the year 1926-1927, as follows:

A. L. Levinsky, Stockton Electric Railway, Stockton, Cal., president.

F. J. Furman, Butte Electric Railway, Butte, Mont., first vice-president.

A. W. Worthen, Tacoma Railway & Power Company, Tacoma, Wash., second vice-president.

B. W. Fernald, Key System Transit Company, Oakland, Cal., third vice-president.

B. F. Boynton, Portland Electric Power Company, Portland, Ore., secretary-treasurer.

Executive Committee: J. H. Handlon, San Francisco, Cal., chairman; Thomas G. Aston, Spokane, Wash.; W. H. Moore, San Diego, Cal.; Charles A. Blackburn, Butte, Mont.; F. D. Oakley, Tacoma, Wash.; H. K. Relf, Portland, Ore.: A. M. Lee, Seattle, Wash.; C. M. Roberts, Los Angeles, Cal.; S. A. Bishop, Los Angeles, Cal.; C. R. Peck, Portland, Ore.; V. F. Bennett, San Diego, Cal.

Making Ready for Cleveland Exhibit of the A.E.R.A

The upper picture was taken Aug. 9; that below was taken Aug. 14.

CONVENTION time is not far away. It may seem so to many, but not to the Cleveland convention committee. The above views show that much more than a start has been made to house the greatest of railway conventions and exhibits—that of the American Electric Railway Association, to be held Oct. 4-8. The pictures were taken looking north from St. Clair Avenue near its intersection with East Third Street through what will be approximately the center of this exposition.

At the right of the picture are the temporary tracks installed to service the convention. They connect, on the north, with the Pennsylvania and New York Central lines, and, on the south (in the foreground), with the Cleveland Railway tracks on St. Clair Avenue. Other connections will be made for the car exhibit. At the extreme right may be seen a corner of the City Hall, which faces the Public Auditorium.

The street through the center of the pictures (East Third Street) will be closed to traffic during the week of the convention from St. Clair on the south to Lakeside on the north.

On the left half of the upper picture the ground is cleared for laying the concrete floor of the new exhibition hall. In the background may be seen a large area with the concrete floor completed, and in the right-hand corner of the new building is the portion of floor that was laid in the first four hours of Monday, Aug. 9.

In the middle of the picture are the remains of an old brick-and-wood stable which belonged to the city of Cleveland. The work was threatened with delay because of the slow progress of its dismantling. Saturday afternoon, Aug. 7, Charlie Clark soaked the interior with kerosene and burned out the woodwork; then threw a ¾-in. steel cable around the base of the building and through a fall block connected it with a work train on the temporary track. In four hours the fire was out and the remains of the building are seen in the pit. Monday morning, trucks were busy throwing in the additional fill.

The lower picture shows the extent of progress made in five days. Grading has gone forward rapidly. The first track on East Third Street has been completed and the second one laid. The concrete floor is extended.

Other pictures will be published from week to week in order that the readers of this paper may check up the progress of the work and be assured that everything will be complete and in readiness for the convention.

The News of the Industry

Commission Powerless

New York Body So Rules With Respect to Fares in Albany and Rensselaer —Future Course Not Stated

A decision of far reaching importance was rendered by the Public Service Commission of New York on Aug. 18. In the matter of the application of the United Traction Company, Albany, for an increase in its fares in the Capitol district from 7 to 10 cents, the commission reaffirmed its former decision that the Legislature has taken away its power to regulate fares as against local franchise fare restrictions in the cities of Troy and Rensselaer.

The company had sought to increase its fares on its entire system. The cities contended that the commission was without jurisdiction to hear the petition for increased fares on the ground that no power had been conferred on the commission to abrogate or nullify the fares and conditions fixed in the consents to the United Traction Company. The commission rendered a decision on June 23 and it was upon the petition for a rehearing that the decision just made was rendered. The determination reaffirmed on Aug. 18 held:

That the Legislature has revoked the power to regulate rates fixed in franchise agreements by the repeal of the statute conferring it, and that the Public Service Commission has no jurisdiction now to exercise such delegated authority, and that therefore evidence should not be received in this proceeding as to valuation, operating expenses and revenues of the lines of the United Traction Company within the city of Troy and the city of Rensselaer affected by such franchise agreements, except insofar as such evidence may be necessary to permit an allocation of the revenues and expenses of the system to those lines unaffected by franchises and over which the commission has jurisdiction to fix rates, and that the commission as a fact finding body must regard such agreements as valid and subsisting until they have been annulled or limited by a court of competent jurisdiction.

This leaves the United Traction Company in the position of being able to petition for an increased fare on such of its lines as are located outside the cities of Troy and Rensselaer only. Whether or not the company will appeal to the courts from the decision of the commission could not be learned on Aug. 18.

New Grant at Louisville Advanced

It now appears likely that the Louisville Railway, Louisville, Ky., will secure its long-desired franchise modifications. On Aug. 10 the lower board of the City Council, by a unanimous vote, approved the ordinance recently placed before the City Council by the company, but with certain amendments. The chief of these was that on combination rides, on street cars and buses of the Kentucky Carriers, Inc., a subsidiary company, the maximum fare would be 10 cents, instead of 12½ cents. On street car rides the fare will be 7 cents straight, with 3 cents extra where a transfer is issued to a bus. On buses the fare will be 10 cents, whereas it is now 15 cents for single rides, or 12½ cents where tickets are bought. The bill will now go before the Board of Aldermen.

On Monday, Aug. 16, a conference was scheduled to consider amendments to the bill, to be participated in by the company, the railway committees of the upper and lower boards of the City Council, the Mayor, and City Attorney, as well as Board of Public Works. After agreements are reached at this meeting, the bill will go to the Aldermen, and if passed there, will be ready for the Mayor's signature, which is final.

Following the unanimous vote of the lower board of the Council it is indicated that there is not much resistance to the measure. Under the terms of the agreement the straight 7-cent fare would remain in effect for a period of two years, after which there would be a readjustment, instead of the present barometer arrangement under which the fare is arbitrarily put up or down every six months.

New Ordinance for Interurban Introduced at Cincinnati

An ordinance has been submitted to the transportation committee of the City Council at Cincinnati, Ohio, by the City Solicitor which grants the Cincinnati, Hamilton & Dayton Railway the right to continue the operation of electric cars from Dayton to Cincinnati and over the streets of Cincinnati for twenty-five years. The ordinance was made necessary because College Hill, through which the railway runs, was not a part of Cincinnati when the original franchise was awarded. The ordinance undoubtedly will be passed at the next meeting of Council.

Rapid Transit Issues in Los Angeles

Review of the Trials and Tribulations of the Local Railways in their Efforts to Give the City of Los Angeles a System It Should Have but Does Not Deserve

THE rapid transit problem in Los Angeles remains unsettled as to the ultimate plan the City Council will adopt. The Plaza Union Passenger Terminal controversy, bitterly contested by the railroads for years, has injected several new factors into the issue. The Plaza Terminal plan for a union station in the northern part of the city for all steam roads entering the city was investigated by the Interstate Commerce Commission, after a ten-year dispute between municipal bodies on the one side and the Southern Pacific, Union Pacific and Santa Fe Railroads on the other. In 1916 a so-called "grade separation and union passenger station" case came up before the State Railroad Commission and the commission ordered the railroads to submit plans for the construction of a passenger union station at the Plaza site.

The railroads secured a writ of review from the State Supreme Court, which on Dec. 19, 1922, annulled the commission's order, known as decision 8,901, on the ground that the court could "see no indispensable relation between the elimination of grade crossings and the establishment of union depot facilities," and that the California Railroad Commission had no jurisdiction to compel the construction of a union station by any railroads anywhere in California. That power has been transferred to the Interstate Commerce Commission by the transportation act of 1920. The Railroad Commission appealed to the United States Supreme Court, but again lost its case, for the decision of the California Supreme Court annulling the Railroad Commission's order was upheld on April 7, 1924.

The proceedings started in 1916 were reopened on Oct. 3, 1925, by the State Railroad Commission, on motion of the Central Development Association, and were set down for further hearing. These proceedings are now pending before the Railroad Commission. At the hearing held in Los Angeles during the last two weeks of April, 1926, lengthy and massive evidence was introduced by the city before the commission, while the railroads likewise presented many data and much evidence for their side of the question. The commission adjourned the hearing to review the evidence, fixing Aug. 2 as date of continuation.

When the city of Los Angeles placed its case before the Interstate Commerce Commission that body decided that "careful study of the Interstate Commerce Commission act convinces us that Congress has not conferred upon us the authority to require carriers to construct union passenger stations under conditions such as are here present."

No order, the carriers point out, was ever made by the Interstate Commerce Commission ordering a union passenger station in Los Angeles, as proponents of the issue claimed; or as the matter rests, there is no order outstanding of any commission requiring that a union

station be built. The Los Angeles Chamber of Commerce and other prominent civic bodies and associations passed resolutions and filed them with the Railroad Commission, in opposition to the Plaza Terminal site. They urged acceptance of the railroads plan, for a separate system of station facilities, elevated lines and grade crossing separations. They contended that the Plaza Terminal plan would take years to complete, whereas the railroad plan could be completed in eighteen months. Also, it was shown that the union station was unnecessary, and that any plan which leaves the electric lines out of the reckoning would be an incomplete solution to the city traffic problems, and create intolerable congestion. It was further contended that the Plaza Terminal plan would eliminate only the steam track grade crossings, and leave the Pacific Electric city grade crossings open.

The railroad plan involves the construction of an extension of the Pacific Electric Railway's elevated line from its present Main Street station to the Los Angeles River and across the river, where it will again come to grade, also connecting with an elevated extension to its private right-of-way at Fourteenth Street for southbound suburban traffic. This plan would take 1,200 trains of the electric interurban line off the downtown streets of Los Angeles daily, eliminate 18,000 grade crossing movements daily and afford relief to 50,000 passengers daily who use the 1,200 interurban trains of the electric lines to certain suburban districts.

Opponents to the railroad plans, backed by a leading daily paper, endeavored to impress upon the people the horror of elevated lines. To this end it featured during the election campaign photos of wrecks on elevated systems in the East, likewise giving the impression that the proposed elevated extensions in Los Angeles were to enter the main business streets. The railroads endeavored to dispel this impression by public announcements and advertisements that the elevated extensions were to be projected outside of the business district and to be constructed on private right-of-way.

Issue Submitted to the Public

Despite the fact that the Board of Public Utilities approved of the railroad plan and asked the city to dismiss its case before the commission, the City Council remained neutral and passed a resolution to place the issue before the people to obtain a straw vote. The election was held on April 30 last. Proposition No. 8 on the ballot for a union station in Los Angeles, but not designating any location, received a majority of 42,779 votes. Proposition No. 9 for a union station at the Plaza, received a majority of 4,082 votes.

The election outcome is not final, binding neither the city nor the railroads as to the building or location of a union terminal. Prior to the election the railroads applied to the City Council for franchise to cross certain streets to construct 2.9 miles of elevated railroad, but not longitudinally over the streets of Los Angeles.

A new issue has developed by certain factions opposing the elevated issue and has come to the front to fight the Kelker rapid transit plan, which calls for elevated lines and was adopted by the City Council. It will be recalled that the transportation committee of the Council, appointed in June, 1925, after the new city charter became effective, began a study of the proposed Kelker report and plan to work out means by which it could be financed and carried out. This plan also called for an extensive subway system in the downtown business district.

Chance for Local Line Extensions Small

Several weeks ago the Los Angeles Board of Public Utilities and Transportation issued a statement to the effect that there was no hope of any further car line extensions by the Los Angeles Railway until definite action has been taken on a comprehensive rapid transit plan, as involved in the Kelker-DeLeuw report, inclusive of the possibility of the unification of the Los Angeles and the Pacific Electric Railway systems.

The statement further outlined that it is impossible for the Los Angeles Railway system to finance any large capital expenditure until some definite plans have been acted upon for rapid transit or for unification of the two local railway systems. There is now pending before the State Railroad Commission for decision the application of the Los Angeles Railway Corporation for the reorganization of the company as a necessary precedent to refinancing. The franchise condition is such that the railway intends to apply for a resettlement of the franchise as soon as the people have adopted a procedure ordinance. Neither the city of Los Angeles nor the State Railroad Commission has any authority to order a street railway to extend any of its lines, and the Los Angeles Railway is at present unable, at anything like favorable terms, to raise capital to carry out new construction, betterments or extensions. This statement was addressed to certain communities that are agitating railway extensions in the city.

Decision Expected Soon in Suit of Illinois Line

The decision of United States Judge Walter C. Lindley of Danville, Ill., in the injunction suit of the East St. Louis Railway, East St. Louis, Ill., against the Mayor and City Council of East St. Louis, who contemplate tearing up the railway tracks on Third Street between Broadway and Missouri Avenue, is expected shortly. A temporary restraining order was issued by the court on May 29, last, and the question is whether the injunction shall be made permanent.

The railway contends that the tracks in question are necessary for the efficient operation of the balance of the company system, and further that the Illinois Commerce Commission and not the City Council has final jurisdiction over the tracks. The commission declined to take action on behalf of the company.

The franchise on the stretch of tracks expired on May 31 and the majority of the Councilmen have refused to renew it.

Advance in Utica Fares Allowed

The New York State Railways was authorized by the Public Service Commission on Aug. 19 to put into effect on its Utica Lines, including the city of Utica and adjoining villages, a 7½-cent ticket fare and a 10-cent cash fare. The present fare rate is 7 cents. The order is effective on Aug. 22.

The company is authorized to sell ten tickets or tokens for 75 cents, each token or ticket good for one ride with all transfer privileges. Where tickets or tokens are not purchased, the fare is to be 10 cents.

Evidence submitted in behalf of the company's petition estimated that 80 per cent of the passengers on the Utica lines will purchase tickets, while 20 per cent, or occasional riders, will pay the 10-cent cash fare. The commission finds that the present 7-cent fare is not compensatory and does not yield the company a fair return upon the value of the property used in giving transportation service on the Utica lines.

The order of the commission providing for the 7½-cent ticket rate and the 10-cent cash fare was unanimous. There were two opinions, one by Commissioners Pooley, Van Voorhis and Lunn, and one by Chairman Prendergast and Commissioner Van Namee.

Improvement Program Going Ahead at Richmond

Officials of the Virginia Electric & Power Company, Richmond, Va., report that the company has completed upward of two-thirds of its $1,500,000 improvement program and are ready to rush it to completion after Sept. 1, provided the blanket franchise and bus legislation, which now are before the Richmond City Council, can be finished.

The company set aside $500,000 for the acquisition of the bus lines of the Richmond Rapid Transit Corporation and early extensions in this service and $1,000,000 for the co-ordinated bus and street railway improvements. The bus service was bought outright, $220,000 more has been spent on new electric cars, $72,000 for new buses and $60,000 on a new garage and terminals for buses. Meanwhile, the company has kept in advance of street construction in laying new tracks.

It is stated that, under the new transportation system, every resident of Richmond will be closer than 1,320 ft. to a street car or bus line.

In reply to a question as to how long after passage of the blanket franchise and bus ordinance the entire unified system would be in operation, officials of the company stated that all of the new bus lines would be ready within approximately 120 days, and that the last of the railway extensions would be complete and in operation within eighteen months. The first of the electric extensions should be in operation within three weeks after the passage of the ordinance, it was stated.

Two hundred and thirty-seven street cars and 62 buses are in operation. Fifteen new street cars recently were added to the system on one line alone, and fifteen new buses have been ordered.

Three-Year Labor Agreement Reached in New Orleans

Union orders directing a strike of the trainmen of the New Orleans Public Service Company, New Orleans, La., effective Aug. 13 were revoked at a meeting of the union executive committee the night previous. The solution was found in a proposition whereby the union men could get their dismissal and suspension cases before members of the board of directors without having to subject the board to the necessity of sitting regularly to go through formal trials.

Here is the paragraph upon which agreement was reached:

> If any employee shall have grievances or claim unjust treatment, same shall be taken up directly by the employee involved, or through representatives or committees composed of and selected by the employees for that purpose, with the division superintendents. The right of appeal to and review by the general superintendent of the department in such case shall exist from any ruling of the division superintendent and in turn to the general manager. If the decision of the general manager is unsatisfactory to the party accused, he, or the association, shall have the right of appeal to the executive committee of the board of directors of the company and upon notice of appeal the said executive committee shall sit within ten days and determine the case upon written statements. The decision of the said executive committee shall be final and conclusive.

All provisions of the contract except the dismissal feature had been agreed upon previous to the call for a strike.

Among the provisions of that agreement are:

> That the contract shall be for three years.
>
> That during that period there shall be no strike for any cause whatsoever.
>
> That the wages of the carmen shall remain the same—that is, 45 cents an hour for the first six months; 47 cents for the next six months and then 51 cents.
>
> That all employees in the departments concerned must become members of the union.
>
> That the company shall not be required to discharge an employee should he be expelled from the union for any reason except for non-payment of dues.

After the new contract had been signed Rudolph Hecht, chairman of the board of directors, issued this statement:

> The directors of the New Orleans Public Service Inc. are pleased that a strike has been averted and that the differences between the company and the employees have been satisfactorily adjusted. The company has consistently taken the position that matters of discipline could not in the very nature of things be the subject of arbitration. However, to avoid any misapprehension on the part of the employees and to assure them that the company and its officers and directors have every intention of giving them a square deal, it has been provided that the ultimate decision in matters of discipline will rest with the executive committee of the board of directors. To Mayor O'Keefe and the other members of the Commission Council we extend our thanks for their splendid services in bringing about the settlement.

Not by any means was agreement among the men general that a strike was advisable. As a matter of fact before the settlement was reached, St. Clair Adams, acting for some of the union men who dissented from the strike order, took additional steps intended to make the strike ineffective. First a restraining order was secured from the court prohibiting the strike call, and then a supplementary order was secured prohibiting the officers of the union from spending any union funds and prohibiting the banks in general from paying out any of the funds of Division 194, until after a hearing on the injunction petition. This hearing was set for Aug. 16, but its need was removed by the terms of the settlement reached.

Scant Progress at Chicago

The task of solving Chicago's traction problem to the taste of the many parties involved loomed even larger last week as a result of the failure of city officials, traction executives, bankers and representatives of the Surface Lines security holders' protective committees to agree upon any definite plan.

Traction officials who appeared before the City Council committee on local transportation on Aug. 17 expressed many ideas on the subject, few of which were in actual agreement.

James M. Sheean, representing Henry M. Blair, president of the Chicago Surface Lines, as counsel, reiterated the traction chief's earlier statement that the Surface Lines will not be ready to negotiate with the city in working out the details of a new ordinance until legislation is obtained from the state removing the present 20-year franchise limitation. He said he did not think it wise for the city to negotiate a contract and then try to get the Legislature to "sign on the dotted line." In the last analysis, he added, the solution of the problem lies mainly in making traction securities attractive to investors.

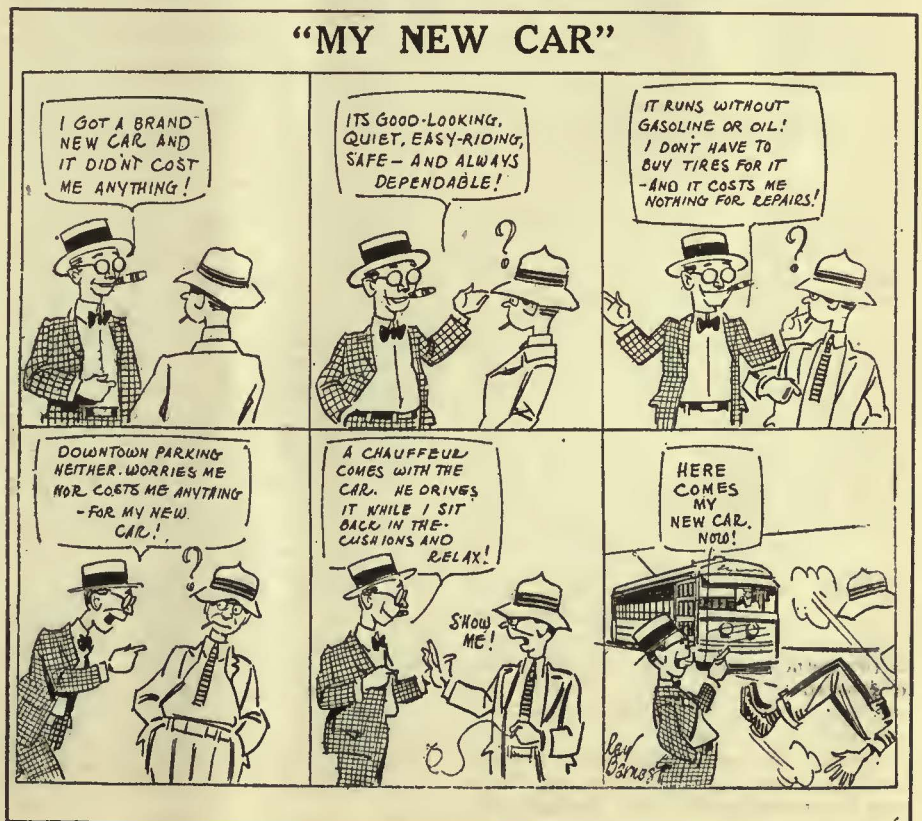
In rather marked contrast to Mr. Blair's reported opinions, however, were the remarks of Leonard A. Busby, president of the Chicago City Railway, and the only company man to sit in with the Aldermen at the first traction settlement conference to which all the traction heads had been invited early in July. Mr. Busby pointed out that enabling legislation and the details of an ordinance are so inseparably bound together that it is impossible to discuss one subject without discussing the other. He agreed to co-operate with the City Council in working out the terms of a new franchise at any time.

Save for Mr. Blair, all the other officials in attendance, including Samuel Insull, chairman of the Chicago Rapid Transit Company, likewise promised to join forces with the city in attacking the baffling traction problem. Mr. Insull was doubtful, however, about the wisdom of plunging the elevated lines into the present traction ordinance discussion when they do not need a franchise. He said that under the provisions of the tentative ordinance, the elevated lines would be unable to secure capital on which to function properly.

In replying to Mayor Dever's statement that the city could not build a subway until it knew who would operate it and on what terms, Mr. Insull said that the elevated lines would "enter into any kind of an agreement by which it could pay out on the rate of fare to be charged." He was willing to enter into any arrangement to operate jointly the subway and elevated properties. If the city could agree with the Surface Lines it would not be difficult to work out an agreement with the elevated.

Cartoonist Uses Grand Rapids Cars to Point Moral

One of the most recent instances of public response to the modernization movement in Grand Rapids, Mich., is furnished by the use of the new rolling stock of the Grand Rapids Railway as the subject of the accompanying sketch "My New Car," done for the *Grand Rapids Herald* by Ray Barnes.



Ray Barnes in the *Grand Rapids Herald*

Survey of Transit at Cincinnati

The City Council of Cincinnati, Ohio, has awarded the Beeler Organization, New York, the contract to make a survey of all local transportation there and especially to report on the matter of the completion of the rapid transit project, upon which the proceeds of $6,000,000 of city bonds have already been expended with further expenditures required to complete. Upon the information which the present investigation divulges will hinge the issue of additional bonds, estimated at $6,000,000, by the rapid transit board. The problem is whether to abandon this plan, complete it along original lines or modify it, and if so, how. John A. Beeler, directing head of the Beeler Organization, started work at Cincinnati personally with his associates on Aug. 16.

Fast Service for Fairmont Interurban

The Monongahela West Penn Public Service Company, Fairmont, W. Va., is arranging to place in commission on its interurban line between Fairmont and Clarksburg a fast limited car, to be known as "The West Virginia," named for the State University. It will make the run between the two cities in one hour. In order that the limited may negotiate the 25 miles between Fairmont and Clarksburg, many of the usual stops will be eliminated. According to the present plan, the trains will make only four stops between the terminals of Clarksburg and Fairmont-Shinnston, Enterprise, Worthington and Monongah. In the establishment of the new service the company will not decrease the present service on the Clarksburg-Fairmont line. Trains at half hour intervals during the day and hourly intervals at night will continue to be operated. The new car is decorated in old gold and blue, the colors of the university after which it is named.

Speed Boats Suggested to Ease Traffic Jam

River transportation fed by cross-town buses is suggested as a method of transportation relief in New York during rush hours, in a report made by Major Philip Matthews, chief executive officer of the Transit Commission. The report is the result of a survey made by the commission during the recent Interborough subway strike.

Major Matthews suggests that high-powered boats be used to transport passengers up and down the North River with bus lines feeding the boats at such points as 125th, 96th, 42d and Rector Streets, with a possible stop at or near Fourteenth Street.

There is a possibility that if co-operation can be arranged with those who obtain bus franchises, similar service might be introduced on the East River, and fast boats operating as part of bus systems might be run between Manhattan and Brooklyn and Manhattan and Queens. Docking privileges would be obtained from the city if the plan was made effective. It is the suggestion that the extraordinary service be used only in rush hours and the boats be put to some other use at other times.

Wage Arbitration Case on Eastern Massachusetts Closed

The arbitration hearings on a new wage scale for the employees of Eastern Massachusetts Street Railway, Boston, Mass., are ended, and the closing argument has been held. The case is now before the special board of arbitration for its decision.

City Rejects Long Island Road's Offer

Chairman John H. Delaney of the Board of Transportation of New York City has informed the Long Island Railroad an offer it had made to cede its franchise for the Whitestone Landing branch was not acceptable. The company recently offered to surrender its right of way at a great saving both to the city and the railroad.

In his offer George Le Boutillier, vice-president of the railroad, said the company could not afford to eliminate the grade crossings as required under the law and that it was willing to abandon the line. He estimated the saving to the city would be $1,000,000 and to the company $2,000,000. The letter said the line would become obsolete when the city had completed its rapid transit program and suggested it might be made a part of the subway extension if ceded to the city.

Mr. Delaney says that the city's financial resources will be strained to the limit for the next eight years to provide funds for the financing of the $600,000,000 trunk subway program already laid out, and not one cent will be diverted for the extension of existing subways.

Cinderella Holds Up Traffic

The United Railways & Electric Company, Baltimore, turned to good account a little item that appeared in the Baltimore *American* recently.

"What's a traffic jam compared to a pair of light green satin slippers that just match one's latest frock? Bah! Don't mention 'em in the same breath!" said the newspaper story. "Which, there is little doubt, was the line or reasoning employed by a pretty Baltimore maiden yesterday afternoon in West Lexington Street. She left her roadster in the middle of the thoroughfare, tripped into a store and came forth with the slippers. There was a traffic jam three blocks long."

In reprinting the story the United also presents the following editor's note: "The 'amazing' thing about this tale is that she didn't repeat this performance at eight different stores and wind up by buying a new hairnet instead of slippers. The moral is, shop for your green satin slippers by street car."

Seattle Railway Leased by Theater

For one hour on Friday night, Sept. 10, every resident of Seattle, Wash., who so desires will be permitted to ride free on the municipal street cars to the downtown sections of the city. Under an agreement sanctioned by the City Council, D. W. Henderson, superintendent, has been authorized to lease the 197 cars between the hours of 6:30 to 7:30 p.m. that day to the Fifth Avenue Theatre Company, at a cost of $669.80.

The renting company will open its theatre on that night. It will also carry as its guests all inbound passengers on municipal street cars, and Mr. Henderson has declared that he will have rolling stock available to transport every person in the city from home to downtown that night during the one hour of free rides. Mr. Henderson explained to the Council that inbound traffic between 6:30 and 7:30 nightly was at its lowest ebb, that the leasing of the cars would cause no operating loss to the service, and that it would tend to encourage people to use the cars.

Hope for Agreement in Control of California Line

For the coming fruit shipping season, the Central California Traction Company, San Francisco, Cal., will be operated as an independent railroad, and the section between Sacramento and Stockton will be open freight soliciting territory as far as the Santa Fé, the Southern Pacific and the Western Pacific are concerned. This is the result of the third postponement of the date for filing exceptions to the examiner's report which has been granted by the Interstate Commerce Commission in order to give the three railroads concerned time to agree upon a plan whereby the traction company can be operated under joint management. The date now set is Dec. 1. Note of the opinion of R. R. Holster, Interstate Commerce Commission examiner, was made in the ELECTRIC RAILWAY JOURNAL of March 29. All three of the transcontinental railroads have offered to buy the traction line, but in each case the examiner has decided that such an arrangement would not be in the public interest.

One-Man Cars on 32-Mile Run

What is said to be the longest one-man car route in Ohio is being operated by the Stark Electric Railroad between Canton and Salem, a distance of about 32 miles.

To reduce the operating cost of the interurban line, the Stark Electric has placed eight new one-man cars in service over the route on a half-hour service.

To protect cars at three grade crossings, the company has employed its own watchmen. With two shifts at each crossing, the company employs six men to replace from 16 to 24 men.

On the old basis with two-man cars eight cars were in constant operation. This required 32 men for two shifts with additional men for the night runs.

Draft of New Toledo Grant Being Completed

Aug. 23 is the date that has been fixed for the presentation to the City Council of Toledo, Ohio, of the new franchise ordinance for the Community Traction Company. If the ordinance is passed it will be placed before the voters in November. Into the ordinance will be inserted an amendment to the city charter which will permit a monopoly of local transportation by the railway. Voters will cast their ballots for both the amendment and the new ordinance on one ballot.

The draft of the new ordinance is now being completed. Naturally there are many rumors as to its terms. It is said that a maximum fare of 10 cents and a complete monopoly to the Community Traction Company will be provided. Under the new ordinance the Street Railway Board of Control will have practically complete control. A drastic forfeiture clause will be included in the new ordinance to protect car riders. This clause, it was announced, will force the operating company to maintain adequate service at a reasonable cost.

The board of control will be tested with power to raise or lower fares as it sees fit to encourage street car riding. The new ordinance practically breaks away from the old flexible fare rate which provided that fares increase as street car riding decreases.

The street railway commissioner will act as an executive officer of the board of control under a new ordinance.

The city will pay for paving and repaving of streets between the street car tracks but the forfeiture clause will include a provision requiring the company to maintain this pavement.

The new ordinance is being drafted along lines suggested in a transportation survey made by Prof. H. E. Riggs of Ann Arbor.

Terminal Electrification Discussed in Chicago

Electrification of Chicago's steam railroad terminals would be an immense civic improvement, but it cannot be accomplished until the railroads are convinced that a fair return is possible on the tremendous investment that would be necessary to carry out the work. This, in brief, was the conclusion reached by the subcommittee of the City Council at the end of its series of conferences with railroad executives, real estate operators and engineering experts on July 25.

Mayor Dever declared that the health of Chicago's citizens must be protected against smoke and dirt. He cited the example of New York, and also that of the Illinois Central Railroad, which recently electrified its suburban divisions out of Chicago, as proof that electrification is possible.

Joseph K. Brittain, president of the Chicago Real Estate Board, declared that speedier transportation is an immediate necessity. He said that he believed the benefit to community real-estate values would easily equal, if not exceed, the immense cost of electrification of lines serving it. This opinion was concurred in by F. L. Thompson, vice-president of the Illinois Central, who told the Aldermen that his company expected to make its suburban service pay for the first time by virtue of increased business attracted by recent electrification.

William R. Dawes, president of the Chicago Association of Commerce, was less encouraging. He declared that Chicago business men were not in favor of electrification, because they realized that the railroads must inevitably increase their freight rates in order to retrench themselves for the enormous outlay necessary. Charles Dillon, editor of the *Railway Review*, was of much the same opinion. He stated that many railroads entering Chicago were small and financially weak and that, for them, electrification was absolutely impossible.

The testimony of various officials of several of the larger railroads was substantially the same. They declared themselves to be in hearty sympathy with the aspirations of the committee, but feared that electrification would be gradual at best. They all agreed that the railroads could not consider the question seriously until it was demonstrated that they could secure a fair return on their investment.

News Notes

New Development in the Ironwood Street Car Controversy.—The Ironwood Commercial Association has endorsed the proposal that the city commission join with the Lake Superior District Power Company, Ashland, Wis., in submitting the matter of increased fares and paving relief to the Michigan Public Utilities Commission. This marks the latest developments in the Ironwood street railway abandonment controversy. Members of the association looked upon the proposed loss of railway service as a grave injury to the future growth and prosperity of Ironwood.

Paving Controversy Holds Up Abandonment.—Action by the City Council on the request of the Lincoln Traction Company, Lincoln, Neb., for permission to take up its South Fourteenth Street track as soon as bus service to the State Penitentiary can be established and routed largely by way of Thirteenth, has been halted by the insistence of property owners that the company make some contribution toward the paving of that part of South Fourteenth Street which is unpaved and where the tracks now rest. The company protests against paying for paving where it will have no tracks in the future, but the property owners insist they would not have signed for paving if they had known the company would, by withdrawing car service from the street, avoid any liability for paving costs and thrust the additional burden upon their shoulders. The Council is seeking a way to pave without increasing the proportion that it was intended originally the property owners were to pay.

Seattle's Transportation Problems Discussed. — Prominent business men and civic leaders of Seattle recently organized themselves into the Seattle Rapid Transit Club to conduct a campaign for better transportation. At their meeting one of the number expressed the opinion that Seattle's progress will be seriously retarded unless rapid transit is installed to afford traffic relief; that records of large Eastern cities having rapid transit show a steady and rapid growth; and that a project under which Seattle will be furnished with local transportation more commodious than is possible by surface car is the only permanent solution of Seattle's traffic problems.

Increase for Washington Trainmen. —Trainmen in both passenger and freight service of the Seattle & Rainier Valley Railway, Seattle, Wash., have been awarded an increase in wages of 2 cents an hour effective Aug. 1, by a board of arbitration. The increase will not apply to present line bus operators.

Street Railway Improvement for Wisconsin. — Improvement of the railway system operated by the Wisconsin Gas & Electric Company, Kenosha, Wis., to include the extension of one line, building of two single track lines and the double tracking of three lines with a view to increasing transportation facilities and relieving traffic congestion in the downtown district, was practically assured when the City Council indorsed extensions to the railway franchise bearing on these proposed improvements.

New Franchise for Ohio Line.—The Western Ohio Railroad, Lima, Ohio, has been granted a new franchise by the City Council of Sidney, Ohio. The present franchise expires on Nov. 1 and the new one will extend for a period of twenty years.

Will Use Buses on Part of Line.—The Rockford City Traction Company, Rockford, Ill., has been ordered to remove its tracks on South Main Street from West State to Morgan Streets, and to operate buses instead of cars. The order was made by the City Council at a stormy session attended by a large number of protesting South Rockford residents. An assessment of $25,000 has been ordered against the traction line to pay for the replacement of paving between the car tracks and an annual license fee of $50 has been fixed for each bus now operated or to be operated in the future by the company.

Railroad Reduces Fares in New York Suburbs.—Although the village trustees of Mamaroneck recently authorized the New York & Stamford Railroad, Port Chester, N. Y., to operate under an old fare schedule which places the fare from Mamaroneck to Larchmont at 14 cents, it is learned that the railroad plans to collect only a 10-cent fare during September. This action is construed by village residents to mean that the railways will compete, at least in fare, with any bus lines that start between the villages. Several propositions have been made to the officials of towns between Port Chester and Larchmont, but no company has yet received the support of all communities.

Recent Bus Developments

Bus Rumors Revived in Westchester

Officials of the Third Avenue Railway, New York, are understood to have been in conference with bus owners at White Plains in an effort to establish the nucleus of a proposed county-wide bus system. The firm of Brennan Brothers and the Soundview Transportation Company, are said to have received offers for their lines.

S. W. Huff, president of the Third Avenue Company, which through a subsidiary, the Union Railroad, recently purchased the Westchester Street Railroad at auction, said at a conference with officials of White Plains that his company planned to run trolley cars until it was proved that buses would be better.

The Yonkers-Rye Beach bus system is operated through White Plains by the Third Avenue Company, which also has a bus route to Harrison from White Plains. Buses have replaced the trolleys in a section of East Chester. The trolley line abandoned was another subsidiary of the Third Avenue Company, the Westchester Electric Railway holding the only franchise for the operation of vehicular transportation between White Plains and Mamaroneck. The route from the city line to the center of the village of Mamaroneck has been suspended for several years, but the Third Avenue Company is attempting to install a bus service along the Sound shore. The company most favored is the County Transportation Company, a subsidiary of the New York, Westchester & Boston Railroad, which operates to Mamaroneck and is extending its line to Harrison.

In Yonkers the efforts of the city to sell at public auction franchises for the operation of fifteen bus routes is being opposed by the Third Avenue Company, which operates both trolleys and buses there.

In Larchmont the Village Board on Aug. 10 voted unanimously in favor of granting to the County Transportation Company, a franchise to operate a bus line within the village limits. It is the purpose of the company to establish a line of buses to connect Port Chester, Rye, Harrison, Mamaroneck and Larchmont. The company has received a permit to operate in Harrison, and it is understood that franchises will be granted in Port Chester and Rye.

Change of Plan Causes Delay for Nebraska Interurban

The State Railway Commission has declined to approve the application of the Omaha, Lincoln & Beatrice Railway to supplement interurban service by bus service between Lincoln and University Place, a suburb 5 miles distant, until such time as the Lincoln Traction Company has had an opportunity to examine the situation and enter a protest if it chooses to do so. The commission so ruled after the interurban had amended its original application, in response to letters and requests from business interests, so as to run the buses through the retail district, now served by the Lincoln Traction Company, the territory of which the interurban has hitherto carefully refrained from invading. The Councils of both Lincoln and University Place approved the supplemental service. The company's original plan was outlined in the ELECTRIC RAILWAY JOURNAL in the issue of July 14.

Construction of Bus Terminal Delayed

The project of the Pacific Northwest Traction Company, Seattle, Wash., which provides for construction of a $500,000 interurban and bus terminal, faces another thirty days delay, as the City Council has recently returned the entire matter to the committees on franchises and streets and sewers for further consideration. Property owners in the district have protested the construction.

Bus Service Expanded at Olean

Buses replaced trolley cars in the territory served by the line of the Olean, Bradford & Salamanca Railway Company, Olean, N. Y., between Olean and Salamanca, on Aug. 14, except for two runs daily. The change is in the nature of an experiment, which will be continued for an undetermined time. Should the change prove successful, the bus service will be made permanent. Buses have been used on the run between Olean and Bradford some time. The night bus leaving Salamanca for Little Valley at 9:30 has been discontinued. The last bus for Little Valley now leaves at 3:05. The revenue received did not warrant the 9:30 bus.

Bus Lines in Kansas City Rerouted

Temporary changes in the routings of the 39th Street crosstown and the Country Club express bus lines in Kansas City, Mo., have been granted by the city with the understanding that if the changes do not prove beneficial after a trial of ninety days, the lines are to be returned to their former routings.

The western terminus of the 39th Street line will be moved from 47th and Mill Creek Parkway to 48th Street and Belleview Avenue to the following route:

From 47th and Mill Creek Parkway, west in 47th Street to Roanoke Boulevard, thence south to 48th Street: West in 48th Street to Belleview Avenue; north in Belleview Avenue to 47th thence east to present terminus at 47th and Mill Creek.

This change extends the line to an apartment district not served before.

The change in the Country Club express route is not an extension. It will be between the intersection of Wornall road and Alameda road and the intersection of Alameda road and Wornall road by way of 47th Street. Thus the express line will be made more convenient to residents in the vicinity of Country Club Plaza.

Railways Plan Greater Use of Buses

Two interurban railways operating out of the city of Tulsa, Okla., plan greater use of buses in carrying passengers. The Union Transportation Company, which handles bus business of the Oklahoma Union Railway, Tulsa, Okla., has been authorized by the Corporation Commission to operate buses from Tulsa to Mounds via Sapulpa and Kiefer with the restriction that passengers are not to be carried by bus between Tulsa and Sapulpa. The company will continue to carry passengers over its interurban line from Tulsa to Sapulpa. The service from Sapulpa to Mounds, the southern terminus of its interurban line, and from there into Okmulgee and Henryetta will be handled entirely by buses. The railway line, however, will be maintained to handle freight service.

The Sand Springs Railway, Tulsa, Okla., operating an interurban line from Tulsa to Sand Springs, has notified city officials at Tulsa of its intention to apply to the State Corporation Commission for a permit to operate a bus line parallel to its interurban line. Officials of the company state that this does not mean that the interurban line will be abandoned, but that supplemental service will be given.

Wind-Kissed Cheeks of Apollos and Aphrodites of West

Alabaster Apollos who crave a golf course tan without the exercise are riding the bus tops in Kansas City these days. There is plenty of proof of this, according to officials of the Kansas City Railways, Kansas City, Mo., who announce that the receipts of the lines on which the double-deckers are run have greatly increased in the last two months. Likewise athletic Aphrodites who disdain the lemon and sunbonnet are getting their sunlight and wind that way. It makes one look and feel like the sipper in the soft drink ads. Palm Beach, ahoy!

The "toppers" are now in their heyday on the double-deck lines. Coatless, hatless, they gulp the sun swept winds as the city comes rolling up. The results are the same as might be secured at the seashore and they can be obtained going to and from work.

During the rush hours the buses, of course, are filled to capacity, but in the off periods riding on the double deckers is confined almost entirely to the upper deck.

With the arrival of hot weather the interiors of the single-deck buses were uncomfortable as the four ventilators, designed to carry the air in and out, were not of capacity sufficient to the needs. To remedy this condition cast-

ings prepared in the company shops were fitted to the buses so as to allow the opening of the front windshield and permit the air to sweep through the buses. This proved so satisfactory that the patrons of the single-deck vehicles have ceased to envy their friends who use the lines on which the double-deckers are run.

Bus Franchise Report Not Ready for New York Board

Owing to the failure of the Board of Transportation of New York City to have the analysis on the bus franchise applications ready, no meeting of the Board of Estimate was held on Aug. 19. The date of the next meeting is contingent upon the receipt of the report by Mayor Walker. Four days after he receives it the meeting will be held, to allow members of the board now on vacations time to get to the meeting.

Bus Service for Scranton Discussed.—The Scranton Railway, Scranton, Pa., is asking the Public Service Commission for certificates of convenience to run bus lines on Green Ridge Street from Dunmore to Providence and also from Throop directly into the center of the city. A hearing at which the city was represented was held recently at Harrisburg.

Loss on Line Company Seeks to Abandon.—According to the petition of the Interstate Public Service Company, Indianapolis, Ind., to abandon its bus service between Franklin and Columbus, Ind., between Seymour, Ind., and the Indiana-Kentucky state line and its through service between Indianapolis and Louisville, the loss during the first six months of this year on the Indianapolis-Louisville service was $10,494. Receipts were only $4,350, compared with operating costs of $14,844. On the Indianapolis-Seymour bus line during the first ten days of July the company transported only 49 passengers with a total revenue of $43,05. Mention of the company's intention to abandon these lines was made in the ELECTRIC RAILWAY JOURNAL of Aug. 7.

Adequacy of Five-Cent Bus Fare Discussed.—From the point of view of Mayor C. M. Blanc of St. Petersburg, Fla., the fares on the newly established municipal buses should be fixed at 5 cents, at least during the summer, in order to induce the citizens to use them. Other officials point out, however, that tests elsewhere have established 10 cents as the minimum fare at which buses can be operated successfully under average conditions. It is hoped that the bus lines eventually will pay their own way, but at present any deficit in their maintenance will be met from the profits of the electric railways, which are said to be paying steadily.

Buses Will Supply Service.—The City Council of Canton, Ohio, has permitted the Northern Ohio Power & Light Company to abandon one of its city lines extending from Market Street over Sixth Street, Ninth Street and Maryland Avenue, a distance of nearly 2 miles. Bus service will be substituted. The line has been operated at a loss for a long time due to the closing down of industrial institutions.

Applies for Bus Line in Troy.—The Capitol District Transportation Company, Inc., a subsidiary of the United Traction Company, Albany, N. Y., filed a petition with the Public Service Commission for a certificate for the operation of a bus line from the Troy City line in Pawling Avenue, along Pawling Avenue to Congress to Fourth to Fulton to Third to Congress to Fourth Street, the city authorities having granted the company a consent for such operation.

Bus Service Extended in Illinois.—The Red Line Motor Bus Company has been granted permission by the Illinois Commerce Commission to extend its service from Greenville to Vandalia, Ill. This company originally started with a line between Collinsville and Troy, Ill. Later it extended to Greenville and when control passed to the East St. Louis & Suburban Railway, East St. Louis, Ill., the buses were run into St. Louis, Mo. The State Commission has authorized the Tri-City Service Company to extend its service from Vandalia to Effingham, Ill.

Tulsa Chamber Approves Anti-Jitney Ordinance.—The directors of the Tulsa Chamber of Commerce have expressed unqualified approval of Tulsa's present bus service system as operated by the Union Transportation Company and have condemned the old seven-passenger jitneys which were formerly operated on the streets of Tulsa by several different concerns. The resolution was occasioned by efforts of jitney owners to regain use of the streets of Tulsa through a suit in the district court. The city commissioners of Tulsa recently adopted a stringent ordinance regulating the capacity and equipment of city transport carriers and which was intended to keep jitneys off the streets.

California Company Changes Bus Route.—The Pacific Electric Railway, Los Angeles, Cal., has been authorized by the Railroad Commission to change its motor bus route between Pasadena and Shoeb. The rerouting was desired by the city of Pasadena to relieve traffic congestion on Colorado Street and Raymond Avenue, and to eliminate five safety stops in the cities of South Pasadena and Alhambra and avoid a highway not well paved.

Buses Start New Service in Minnesota.—Permission has been granted by the City Council of Superior, Minn., to the Superior-Duluth Coach Company, a subsidiary of the Duluth Street Railway, Duluth, Minn., to operate a city bus service on the streets of Superior. The company will begin service with four buses.

Co-operation Between Ohio Car and Bus Lines.—Through an agreement, effective Aug. 1, signed between the Indiana, Columbus & Eastern Traction Company, Springfield, Ohio, and the Springfield, Urbana & Piqua Bus Company the buses of the latter company will use the traction stations as terminals in Springfield and Urbana. Schedules of the buses will be changed so that direct connection will be made with the traction company's cars and buses to Columbus and Dayton.

Buses Replace Street Cars in Belleville.—Buses replaced the local street cars of the East St. Louis & Suburban Railway, East St. Louis, Ill., in Belleville after months of discussion and negotiation with the city officials. These new bus lines cover approximately 60 per cent more territory than the street car lines, and the change has greatly improved the local transportation facilities, putting the city of Belleville on a par with any other of similar size in the United States. In July, 1924, the Oakland street car line was abandoned and a bus run in its place. The route covered by the bus was approximately 50 per cent greater than that covered by the street car. The success of the Oakland bus line led the company to ask the city officials for permission to replace the other street car lines with buses.

More Bus Lines for Cleveland.—Two new bus lines in Cleveland, Ohio, one on Eddy Road from Euclid Avenue to Lake Shore Boulevard, and the other on Bartlett Avenue from East 131st Street, to Gay Avenue, and thence to East 129th Street to Corlett Avenue probably will be placed in operation by the Cleveland Railway within the next few weeks.

Express Bus Service in Ohio.—The Northern Ohio Traction & Light Company, Akron, Ohio, established express bus service at a 10-cent fare on the through city streets of Akron on Aug. 4. Service is being well patronized. Buses from the Six-Wheel Company, Philadelphia, are being used. The single-deck bodies were built by Kuhlman, Cleveland. The double-deck bodies were built by Hoover Company, York, Pa.

Buses Operate in Westfield. — Bus service was started in Westfield on Aug. 1 by the Springfield Street Railway, Springfield, Mass. The trolley service has been abandoned, with the exception of the line running from Springfield to Westfield and the short line in Westfield proper. The fare has not been changed under the new régime.

Buses to Replace Logan Street Railway.—Replacement of the railway system in Logan, Utah, with a fleet of buses is asked by the Utah-Idaho Central Railroad, Ogden, Utah, in a petition submitted to the Public Utilities Commission. The petition states that the street car line has lost money for several years and that with bus service the company will be able to cover a wider area in the city and give better service than does present electrically operated railway. The company proposes to charge a 7-cent fare on the buses, offering three fares for 20 cents and twenty school tickets for $1. While no mention is made in the petition regarding the disposition of the railroad trackage, it is understood that it will be removed.

Buses Begin New Service in Pennsylvania.—The Northern Cambria Street Railway, Patton, Pa., has abandoned traffic over its railway lines, and substituted service with three buses. The buses will operate from Barnesboro to Spangler, Bakerton and Carrolltown with probable extensions of the lines to nearby towns. The last trolley was run over the 8-mile route on July 31.

Financial and Corporate

New Company to Take Cuban Railways

A new company called the Havana Electric Railway is to be incorporated under the laws of Maine, preliminary to carrying into effect the program of the Havana Electric Railway, Light & Power Company to segregate its railways from its light and power properties. This new Havana Electric Railway will acquire all of the railways now owned by the Havana Electric Railway, Light & Power Company and by the Camaguey Electric Company and by the Santiago Electric Light & Traction Company.

The Havana Electric & Utilities Company, which is controlled by the Electric Bond & Share Company, will have a substantial interest in the common stock of the new company and will be represented on its board of directors.

Frank Steinhart, who for about twenty years has successfully operated the properties of the Havana Electric Railway, Light & Power Company, will become president of the new company. Mr. Steinhart says that the segregation of the railways from the light and power properties would benefit both divisions. In none of the twenty years of operation, he said, had the railway business of Havana failed to show a substantial profit and an appreciable part of the improvements to the light and power plants had been financed out of the surplus profits resulting from railway operations. Bearing in mind the future development and expected growth of the railway and power properties, he had reached the conclusion that their financial requirements could better be met if the two divisions were organized as separate units.

Provision will be made for the release of property under and satisfaction of some of the underlying mortgages. The securities of the new company, consisting of $5,500,000 of 5½ per cent gold debentures bearing subscription warrants for common stock, and $5,000,000 of 6 per cent cumulative preferred stock carrying a bonus of common stock, have been purchased by Speyer & Company and J. & W. Seligman & Company, and will shortly be offered for public subscription.

Lines of the system in 1925 carried approximately 136,000,000 passengers. Gross revenues for 1925 were more than $6,960,000 and net earnings, after operating expenses, maintenance and taxes, were more than $1,880,000.

In accordance with the new plan Speyer & Company in conjunction with J. & W. Seligman & Company, Hemphill, Noyes & Company, and Otis & Company, offered for sale on Aug. 16 $5,500,000 Havana Electric Railway twenty-five year 5½ per cent gold debentures (each debenture accompanied by a twenty-five year warrant entitling the holder to subscribe to 23 shares of common stock at $45 a share). The offering price was 92, at which price the debentures yield more than 6½ per cent. This issue was followed by formal offering later in the week by the same group of $5,000,000 Havana Electric Railway 6 per cent cumulative preferred stock. This stock was offered by the bankers at $100 a share with a bonus of six-tenths of a share of common stock.

$5,000,000 More P.R.T. Stock for Sale to Riders

The City Council has been requested by the Philadelphia Rapid Transit Company, Philadelphia, Pa., to assent to the issuance of $5,000,000 of 7 per cent preferred stock, $50 par, retirable upon any dividend date at $55 a share and accumulated dividends.

This stock will be sold direct to car riders, in accordance with Mitten Management policy of having P. R. T. customers—the riding public—share in the ownership of the company which supplies them service. To this end P.R.T. common stockholders have been requested to waive their rights of subscription.

About $1,550,000 of this new preferred stock will go toward the retirement of underlying securities, including P.R.T. bonds and car trust certificates and similar securities of P.R.T. underlying companies.

About $1,700,000 will be used for normal capital expenditures for track improvements and extensions; improvements and additions to carhouses, substations, transmission and distribution system, etc.

About $1,750,000 is required for additional buses to add to the extensive system which P.R.T. has given to Philadelphia in the past two years, with necessary service equipment and garaging.

P.R.T., in the spring of 1925, started its car-rider ownership policy with the sale of $3,000,000 of its 7 per cent preferred stock. This first issue was sold on the cars in small lots and by such easy payments that the car rider of the most modest means had opportunity to invest in the securities of the company.

In the spring of 1926 authorization was secured from City Council for the issuance of $15,000,000 additional; $5,000,000 of this issue was held pending approval by the Public Service Commission of the purchase by P.R.T. of the Yellow Cab Company and the other $10,000,000 was sold to the car riders under terms similar to those under which the $3,000.000 had been sold a year earlier. This $10,000,000 issue was over-subscribed by the car riders in ten days.

The increase of $5,000,000 now requested, together with the $5,000,000 covering the Yellow Cab purchase, will be put on sale, when properly approved, in the fall of 1926.

Four Massachusetts Roads Make Legal List

The Public Utilities Department of Massachusetts has certified to the Bank Commissioners that four electric railways holding Massachusetts charters have earned and properly paid, without impairment of assets or capital stock an amount in dividend equal to 5 per cent on all outstanding stock, for a period of at least five successive years. Because of this certification their securities are legal investment for the savings banks, under Massachusetts law. The companies so certified are the Boston Elevated Railway, the Boston & Revere Electric Street Railway, the Holyoke Street Railway and the Union Street Railway, New Bedford. They are the only railways in Massachusetts that have met these dividend requirements this year.

Some serial bonds of the Eastern Massachusetts Street Railway come within the same classification, of legal savings bank investment, under special legislation and an agreement with the road's board of trustees.

Merger Hearing Set for Aug. 24

The New York Transit Commission announced on Aug. 18 that it would hold a hearing Aug. 24, on the application of the Fifth Avenue Coach Company for permission to acquire all the common stock of the New York Railways. A total of 900,200 shares, all the common stock of the company, is involved.

That such an application would be made was announced last May when it became known an agreement had been reached for a merger of the companies. The coach company has submitted bus bids and the New York Omnibus Corporation, which represents both interests, has a bid waiting consideration.

The proposal of the New York City Omnibus Corporation was to operate buses north and south in Manhattan for a 10-cent fare, with cross-town lines operating at a 5-cent fare. It was planned originally if the franchises were granted to eliminate 25 miles of surface car lines, supplanting the cars with buses.

Reorganization of Dayton-Springfield Arranged

Plans have been completed for the reorganization of the Dayton Springfield & Xenia Southern Railway, Dayton, Ohio. The property of the company operating under this name was sold on July 22 at Xenia to C. J. Ferneding, president, for $130,000.

Since then the Public Utilities Commission of Ohio has authorized the Dayton-Xenia Railway, the successor company, to issue 3,500 shares of no par value common stock, $250,000 of 5 per cent preferred stock and $250,000 of 6 per cent first mortgage gold bonds. The new securities take the place of $394,000 bonds, $298,000 of preferred stock and $200,000 of common stock of the old company.

The Dayton, Springfield & Xenia Southern Railway was incorporated under the laws of Ohio as a successor

to the Dayton-Xenia Traction Company, the property of which was sold under foreclosure in June, 1909. This last-named company was a consolidation of the Dayton & Xenia Traction Company, Dayton, Spring Valley & Wilmington Transit Company and the Rapid Transit Company of Xenia. The road extends from Dayton to Xenia 20.65 miles. Power is purchased from the Dayton Power & Light Company. The last report available in the financial manuals, namely, that for the year ended Dec. 31, 1924, showed gross earnings of $243,803 with a net income of $22,595 and a surplus of $1,063 after the payment of fixed charges.

Part of Nebraska Road Being Dismantled

Acting under permission from the Nebraska State Railway Commission the Omaha & Lincoln Railway & Light Company, is taking up its tracks between Papillion and Ralston. This interurban was intended to connect the cities of Lincoln and Omaha. It was started in 1911, but never got beyond Papillion. Ralston is a manufacturing suburb of Omaha, and is still served by the company, but with only two cars a day. Bus service was tried between Ralston and Omaha by the interests that run the railway, and proved a success. It is now being extended to Papillion. The company sells a considerable amount of current, but the road between Papillion and Ralston has never been profitable.

Washington-Virginia Railway May Be Sold to Local People

The Washington-Virginia, once one of the famous electric railways of the country, operating 60 miles of track connecting Washington, Alexandria and Mount Vernon, and Washington, Arlington and Fairfax faces abandonment. The company recently announced that the earnings were insufficient and that there were many difficulties surrounding the situation. Therefore the various bondholders' protective committees decided to shut down unless the local communities served were sufficiently concerned in maintaining the service to raise the necessary new capital. Interested bodies in Alexandria and neighboring communities are trying to find ways and means of purchasing all or part of this company's property at a fraction of its original cost.

The Washington-Virginia's difficulties are due principally to the fact that the Virginia Public Service Commission granted certificates to independent bus operators despite the willingness of the company to furnish this service, to the unregulated interstate bus competition, to difficulty in obtaining fare adjustment on account of being subject to the Interstate Commerce Commission, Virginia and District of Columbia Commissions, and finally to expensive maintenance in the District, where the underground electric system is in use.

As noted in the ELECTRIC RAILWAY JOURNAL for Aug. 7, the company has given the local communities a reasonable time to devise some plan by which the operation can be continued before it proceeds to scrap the system.

$118,199 Increase in West Penn Net Income

A comparative statement of the consolidated income account of the West Penn Railways, Pittsburgh, Pa., excluding inter-company items, for the years ended Dec. 31, 1925 and 1924 follows:

STATEMENT OF WEST PENN RAILWAYS EARNINGS

	Year Ended Dec. 31, 1925	Year Ended Dec. 31, 1924
Gross earnings, from all aources	$20,206,221	$20,073,164
Operating expensea, including maintenance, taxes and rentals	11,169,278	11,634,521
	$9,036,942	$8,438,643
Deductions:		
Interest and amortization	3,375,715	3,243,852
Preferred dividends of aubsidiary	909,195	740,100
Income applicable to minority interest	587,889	505,182
Total deductions	$4,872,800	$4,489,135
Net income before renewals, replacements and depletion	4,164,141	3,949,508
Reserved for renewals, replacements and depletion	1,665,778	1,569,343
Net income	$2,498,363	$2,380,164
Dividends on preferred atock	$209,981	$383,579

The company explains that it has continued its policy of raising the standard and safety of the service. The year's operations were conducted in a most satisfactory manner and without serious accident or injury to passengers.

Through freight service over lines of Pittsburgh Railways and West Penn Railways, between the city of Pittsburgh and Coke Region points, started in August, 1924, has been substantially developed and the income arising therefrom very greatly increased during the year.

Sunday passes were adopted for use on long interurban lines with encouraging results and this means of stimulating holiday travel has been placed on a permanent basis and will be extended to other parts of the system. Weekly passes have also been put into effect with very satisfactory results.

The general tendency of the public to relieve street railways from the obligation to renew paving required by old and obsolete franchises has resulted in the company's obtaining new franchises without such obligations in several of the boroughs and towns through which it operates.

Further revisions in the company's rates of fare have been accomplished during the year and economies in transportation expense through the operation of one-man cars and other improvements have resulted in lessening the cost of operation. To relieve traffic congestion in some of the larger cities, loop operation has been adopted and construction of additional passenger and freight terminals with loop facilities in others are now in contemplation.

Chester Dale, New York City, was elected a member of the board of directors to fill the vacancy caused by the resignation of William B. Schiller.

Mitten Bank Opened in Philadelphia

Mitten Men and Management Bank & Trust Company, which took over the bankrupt Producers and Consumers Bank, Philadelphia, Pa., opened for business on July 1 in the building occupied by the defunct company, 927 Chestnut Street. The new bank starts with $1,000,000 of capital, surplus and undivided profits. A branch bank operated by the P.R.T. Securities Corporation, at 235 South Broad Street, the company announces, will accept deposits for the new bank.

Thomas E. Mitten, chairman of the P.R.T. board of directors, is active head of the bank. His son, Dr. A. A. Mitten, also a member of the P.R.T. board, is vice-president. Half of the bank stock is owned by transit employees, who have representatives on the board. This is in accordance with the Mitten plan for the further democratization of the ownership of industry.

As announced when the Mitten offer was under consideration by the court, depositors and stockholders of the bankrupt institution will be credited with the profits of the new bank until their losses are made up, a procedure which has caused much favorable comment.

CONSOLIDATED INCOME ACCOUNT OF WEST PENN RAILWAYS AND SUBSIDIARIES FOR YEAR ENDED DEC. 31, 1925

Gross operating earnings			$18,670,411
Operating expenses and maintenance (including $1,665,778 reaerved for renewals, replacements and depletion)		$11,810,529	
Taxes (including Federal)		1,016,751	12,827,280
			$5,843,131
Miscellaneous income			1,535,809
			$7,378,940
Interest on funded debt	$3,335,418		
Intereat on floating debt	125,641		
Amortization of discount	222,216		
	$3,683,276		
Less proportion charged to improvement accounts	307,561	$3,375,715	
Rentals		7,776	
Dividend accrued on preferred atock of Weat Penn Power Company in possession of public		909,195	
Income applicable to common atock of Weat Penn Power Company owned by The West Penn Company		587,889	4,880,576
Net income			$2,498,363

Reasons for Short Albany Abandonments Reviewed

Approval was sought by the United Traction Company, Albany, N. Y., on July 14 from the Public Service Commission of three petitions seeking abandonment of portions of its route in the cities of Albany and Rensselaer.

The Albany petition sets forth the desire of the company to abandon that portion of its road upon South Ferry Street. This is a single track about 1,484 ft. in length that serves no useful purpose, there being no present operation of cars by the traction company.

Two of the petitions filed relate to proposed abandonments in the city of Rensselaer, one of which covers the portion of the route of the company located on Broadway and Aiken Avenue in that city. This is the section of street railroad trackage over which business are now being operated by Capital District Transportation Company, Inc., and the petition states that it has been agreed between the authorities of Rensselaer and the company that the tracks may be removed in view of the substitution of the motor bus line for the trolley service.

The other Rensselaer petition asks for approval of a declaration adopted by the directors of the United Traction Company for the abandonment of the so-called Third Street line in Rensselaer. This line consists of a double-track road on Broadway and Partition Street and a single track on Third Street. The municipal authorities have determined to pave Partition Street and a portion of Third Street at a cost to the company of approximately $40,000. This line for a long time has been operated at a loss, and there is no reasonable prospect that in the future sufficient revenue can be obtained to pay its proportion of expenses of operation, taxes and interest. The company has offered to serve this territory by buses at a rate of fare the same as may from time to time be charged by the United Traction Company on its trolley lines in Rensselaer and Albany, with interchangeable transfers, but an application by the Capital District Transportation Company, Inc., to the Common Council of the city of Rensselaer for consent to operate such motor bus line was refused.

Dates for hearings upon these applications will be announced by the commission later.

Balance in Honolulu $18,445

Operations in 1925 by the Honolulu Rapid Transit Company, Honolulu, Hawaii, were not so satisfactory as had been expected under the increased fare, but considering the large increase in the number of automobiles registered during the year a loss of passengers was to be expected. This statement was made by the manager in the annual report for the year ended Dec. 31, 1925. The balance of net revenue in 1925 carried to surplus was $18,445, against $21,550 in 1924.

Total revenue from all sources for the year was $1,074,483, compared with $1,014,349 for the year 1924. Total operating expenses were reduced from $713,930 to $708,717 in 1925. In addition $26,284 was charged to operating expenses for replacements during 1925, compared with $25,433 for replacements during 1924. Total transportation revenue for the year was $1,062,788, which included $1,040,452 for passenger revenue and $21,082 for bus revenue. In 1924 the total transportation revenue of $1,005,193 included a passenger revenue of $990,443 and $11,845 bus revenue. The total number of passengers carried exclusive of transfer passengers was 17,607,737 in 1925, against 19,839,528 in 1924.

REVENUE AND EXPENSE ACCOUNTS OF THE HONOLULU RAPID TRANSIT COMPANY, LTD.

	1925	1924
Total revenue from transportation	$1,062,788	$1,005,193
Total revenue from other rsilway operations	$11,695	$9,155
Gross revenue from operations	$1,074,483	$1,014,348
Total operating expenses	$708,716	$713,930
	$365,766	$300,418
Replacements chargeable to operating expenses	26,283	25,432
	$339,483	$274,986
Taxes	$94,847	$128,577
Profit and loss	826	3,261
Depreciation	45,155	45,089
	$140,829	$176,928
Net revenue from operations	$198,653	$98,057
Deductions—		
Interest	$5,208	$1,506
Dividends	175,000	75,000
	$180,208	$76,506
Balance 1925 to surplus	$18,445	$21,550

Abandonment at Chippewa Falls Approved

The Wisconsin Railroad Commission has approved the application of the Northern States Power Company to abandon railway service in Chippewa Falls as well as the interurban electric line running between Eau Claire and Chippewa Falls. The commission found that the line had suffered an operating loss for the past five years due to the use of the private auto and buses, which parallel the route of the electric line. With the passing of the interurban line service between these cities will be provided by buses. A checkup on the electric interurban line made last October showed that the number of through passengers carried between the two cities averaged 1½ per trip.

Insull Properties Merge in New Hampshire.—The Public Service Company of New Hampshire was incorporated at Concord on Aug. 16 to take over electric utilities in New Hampshire controlled by the Insull interests of Chicago. The companies involved are the Manchester Traction, Light & Power Company, the Keene Gas & Electric Company, the Laconia Gas & Electric Company and the Souhegán Valley Electric Company. Walter S. Weyman, Augusta, Me., is president. The company will issue 400,000 shares of preferred and 200,000 of common stock of no par value.

Another Washington Merger Bill Promised.—Preparations were made on Aug. 12 by officials of the Public Utilities Commission for drafting a bill for introduction at the next session of Congress to compel a merger of the Capital Traction Company and the Washington Railway & Electric Companies. Actual framing of the measure will be done by Major W. E. R. Covell, assistant district engineer commissioner, assigned to public utilities. The bill will be modeled after a measure introduced in Congress several years ago providing for a voluntary consolidation of the traction companies. It is said, however, that the bill will penalize the companies if they fail to merge.

Chicago Firm Purchases Painesville Line.—Announcement is made of the purchase of the Cleveland, Painesville & Easton Railroad, Willoughby, Ohio, by the Hyman-Michaels Company, Chicago. The property, which consists of about 70 miles of right-of-way, will be dismantled at once, and all equipment will be put on the market.

Earnings Off in Indianapolis in June.—The June statement of the Indianapolis Street Railway, Indianapolis, Ind., shows that the total gross earnings for the month were $451,179, compared with $435,355 for June of a year ago. Bus receipts for June this year were $17,454, compared with $1,575 for the similar month a year ago. The operating expenses for June this year, however, were $352,854, compared with $322,326 for June a year ago. Net earnings from operation less taxes were $70,273 for June this year, compared with $91,826 a year ago.

Minnesota Road Does Well.—The Minneapolis, Northfield & Southern line, Minneapolis, Minn., handling passenger trains by gas-electric engines and freight by steam, reports a gain in business in the year closed. Net operating profit was $144,598. After paying preferred stock dividends the company earned at the rate of $47.77 a share on common. This was put back into the road.

Would Abandon Part of Troy Line.—The United Traction Company, Albany, N. Y., applied to the Public Service Commission on Aug. 11, for approval of a declaration of abandonment of part of its line in Troy. The company says the municipal authorities of Troy have determined to pave certain of the streets and an agreement has been reached whereby the trolley service is to be succeeded by a bus service.

Offer Made to Underlying Holders.—The Pittsburgh Railways, Pittsburgh, Pa., notified holders of first mortgage 5 per cent bonds of the Brownsville Avenue Street Railway, due Aug. 1, 1926, outstanding to the amount of $300,000, that in pursuance of the policy followed with reference to other matured bonds, it was prepared to continue interest payments on this issue pending completion of the financial reorganization plan, providing for a general refunding and unifying mortgage under which bonds would be exchanged at rates to be determined. Bondholders desiring to accept this arrangement were requested to forward bonds to Pittsburgh Trust Company.

Personal Items

C. H. Jones in New Chicago Post

Charles H. Jones, for the past nine years electrical engineer of the Chicago Rapid Transit Company and the Chicago, North Shore & Milwaukee Railroad, has assumed his new duties as general manager of the Chicago, South Shore & South Bend Railroad, another of the high-speed electrically operated railroads under the management of Samuel Insull and associates.

Mr. Jones' promotion, announced in the ELECTRIC RAILWAY JOURNAL of Aug. 7, comes as a reward for long and faithful service, during which he has won wide recognition in the electrical field. He began work with the Chicago Rapid Transit, Chicago, Ill., immediately after his graduation in 1909 and remained continually in this service until his recent promotion.

Charles H. Jones

Working his way up through the various stages of promotion from battery man on the Metropolitan Division, Mr. Jones was made electrical engineer of the Rapid Transit Lines and the North Shore Line in 1917. His first notable achievement was rebuilding the power distribution system of the Rapid Transit Lines shortly after their consolidation in 1912. This proved his capacity to handle big jobs, and he has been handling them ever since.

Mr. Jones also was in charge of all electrical work on the new Skokie Valley Route of the North Shore Line, which included the installation of catenary overhead along the entire route and part of the Shore Line Route, and the construction of five automatic substations of the latest type. Under his leadership the enormous power load required for handling the multitudes on the great Eucharistic Congress pilgrimage to Mundelein on June 24 was maintained throughout the performance of this miracle of mass transportation.

The present high standard of service being given on the South Shore Line is in great part due to the personal activities of Mr. Jones since the railroad was taken over by the Insull interests. Under his direction the power system was changed from alternating to direct current, the catenary was rebuilt over a large portion of the line and eight new substations were installed.

Mr. Jones was graduated from Armour Institute of Technology in 1909 with the degree of electrical engineer. He was born in Chicago.

Despite his many duties, he finds time to take an active part in the affairs of national electrical organizations. He is chairman of the power distribution committee of the American Electric Railway Association, in which capacity he has served for the past three years. As chairman he will make the annual report of the committee at the 1926 national convention to be held in Cleveland in October.

D. L. Smith Electrical Engineer of Chicago "L"

Dwight L. Smith, assistant electrical engineer of the Chicago Rapid Transit, Chicago, Ill., for the past seven years, has been appointed electrical engineer in charge of the electrical department, following the recently-announced promotion of Charles H. Jones to general manager of the Chicago, South Shore & South Bend Railroad.

The promotion of Mr. Smith to this position of great responsibility at the age of 36 years is a notable record of advancement in the electrical industry. Despite his comparative youth, however, Mr. Smith has had extensive experience in his chosen field. He was born in Freeport, Ill., in 1890, and received the degree of electrical engineer at the University of Illinois. He entered the Rapid Transit Line organization in 1910 as third-rail helper on the Metropolitan Division. He advanced rapidly, and in 1913 was made power supervisor of the entire elevated railway system.

Mr. Smith was serving in this capacity when in 1916 he was called to the Texas border with the National Guard, in which he served as a Second Lieutenant. In October, 1917, he went overseas with the American Expeditionary Forces as Captain of Field Artillery. He returned to civilian life in April, 1919, with the rank of major. He was promoted to assistant electrical engineer during the same year, and served in that capacity until his recent advancement.

C. F. Gustason, acting power supervisor of the Chicago Rapid Transit, Chicago, Ill., for the past two years, has been appointed chief power supervisor. His advancement to this post follows ten years of service in the main office of the electrical department. Mr. Gustason is a graduate of Crane Tech. He entered the Rapid Transit organization in 1909 as battery man on the Metropolitan Division.

Railway Man an Elmira Bank Director

Frederic H. Hill, vice-president and general manager of the Elmira Water, Light & Railroad, Elmira, N. Y., has been elected a member of the board of directors of the Chemung Canal Trust Company, Elmira. During his residence of more than ten years in Elmira he has been prominent in civic activities and in several of the town's leading industries.

Mr. Hill has been vice-president of the Elmira Water Light & Railroad Company since 1918. He joined the company in 1913 as chief engineer, and a few months later was made general manager. A steady increase in the company's business has been noticed under his managership, and additions have been made to the property. A new gas plant has been built during his administration and service extended into surrounding towns and villages. He is also director of several other public utilities companies.

Frederic H. Hill

At the time of his appointment to the Elmira company Mr. Hill was the operating engineer of the United Gas & Electric Corporation. Before that he was connected with the Mellen banking interests on interurban electric railway work, and later with the Pennsylvania Railroad on construction and maintenance of way.

Mr. Hill was born in Bridgeville, Pa., in 1879. He was graduated from Washington and Jefferson College at Washington, Pa., and later received an engineering degree from the University of Pittsburgh.

In the ELECTRIC RAILWAY JOURNAL of July 7, 1923, there is an account of a celebration held by the employees of the Elmira Water, Light & Railroad Company showing their appreciation of his ten years of managership.

Henry V. Faber has been appointed assistant treasurer of the Jacksonville Traction Company, Jacksonville, Fla. The railway is under the management of Stone & Webster, Inc., of Boston, Mass., with which organization Mr. Faber was connected during the war on the Hog Island work. Later he became

traveling auditor for the Boston office. Mr. Faber went to Jacksonville from the Boston office of the Haverhill Gas Light Company, where he worked on the standardization of forms and later in the treasury department.

Eldon A. Imhoff, office engineer of the Chicago Rapid Transit Company, Chicago, Ill., for the past five years, succeeds D. L. Smith as assistant electrical engineer. His promotion comes after efficient service with the company since January, 1919. Mr. Imhoff is a graduate of the University of Iowa, where he received the degree of Bachelor of Engineering in 1917. As noted elsewhere in this issue Mr. Smith has been named electrical engineer of the company.

Robert M. Davis, statistical editor of the *Electrical World* since 1919, has been made statistical adviser and consultant for all the McGraw-Hill papers. His wide experience in making statistical studies and his extensive knowledge of engineering qualify him well for this work. For several years before joining the staff of the *Electrical World*, Mr. Davis was engaged in engineering and statistical work in connection with water-power development for the United States Geological Survey. He is a graduate of the College of Civil Engineering of Cornell University, class of 1907.

Obituary

J. H. Chase

John H. Chase, district manager for the Iowa Southern Utilities Company at Burlington, Ia., died very suddenly on Aug. 14. He had been at his office the day previous.

Mr. Chase was a native of Marysville, Ohio. He was 50 years old, and had been connected with the Iowa Southern Utilities Company since 1914. He was first located at Centerville, Ia., and was later transferred to Creston. When the utility corporation took over the Walsh interests at Burlington two years ago, he was sent there as general manager. Under his direction the properties began to grow rapidly. He instituted the first bus service in the city.

Mr. Chase was a public spirited citizen. He was active in the Community Chest organization, and a director of the Greater Burlington Association and the Burlington Rotary Club, besides being affiliated with the Burlington Drama league.

Julius Thielson, formerly superintendent of the Providence & Danielson Street Railway, and retained as head of that division when the road was taken over by the Rhode Island Company, now the United Electric Railways, died in Portland, Ore., recently. He had been engaged there for the past six years in the manufacture of wood pulp for paper. Mr. Thielson, who helped lay the tracks for several transcontinental railways, went to Providence in 1900 with D. F. Sherman, who built the Providence and Danielson line. On the completion of the road Mr. Thielson was appointed superintendent.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

More Facts for Exhibitors at Cleveland

Instructions are going out from association headquarters about the shipping of material intended for use at the exhibit in connection with the meeting of the American Electric Railway Association at Cleveland, Ohio, starting on Oct. 4. Conditions are different this year from those in the past at Atlantic City. It is impossible of course to reproduce here all that the association has to say about this subject through Fred Dell, director of exhibits, but the facts are all contained in a special circular, a copy of which should be retained by the shipping department of each exhibitor and another copy by the exhibitor for his file.

The shipping instructions for freight and for express vary, but the differences are emphasized in the circular. All exhibitors should ship early, but this admonition is directed especially to those who send stuff by freight. All such shipments must be sent freight prepaid. A similar prepayment order applies to the express shipments. Norris Brothers, 2138-44 Davenport Avenue, Cleveland, are the official draymen.

To ignore the details set forth in the circular or not to follow them to the letter is to court disaster. There is no dearth of these circulars about shipping and Mr. Dell will supply as many as are needed within reason. Not only is it essential to ship material promptly, but it is highly necessary that particular attention be paid to the installation dates set forth in the circular. All exhibitors should bear in mind that likelihood that any lateness on their part in installing their own exhibit may discommode others who have been prompt in arranging their space.

Progress all along the line is reported in connection with the proposed exhibit. The sub-committee on decorations of the exhibit committee met in Cleveland, on Aug. 13, at which time bids were received from several prominent decorators. The committee is now studying the various proposals submitted and is preparing to let contracts in the near future.

General Motors Earnings Take Sharp Upward Rise

Recent feverish speculation on the Stock Exchange in issues of the General Motors Corporation, due to a statement attributed to a partner of J. P. Morgan & Company, that the stock was sure to rise in value, makes doubly interesting the balance sheet and statement for the half year ended June 30, 1926, issued on Aug. 9 by Alfred P. Sloan, Jr., president of General Motors.

Earnings for the six months considerably exceeded those of any previous half year in the company's history, and, moreover, earnings for the second quarter exceeded those of any previous quarter of any year. The total for the six months was $93,285,674, as opposed to $50,363,099 for the corresponding period of 1925. The first half of 1926 showed an earning of $17.33 per share of common stock, an increase of $8.31 over 1925. This pronounced gain in profits was due to marked increase in volume of business, as the profit per car has been tending downward.

G.E. Employees Offer Many Suggestions

Awards totalling $22,602 were paid to 2,172 employees of the General Electric Company during the first six months of the current year for suggestions which ranged from safety devices for the protection of workers to improved methods of manufacturing.

In all, 7,080 suggestions were made, an increase of approximately 1,500 over the first six months of last year, showing a gradual increase in the interest of employees in the company's suggestion system. For the first half of 1925, awards were made totalling $17,510 to 1,693 employees.

The awards, which ranged up to $500, were paid at the option of the recipient either in cash or G-E Employees Securities Corporation bonds, which yield 8 per cent as long as the original holder remains in the employ of the company.

Electricity Supplants Ice in Railroad Refrigeration

The Chicago, North Shore & Milwaukee is the latest railroad to turn to electricity as a means of solving its refrigeration problems. Five electric refrigerator cars, manufactured by the Phoenix Ice Machine Company, Cleveland, Ohio, have been purchased, and will soon begin to carry perishable produce from Chicago and Milwaukee provision houses to smaller towns along the line.

The successful application of electric refrigeration on the interurban lines of the Northern Ohio Traction Company was described in the ELECTRIC RAILWAY JOURNAL of Feb. 7, 1925. In that instance, conditions were such that the electric refrigerator car was able to perform in 24 hours a service similar to that performed by an ice refrigerator car in four days.

For the Chicago, North Shore & Milwaukee, the value of electric refrigeration lies not so much in the saving of time as in the way in which it meets several difficulties peculiar to the railroad. For example, one of the serious objections to ice refrigerator cars was the dripping from the ice bunkers, since the tracks of the company are elevated in the city of Chicago. More-

over, since the railroad is electrified, the cost of necessary power is considerably less than that of ice. Also, the electric refrigerator car operates automatically, and requires no special organization to care for it. Thus, its overhead expense is nominal.

Frameless Truck Electric Switching Locomotive

A switching locomotive, known as the frameless truck type, which embodies several unique features of design, has recently been supplied to the Delaware, Lackawanna & Western Railroad for use at the company's Wallabout terminal, Brooklyn, by the General Electric Company.

The most important feature of this design is the truck, which is a departure from the usual construction of swivel truck locomotives. In place of the customary two axle bearings of the motor and the two truck journal bearings, the motor itself is modified in its external construction and provided with a single substantial bearing in place of the usual auxiliary bearings. The gears occupy their usual location, but no external journals are used. On this account the locomotive has the appearance of what is commonly called the inside-hung bearing type of truck design.

Each motor frame is cast with two pairs of lugs directly over the axle bearing to receive the ends of the equalizers. A substantial pin passes through the end of an equalizer and the lugs are so spaced as to serve as guides for the equalizers.

Two equalizers forged from steel bars perform the usual functions of truck equalizers in supporting the transom and, in addition, tie the trucks together and hold the parts in alignment.

A Departure from the Usual Truck Design Has Been Made for This Locomotive

The steel bolster is cast with the truck portion of the center plate with recesses and lugs for the motor noses and safety lugs and with slotted extensions for the brake hangers and levers. The transom, supporting the weight of the superstructure, the brake rigging and about half the weight of each motor, is in turn carried on coil springs which rest in spring hangers suspended from the equalizers. Vertical slots in the transom at opposite sides of the center plate serve as guides for the two equalizers.

The electrical equipment consists of four GE-207, 110-hp. motors, similar in all respects to the usual railway type motor except in the external form of the frame. Type M control is used, including the master controller and the necessary auxiliary contactors and rheostats. Compressed air is furnished by a 600-volt motor-driven air compressor having a rated piston displacement of 50 cu.ft. of air per minute.

The specifications of the new type locomotive follow:

Over-all length	29 ft. 2 in.
Over-all width	9 ft. 0⅞ in.
Height over cab	11 ft. 9¾ in.
Height over trolley locked down	16 ft. 8¼ in.
Maximum height, trolley up	25 ft. 6 in.
Total wheelbase	18 ft. 8 in.
Rigid wheelbase	6 ft. 2 in.
Diameter of driving wheels	36 in.
Minimum radius of track curvature	45 ft.
Total weight, all on drivers	100,000 lb.
Weight per driving axle	25,000 lb.
Operating voltage	600 volt, d.c.
Motors	Four GE-207-G.

Portable Generator Receives Approval of Underwriters

The medium pressure portable acetylene generator manufactured by the Bastian-Blessing Company, Chicago, Ill., is the first machine of this type to be approved by the Underwriters, according to recent statements made by officials of the company. This approval was not given until the generator had passed through several stringest tests.

Its stability was demonstrated by the fact that it failed to tip over when its side was raised 21 in. or when its front was raised 66 in. Its safety was proved by two other tests. In the first of these the generator was set to producing gas at 10-lb. pressure and then thrown on its side, while in the second test the carbide feed was locked and the machine again thrown on its side. In both cases, when the generator was righted, it had suffered no damage and operated perfectly.

Large Equipment Order Placed at Seattle

The City Council of Seattle has authorized the Board of Public Works to enter into a contract with the St. Louis Car Company for 80 new street cars at a cost of $1,400,000. This is an expenditure of $120,000 more than now is available for this purpose. This action by the Council reverses its former mandate to the board that the fund of $500,000 for a street car bridge across the West Waterway on West Spokane Street should not be touched to buy new equipment. The Council states that the estimate upon which the former allocation was made provided for paving the street car bridge, which is now considered unnecessary.

ELECTRIC RAILWAY MATERIAL PRICES—Aug. 17, 1926

Metals—New York

Copper, electrolytic, cents per lb.	14.525
Lead, cents per lb.	8.90
Nickel, cents per lb.	35.00
Zinc, cents per lb.	7.75
Tin, Straits, cents per lb.	64.75
Aluminum, 98 to 99 per cent, cents per lb.	27.00
Babbitt metal, warehouse, cents per lb.:	
Commercial grade	55.00
General service	30.50

Bituminous Coal

Smokeless mine run, f.o.b. vessel, Hampton Roads	$5.00
Somerset mine run, Boston	1.95
Pittsburgh mine run, Pittsburgh	2.00
Franklin, Ill., screenings, Chicago	1.825
Central, Ill., screenings, Chicago	1.50
Kansas screenings, Kansas City	2.50

Track Materials—Pittsburgh

Standard steel rails, gross ton	$43.00
Railroad spikes, drive, Pittsburgh base, cents per lb.	2.90
Tie plates (flat type), cents per lb.	2.30
Angle bars, cents per lb.	2.75
Rail bolts and nuts, Pittsburgh base, cents, lb.	4.20
Steel bars, cents per lb.	2.05
Ties, white oak, Chicago, 6 in.x8 in.x8 ft.	$1.45

Hardware—Pittsburgh

Wire nails, base per keg	2.65
Sheet iron (28 gags), cents per lb.	3.10
Sheet iron, galvanized (28 gage), cents per lb.	4.25
Galvanized barbed wire, cents per lb.	3.35
Galvanized wire, ordinary, cents per lb.	3.10

Waste—New York

Waste, wool, cents per lb.	12–18
Waste, cotton (100 lb. bale), cents per lb.:	
White	13–17.50
Colored	10–14

Paints, Putty and Glass—New York

Linseed oil (5 bbl. lots), cents per lb.	12.80
White lead in oil (100 lb. keg), cents per lb.	15.25
Turpentine (bbl. lots), per gal.	$0.9925
Car window glass, (single strength), first three brackets, A quality, discount*	84.0%
Car window glass, (single strength), first three brackets, B quality, discount*	86.0%
Car window glass, (double strength) all sizes, A quality, discount*	85.0%
Putty, 100 lb. tins, cents per lb.	5.25–5.50

* Prices f.o.b. works, boxing chargee extra.

Wire—New York

Copper wire, cents per lb.	16.25
Rubber-covered wire, No. 14, per 1,000 ft.	$6.25
Weatherproof wire base, cents per lb.	18.00

Paving Materials

Paving stone, granite, 5 in. New York—Grade 1, per thousand	$147
Wood block paving 3½, 16 lb. treatment, N. Y., per sq.yd.	$2.70
Paving brick 3½x8½x4, N. Y., per 1,000 in carload lots	51.00
Paving brick 3x8½x4 N.Y., per 1,000 in carload lots	45.00
Crushed stone, ¾-in., carload lots, N. Y., per cu.yd.	1.85
Cement, Chicago consumers' net prices, without bags	2.10
Gravel, ¾-in., cu.yd., f.o.b. N. Y.	1.75
Sand, cu.yd., f.o.b. N. Y.	1.00

Old Metals—New York and Chicago

Heavy copper, cents per lb.	12.00
Light copper, cents per lb.	10.125
Heavy brass, cents per lb.	7.50
Zinc, old scrap, cents per lb.	4.375
Lead, cents per lb. (heavy)	7.75
Steel car axles, Chicago, net ton	$17.75
Cast iron car wheels, Chicago, gross ton	16.25
Rails (short), Chicago, gross ton	17.75
Rails, (relaying), Chicago, gross ton	26.00
Machine turnings, Chicago, gross ton	7.50

Memphis Cars Are Now Completed

New Memphis Cars Present Excellent Appearance

Delivery has just been made of 32 single-end, one-man street cars ordered from the St. Louis Car Company in February by the Memphis Street Railway of Memphis, Tenn. The cars are of steel construction and weigh but 35,090 lb. They are destined for use in city service. Following are principal specifications on the new equipment:

Seating capacity	56
Weight:	
Car body	16,000 lb.
Trucks	10,520 lb.
Equipment	8,570 lb.
Total	35,090 lb.
Bolster centers, length	22 ft. 0 in.
Length over all	46 ft. 2 in.
Truck wheelbase	4 ft. 10 in.
Width over all	8 ft. 4⅞ in.
Height, rail to trolley base	11 ft. 0⅛ in.
Body	Steel
Interior trim	Mahogany
Headlining	Agasote
Roof	Arch
Air brakes	General Electric
Bumpers	Hedley anti-climber
Car signal system	Faraday
Car trimmings	Polished bronze
Control	K-35 single-end
Curtain fixtures	Curtain Supply Company
Curtain material	Pantasote
Destination signs	Hunter
Door operating mechanism	National Pneumatic
Fare boxes	Johnson, air operated
Fenders	Memphis standard
Gears and pinions	General Electric
Hand brakes	St. Louis Car Co.
Heater equipment	Consolidated Car Heating Co.
Headlights	Golden Glow
Motors	Four General Electric 35 hp., outside hung
Paint	St. Louis Car Co. system
Registers	International, electrically operated
Safety Devices	Safety Car Devices Co.
Sanders	Keystone air operated traps
Sash fixtures	Rex brass sash
Seats	Hale-Kilburn de luxe non-reversible
Seating material	Plush
Step treads	Irving Iron Works "Safkar"
Trucks	Brill
Ventilators	Nichols-Lintern
Wheels	Chilled Iron, 26-in.

Rolling Stock

Steubenville, East Liverpool & Beaver Valley Traction Company, Steubenville, Ohio, has ordered eight new interurban cars, costing approximately $131,000, for trunk line service between Steubenville and Beaver. These cars, which are manufactured by the G. C. Kuhlman Car Company, Cleveland, Ohio, are more than 48 ft. in length and unusually low, measuring only 10 ft. 8 in. from wheel tread to roof.

New York, Westchester & Boston Railway, New York, N. Y., has ordered 20 steel vestibuled, Brinkerhoff cars from the Pressed Steel Car Company. Each seats 80 passengers. Deliveries will commence in September. Some of the principal specifications are as follows:

Number of cars ordered	20
Approximate weight:	
Car body	64,800 lb.
Trucks	32,883 lb.
Equipment	29,837 lb.
Total	126,900 lb.
Bolster centers, length	47 ft. 7½ in.
Length over all	72 ft. 7¼ in.
Truck wheelbase	8 ft.
Width over all	10 ft. 4 in.
Height, rail to pantograph	14 ft. 7 in.
Body	All steel
Interior trim	Agasote and steel
Headlining	Agasote
Insulation	Three-ply Salamander and Tucork
Floor	Red Flexolith
Air Brakes	Westinghouse
Armature bearings	Sleeve
Axles	5½ x 10-in. Standard Steel Works
Car trimmings	Statuary bronze
Center and side bearings	Pressed Steel and Perry
Compressors	Westinghouse XD-EG-2
Conduits and junction boxes	Westinghouse
Control	Westinghouse AB.
Couplers	Pitt
Curtain fixtures	Curtain Supply Co.
Diaphragm	Curtain Supply Co.
Curtain material	Pantasote
Destination signs	Stenciled steel
Door operating mechanism	National Pneumatic
Draft Gear	Waugh
Finish	Devoe & Reynolds enamel
Gears and pinions	Nutall BP flexible
Hand brakes	Blackhall
Heater equipment	Gold
Headlights	14 in. Golden Glow
Journal bearings	5½ x 10 in. sleeve
Journal boxes	Symington
Motors	Two Westinghouse 409-B2, inside hung
Pantagraph	Nuttall 131-A
Sash fixtures	O. M. Edwards
Seats	Hale & Kilburn 392
Seating material	Pantasote No. 85
Slack adjuster	Westinghouse type "L"
Springs	Railway Steel Spring
Step treads	Kass safety
Trucks	Pressed Steel Car Co.—built up
Ventilators	Ten Utility
Wheels	36-in. rolled steel, 42-in. bolted steel

Track and Line

Cincinnati Street Railway Company, Cincinnati, Ohio, is expending approximately $35,000 in relaying 3,000 ft. of single track on McMicken Avenue. The new rails are of the 7-in. types, laid on steel ties imbedded in concrete.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has started work on track improvement program on its Twenty-seventh Street line between Hopkins Street and Atkinson Avenue, where a new double track will replace the present single track line at an estimated cost of $85,000.

Montreal Tramways, Montreal, Que., has started preliminary work on constructing its new line to the top of Mount Royal. Engineering difficulties are consoliderable, as the line will reach an elevation of 690 ft., passing over an elevated viaduct at one point, and in another place going through a tunnel about 300 ft. in length. The line will cost approximately $600,000 and will be ready for operation next spring.

Hydro-Electric Railways, Windsor, Ont., has given out contracts for excavation work in preparation for laying 8,400 ft. of new track on Ouellette and Wyandotte Streets, Windsor.

Trade Notes

Reo Motor Car Company, Lansing, Mich., states that more Reo Model W buses were shipped in July than in any other month in the history of the company. The statement was also made that more buses were shipped during the fiscal year, which ended July 31, than in the previous year and that the company entered the month of August with a large volume of unfilled orders.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued a folder, No. 4710, describing standard gasoline-electric equipment for rail cars. The information about this equipment is classified under four heads: Generating equipment, motors, car data, and performance.

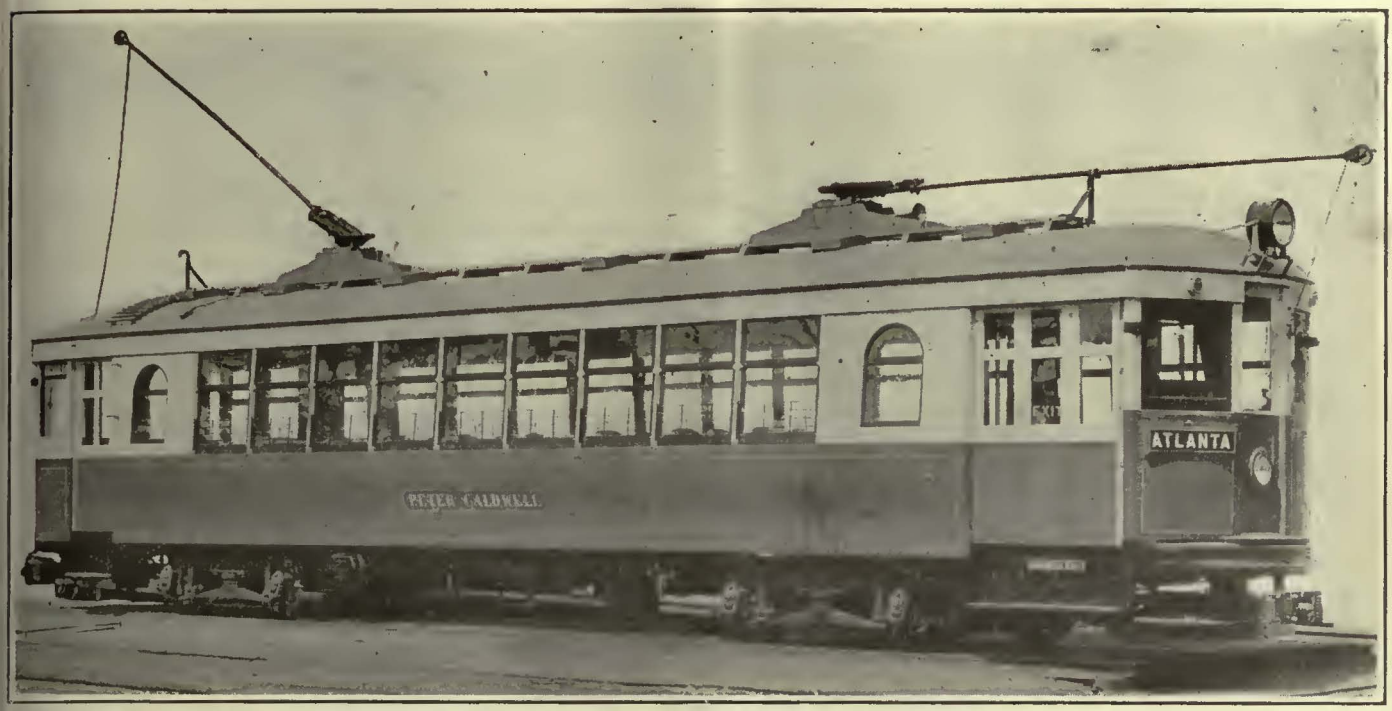
Eisemann Magneto Corporation, New York, N. Y., announces the occupation of its new direct factory branch building at 6511 Lincoln Avenue, Detroit, Mich. Ground was broken for the erection of the structure in April, and building operations were completed July 15.

New Advertising Literature

United States Graphite Company, Saginaw, Mich., has issued a pamphlet describing in detail its line of motor and generator brushes. General suggestions for eliminating brush troubles are also included.

Crouse-Hinds Company, Syracuse, N. Y., has issued a folder describing various types of "Arktite" plugs and receptacles, interlocking switches and plugs and safety hand lamps.

Ohio Brass Company, Mansfield, Ohio, has issued a leaflet which lists several new features responsible for the longer service of the O-B Feist trolley wheel.



PEACOCK STAFFLESS BRAKES

"Trolleying de luxe,—

means rapid and comfortable transportation and better interurban service. This is the new sport which will call to every resident living along the Marietta and Stone Mountain interurban lines of the Georgia Railway & Power Company, Atlanta."

Quoted from the edition of *The Atlanta Constitution* commenting on the ceremonies in connection with placing into service the Company's ten new interurban cars, the last word in modern design.

Of course these new cars are equipped with Peacock Staffless Brakes. The most modern cars are! Modern design demands the Peacock because of minimum platform space occupation; simplicity of operation; low installation and maintenance costs, and tremendous braking power.

Write for facts and figures of past performance and installation estimates on your requirements.

National Brake Company

890 Ellicott Square, Buffalo, N. Y.

Canadian Representative

Lyman Tube & Supply Co., Ltd., Montreal, Can.

Bankers and Engineers

The Economy of the Fageol is Fundamental

Take for example the Hall-Scott Engine, designed throughout to meet the severe requirements of motor bus work. It offers the following exclusive features:

1. Quickly replaced interchangeable units throughout.
2. A lubricating system which constantly refines and purifies the crankcase oil, holding it at its original viscosity for thousands of miles.
3. Complete cam and valve mechanism contained in interchangeable head. Valve grinding, maintenance work on head, and replacement of worn parts do not tie the bus up needlessly for hours or days.
4. Radiator mounted as unit with engine, so weaving of frame does not damage it.
5. Stainless steel pump shaft running in soft metal glands, eliminating troublesome pump leaks.
6. Higher compression ratio, to get more power out of the fuel.
7. Heavyweight aluminum alloy pistons, which limit carbon formation.
8. Combustion chamber design and valve arrangement which makes the necessity of valve grinding quite infrequent.

—and many more.

The final test of all endeavors to create a better, or more economical, more durable product is this: How does it work out in the hands of the user?

Operators who have used the Fageol Hall-Scott engine for 300,000 miles or more say that there is no reason to believe that it will ever wear out. It is brutally strong, and the occasional replacement of a few simple parts brings the engine back to new condition.

Its phenomenally low maintenance cost, and its economy of fuel and oil, have been the chief contributing causes which have created the recognition for economy enjoyed by the Fageol Safety Coach.

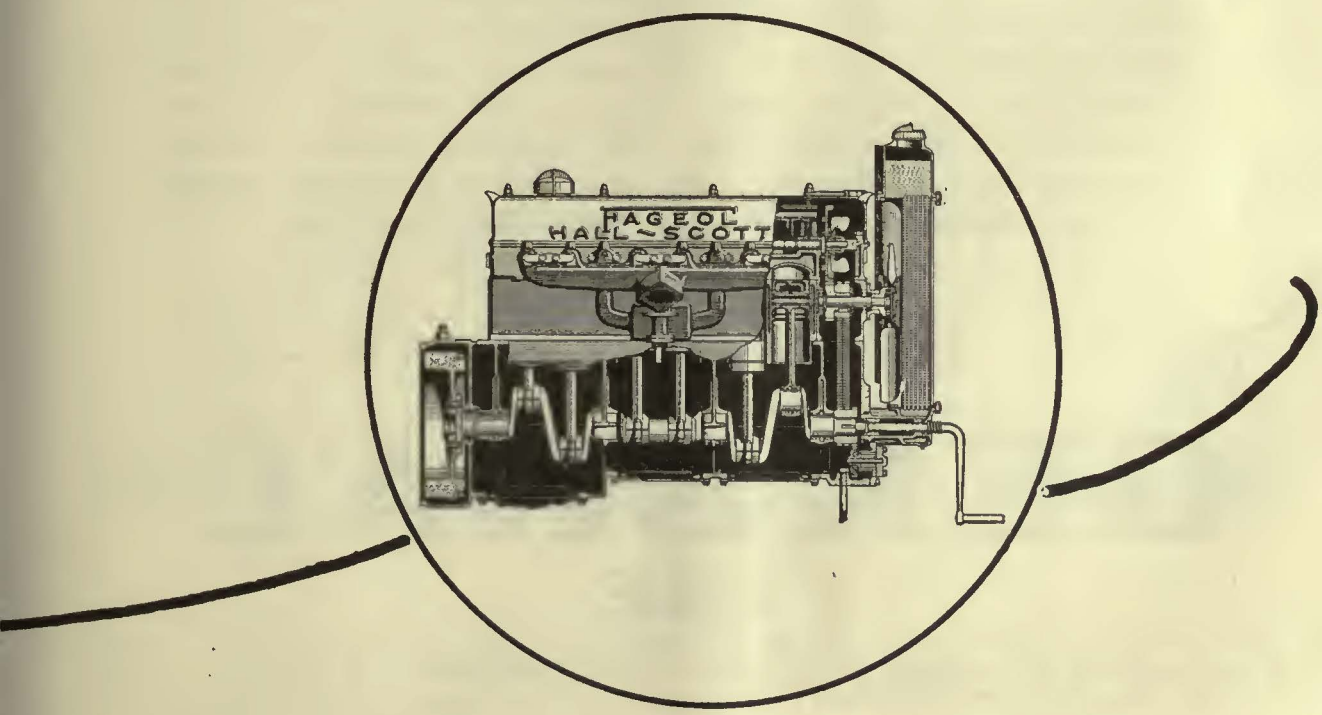
Ask for complete descriptive information

THE FAGEOL COMPANY

A Division of

AMERICAN CAR and FOUNDRY MOTORS COMPANY

30 CHURCH STREET, NEW YORK, N. Y.



First Mack bus *running on a regular route between U. S. and Canada* rides on Generals

The same famous tire which has brought tire costs per mile down to the lowest possible level for large fleet operators thruout America is repeating its achievement on the handsome carrier pictured on this page—the first Mack bus to operate on a regular route between the United States and the Dominion.

100% General equipment makes it possible for the owners of this bus to maintain a rigid schedule between Buffalo, Niagara Falls and St. Catherines, Ontario.

100% General equipment provides maximum protection against the jolts and jars of the road, hence royal comfort for the 25 passengers inside the bus and utmost protection for the bus mechanism.

More than that, the lower rolling-resistance of The General Cord assures the owners of this bus a substantial reduction in power and gasoline consumption—and that means the lowest possible cost of operation—the one thing every bus operator wants!

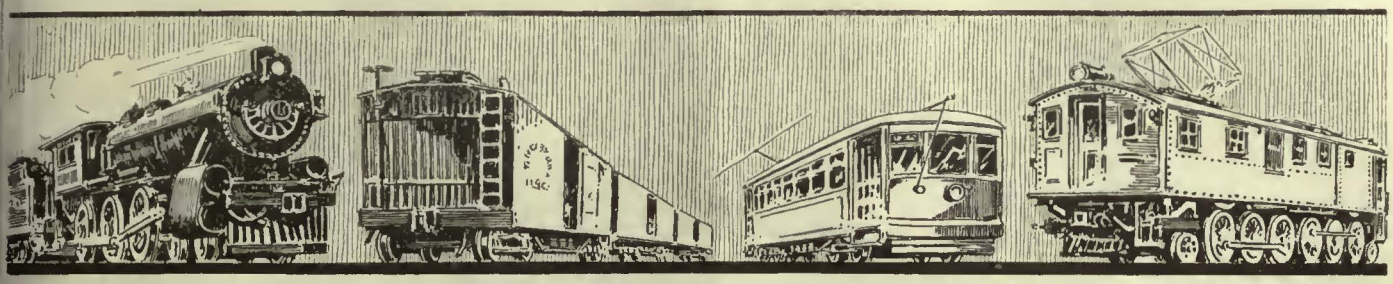
The Mark of Leading Tire Stores Everywhere

The GENERAL TIRE

—goes a long way to make friends

BUILT IN AKRON, OHIO, BY THE GENERAL TIRE AND RUBBER CO.

RAILROAD CONSTRUCTION *for* HIGHWAY TRANSPORTATION



Multi-wheel traction is as necessary on the highway as on the railway——

LONGER LIVED EQUIPMENT

LOWER MAINTENANCE COST

GREATER EARNING POWER

THE SAFEWAY SIX-WHEELER

THE SIX WHEEL COMPANY, 1800 W. LEHIGH AVENUE, PHILADELPHIA, PA.

Manufacturers of De Luxe, City, and Double Deck Type Six-Wheel Coaches

Goodyear-equipped motor coach of the Red Star Transportation Company, Lexington, Kentucky

What SUPERTWIST Adds to Goodyear Tires

You know what rugged strength and long life have always been built into Goodyear Pneumatic Bus tires.

Now you may confidently expect even greater service from Goodyears in motorbus service, because Goodyear Pneumatic Bus Tires are now made with SUPERTWIST.

SUPERTWIST is the extra elastic, extra enduring new material specially developed by Goodyear for Goodyear balloon tires, motorbus and heavy duty cord tires.

It far outstretches ordinary cotton cord, and has a maximum flexing power that yields under impact, protecting the tire from rupture, stone bruise and other injuries. It thus insures virtually *double* the *carcass* life of the tire.

Other exclusive features of the Goodyear Pneumatic Tire construction for motorbus service are (1) the new Goodyear band-building method; (2) the new Goodyear breaker; (3) the new Goodyear bead—patent applied for, and (4) the famous All-Weather Tread.

These advantages you get only in Goodyear Pneumatic Bus Tires—the only motorbus tires made of SUPERTWIST.

They are real advantages, because they result in the utmost durability, tractive power, road safety, riding comfort and long, trouble-free milage at low cost.

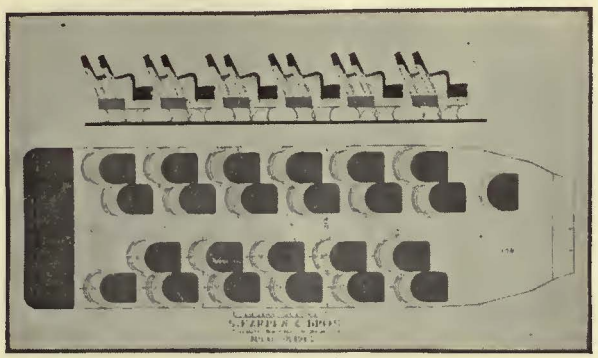
Goodyear Means Good Wear

GOODYEAR

Interior view of deluxe coach with Karpen 37" "Staggard" seating, showing increased comfort, privacy and added aisle space.

More Space, Freedom and Comfort *with KARPEN "Staggard Seats"*

That extra room, increased comfort and privacy, that wider aisle that you have been wanting; -- you can have all these things now, and without sacrificing seats or revenue. Karpen has solved a difficult problem with a distinctly new type of seat. Out of thirty odd years of experience in building parlor, dining and club car seats for the finest railroad service and a careful study of the bus operator's problems came the Karpen "Staggard" double chair. The overlap of the passengers' shoulders gives perfect freedom from crowding, the chief cause of discomfort in ordinary double seats. Notice the floor plan, which explains how the Karpen "Staggard" seating arrangement gives greater available aisle space. In fact, thirty seven inch Karpen "Staggard" double chairs leave 5½ inches more aisle space than thirty five inch regular double bus seats.



(Patents Pending)

Remember that all Karpen coach chairs are built of indestructible *fiber*, with steel reinforcement in every upright stake, and genuine leather cushions on seats and backs. Climatic conditions and temperature have no effect on this construction.

Karpen leads in quality transportation seating.

Karpen FURNITURE

KARPEN Guaranteed Construction FURNITURE

S. KARPEN & BROS.

General Offices, 636-678 West 22nd Street

CHICAGO

New York Salesroom
37th Street and Broadway

Chicago Salesroom
801-811 So. Wabash Avenue

San Francisco Salesroom
180 New Montgomery Street

Medium-size busses are

That's Why Operators Are Swinging To Studebaker Equipment

THE first of the year the Columbus Transportation Company, Columbus, Georgia, motorized one of their electric lines with eight heavy truck-type busses of 29-passenger capacity. A few months' trial convinced them that they could not operate these large units at a profit. So they were replaced with ten Studebaker 21-passenger street car type busses. These low-cost, medium-size Studebakers proved so profitable that they have since purchased seven additional Studebaker busses of the same type for use on another route.

Changing to Medium-Sized Equipment

Experienced bus operators everywhere are replacing heavy truck-type busses with medium-size units. Bus equipment is changing in the same way that street railway equipment has changed.

Early street cars were small, single-truck affairs, seating 20 to 25 people. Bigger equipment seemed to be the key to bigger profits. So heavy, double-truck cars were installed—cars that had more seats, but cost more to buy and more to operate.

What was the result? Occasionally the bigger cars were filled, *but on the average they carried no more passengers than the small cars.* Profits, instead of increasing, melted away, and large cars are now being replaced with smaller, one-man-type cars.

How Size of Equipment Affects Net Income

by J. A. Emery
Vice-President, Ford, Bacon and Davis, Inc.

"The choice of equipment may make or break a bus line. . . Scrutiny of operating expenses reveals that many companies running smaller busses generally operate for less per bus-mile than companies operating larger busses. . . under similar conditions, the difference in operating expenses of a 21-seat bus as compared with a 29-seat bus amounts to from 3½ to 5½ cents per bus mile."

Equipment Must Fit the Average Load

Street car operators have proved conclusively that the only equipment that pays a profit is equipment of the right size to handle the *average* load. Exactly this same principle applies to bus operation. Except at rush hours, large-size busses are half empty—often run at a loss. Studebaker bus equipment—because it is medium-size—not only meets the average load requirements but also yields more consistent profits. For its first cost, operating cost, maintenance and depreciation costs are less.

It is significant that two Studebaker busses can be purchased at practically the same cost as one heavy, truck-type bus. An operator can use the extra Studebaker bus for rush hour business without penalizing profits in slack periods, taking it off when travel is light. The extra equipment can also be used for auxiliary service such as picnics, excursions, etc.

Profit by Street Railways' Experience

The bus operator can profit by the experience of the street railway companies in gauging the size of equipment most profitable to operate. Over 1200 operators are now using Studebaker equipment—and Studebaker busses are operating in every state in the Union.

The Columbus Transportation Company of Columbus, Georgia, recently replaced eight heavy truck-type busses with these ten medium-size Studebakers. The Studebaker equipment proved so satisfactory that they have since purchased seven more of the same type for operation on another route. One more example of the many bus operators who are swinging to medium-size equipment.

STUDEBAKER

PROFIT-SIZE busses!

$6150
f. o. b. factory

tudebaker 20-Passenger Parlor Car De Luxe

US operators have enthusiastically received the new Studebaker Parlor Car De Luxe. *First,* because of its beautiful design and rious comfort. *Second,* because it combines remarkably low first —$6150—with low operating cost.

Ultra-smart appearance

ppearance and luxury of riding comfort, it can be compared only the large parlor car busses selling at from $10,000 to $12,000.

ote the low-hung body with its graceful tapering roof. Length all, 283¾ inches. Framework is of selected hardwood. Finish ch, durable lacquer.

ntrance door (32 inches wide) is on the forward right-hand . Controlled by hidden mechanism, which is oper- by a small hand lever at the left of the driver's . Separate door for driver. Emergency door at rear.

Luxurious, roomy interior

ry interior feature is painstakingly planned to give ost physical and mental relaxation to passengers. ividual armchairs, upholstered in genuine leather, cane sides. Liberal leg room (30 inches) and head m (61 inches). Broad center aisle. Accommoda- for 20 passengers, including driver.

djustable windows with boquet draperies; mohair d and side lining; dome lights; window-post mirrors; aust heating system. Six ventilators are provided ne in the cowl, two over the windshield, and three the roof—insuring continuous circulation of air hout draft. There is a railed-in baggage compartment at the ver's right. Railed-in roof space for additional baggage provided hout extra charge, if desired.

—first cost
—operating cost
—maintenance cost
—depreciation cost
Lower

Most powerful bus chassis of its size and weight

Mounted on specially designed Studebaker bus chassis, this bus is ideal for intercity and suburban service. It has the speed, stamina and dependability to answer the severest demands of service.

According to the rating of the Society of Automotive Engineers, it is the most powerful bus chassis of its size in the world. There are 33 bus chassis on the market with *less* rated power and *more* weight.

The chassis is sturdily built, with surplus strength. It is not a truck chassis—or a passenger-car chassis which has been lengthened and, therefore, weakened by splicing. Extra safety factors are included in its design. Rear axle shaft is extra large; propeller shaft is oversize for extra strength. Springs are extra sturdy and resilient. Four-wheel hydraulic brakes are supplemented by a service brake on the rear wheels and an emergency brake on the driveshaft.

Unusually complete equipment

Equipment is complete, including stop signal system; illuminated destination sign box (above windshield); automatic windshield cleaner; rear-view mirror; front and rear bumpers; motometer; extra wheel with tire, tube and carrier, mounted on fender; 8-day clock and gasoline gauge, plus the usual instruments, mounted in an oval group under glass; inspection lamp with 10-foot cord. Lights are controlled by a steering wheel switch.

Due to standardized design and large-scale production, the new Studebaker Parlor Car De Luxe is offered at a remarkably low price. Operators find that its smart appearance and luxurious riding comfort attract continuous patronage, while its very low initial and operating costs insure *much higher profit per passenger mile.*

x Body Designs, 12 to 21 Passengers, $3935 to $6150

Prices f. o. b. factory, covering body and chassis, complete. Purchase can be arranged on a liberal Budget Payment Plan—Small down payment and balance in convenient monthly installments.

-Pass. (including driver) cross-seat Sedan-Type	$3935
-Pass. (including driver) cross-seat Sedan-Type	$4295
-Pass. (including driver) side-entrance Parlor Car	$5300
-Pass. (including driver) cross-seat Sedan Type	$5050
-Pass. (including driver) Parlor-Car De Luxe*	$6150
-Pass. Pay-As-You-Enter Street-Car Type*	$5125

*Includes dual rear wheels

THE STUDEBAKER CORPORATION OF AMERICA,
Dept. B South Bend, Ind.

Send me free "Profitable Bus Operation" without obligation.

Name.....

Address.....

City.....State.....

We have.....busses at present.

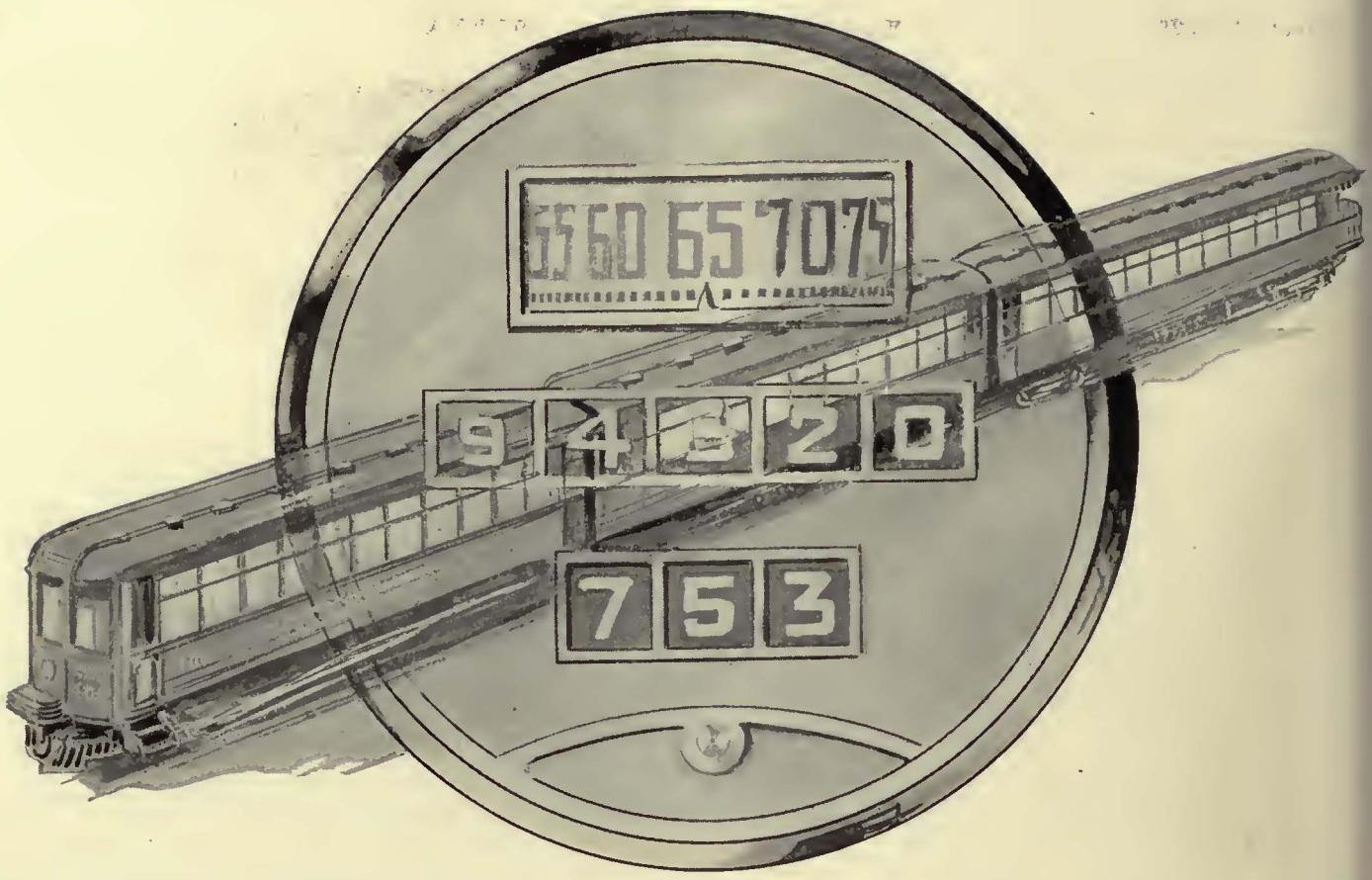
Check below the Studebaker Bus about which you desire information.

Type: Sedan.....Parlor Car.....Street-Car Type.....

Capacity:.....Passengers.

Mail this coupon for further particulars FREE

BUSSES MORE PROFIT PER PASSENGER MILE



MORE MILEAGE

PER DOLLAR OF COST

What, next to safety and dependability, is the most important requirement you look for in wheels for electric railway service?

Isn't it economical mileage—greater service per dollar of cost?

The Illinois Steel Company begins to build economical mileage into Gary Wrought Steel Wheels at the very first stage of manufacture, where the specialized knowledge gained in years of steel-making experience is utilized to produce the cylindrical block of high-grade open-hearth steel that eventually becomes the finished wheel.

The care with which the open-hearth record and chemical composition are checked, and the painstaking way in which all blocks are chipped and inspected, are further steps in the journey.

From the wheel block yard, down on to the ten thousand-ton hydraulic press, the hub punch, the rolling mill, the coning press, the first inspection, the machining operation, the second inspection and the warehouse—the course of Gary Wheels toward economical mileage is unswerving.

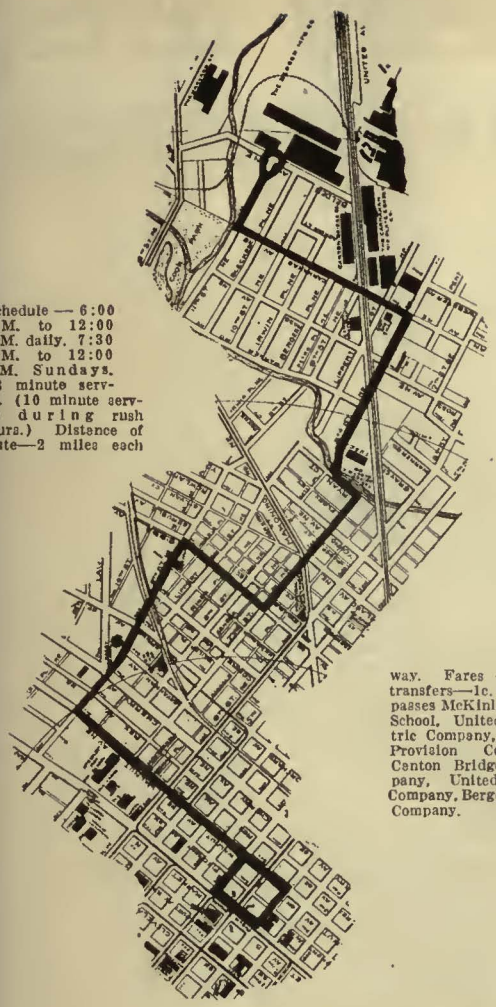
All of which helps to explain the favor these wheels enjoy. Our wheel specialists are at your command.

Illinois Steel Company

General Offices: 208 South La Salle Street, Chicago, Illinois

G A R Y

WROUGHT STEEL WHEELS



Schedule — 6:00 A.M. to 12:00 P.M. daily. 7:30 A.M. to 12:00 P.M. Sundays. 13 minute service. (10 minute service during rush hours.) Distance of route—2 miles each way. Fares — 5c., transfers—1c. Route passes McKinley High School, United Electric Company, Carson Provision Company, Canton Bridge Company, United Alloy Company, Berger Mfg. Company.

ROUTE NO. 1—GREEN LINE TRANSIT COMPANY, CANTON, OHIO.

"Nothing but Kelly tires will go on our busses"

SCHAPPI BUS LINE, INC.
521 GARFIELD AVE PHONE HAMMOND 2403
CALUMET CITY, ILLINOIS

February 23, 1926.

Kelly-Springfield Tire Company,
2001 W. Pershing Road,
Chicago, Illinois.

Gentlemen:

You have requested in your communication of recent date that we furnish you with information relative to the results secured from your Heavy Duty tires operating on the eight busses which we have in service between Chicago and Hammond, Indiana It gives us great pleasure to relate that experience with your tires which has been so satisfactory to us.

Our run is about twenty-five miles each way, and we have to date forty of your tires in service, the first of which was purchased in October of 1925. Those tires have been driven approximately 15,000 miles and their appearance is excellent. We were using one of the well known makes of bus tires prior to our experience with your product, and we are very pleased to state that the service which your equipment has given has reduced our tire bills in the neighborhood of 50%.

Your tires appear to be more resilient than those which we have used in the past and fulfill our every requirement. We did not believe there was so much difference in tires until Kelly Heavy Duties were placed in service. You have attained a genuine accomplishment in manufacturing such a perfectly balanced product, and you may rest assured that nothing but Kelly-Springfield tires will go in service on our busses.

We will be more than pleased to furnish a favorable report to anyone who desires information relative to the performance of your product.

Very truly yours,
SCHAPPI BUS LINE, INC.

KELLY HEAVY DUTY CORD

Fageol Coaches

Garford Buses and Trucks

GMC Trucks

Graham Brothers Coaches and Trucks

International Coaches and Trucks

Mack Buses and Trucks

Safeway Buses

Studebaker Buses

White Buses and Trucks

Yellow Coaches

24 buses and trucks of 10 different makes were exhibited at the 1926 convention of the American Railway Association.

Every one of the motor vehicles submitted to these transportation experts was equipped with Timken Tapered Roller Bearings.

And in regular production, 95% of ALL makes of buses and trucks in America are Timken-equipped.

Timkens are used in transmissions, differentials, pinion or worm mountings, rear wheels, front wheels, steering pivots, fans, and auxiliary drives.

Timkens keep these units rigid, quiet, highly wear-proof and compact. Timkens do it with their tapered design, *POSITIVELY ALIGNED ROLLS* and Timken-made steel. These features enable Timken Bearings to carry thrust and all other loads, with less friction, and in less space for any given capacity.

The cash value of such bearing characteristics is clear from the unanimous choice of Timkens by makers and users of commercial vehicles.

THE TIMKEN ROLLER BEARING CO., CANTON, OHIO

TIMKEN
Tapered
ROLLER BEARINGS

100 · YEARS · OF · MANUFACTURING · EXPERIENCE ·

The Latest H-W Driver Seat *Adjusts to Comfort and Safety*

Driver Seat No. 13

THIS new adjustable H-W driver seat is a welcome advance in comfort and control for the operator. Special malleable iron pedestal construction allows four height adjustments. Seat also slides three inches forward or backward. Cushion and back springs are carefully worked out to give maximum support and driving comfort.

SEATS Nos. 55-P and 11-F are worthy examples of the complete H-W passenger seating lines: the former for middle distances where extra comfort is desired; the latter for extreme comfort on cross-country tours and intercity service. We have a full line of reed seats, too.

Seat No. 55-P

Seat No. 11-F

Ask for the free advice of our transportation engineers on all your car seating problems

Heywood-Wakefield

REG. U.S. PAT. OFF.

HEYWOOD-WAKEFIELD SALES OFFICES

Heywood-Wakefield Company, Wakefield, Mass.

Heywood-Wakefield Company, 516 West 34th St., New York, N. Y.

Herbert G. Cook, Hobart Bldg., San Francisco, Cal.

The G. F. Cotter Supply Co., Houston, Texas

Heywood-Wakefield Company, 439 Railway Exchange Bldg., Chicago, Ill.

Frank N. Grigg, 630 Louisiana Ave., Washington, D. C.

Railway & Power Engineering Corporation, 133 Eastern Ave., Toronto; Montreal; Winnipeg, Canada

FISK

TRANSPORTATION "Fillerless" CORD TIRES

Time to Re-tire
Get a FISK
TRADE MARK REG. U. S. PAT. OFF.

A trial on a competitive basis convinced The Overland Motor Coach Company that Fisk Transportation *"Fillerless"* Cords deliver service at the lowest cost per mile.

Fall River, Mass.

The Fisk Tire Company, Inc.,
Chicopee Falls, Mass.

Gentlemen:—A trial on a competitive basis has convinced me that your transportation cords on my busses are in the same position relatively as your Red-Top Tires are to other makes on my light cars.

Your product is not exactly new to me, although the bus tire is comparatively so. I rode on Fisk in the old days of the "Bicycle Craze" and you surely have kept pace with the times.

With best wishes for your future success, I am,

Sincerely yours,
The Overland Motor Coach Company,
William S. Oakley, Pres.

You'll find it well worth while to learn more about this great commercial tire from one of the 145 direct Fisk branches or the thousands of Fisk Franchise dealers in all parts of the country.

The Fisk Tire Company, Inc.
Chicopee Falls, Mass.

Fisk Transportation "Fillerless" Cords are made in all bus and truck sizes.

4.

Important points to remember for a Complete American Electric Railway Association Convention Sales Program

EXHIBIT SPACE AT THE CONVENTION

ELECTRIC RAILWAY JOURNAL
Convention Number
Dated September 25, 1926

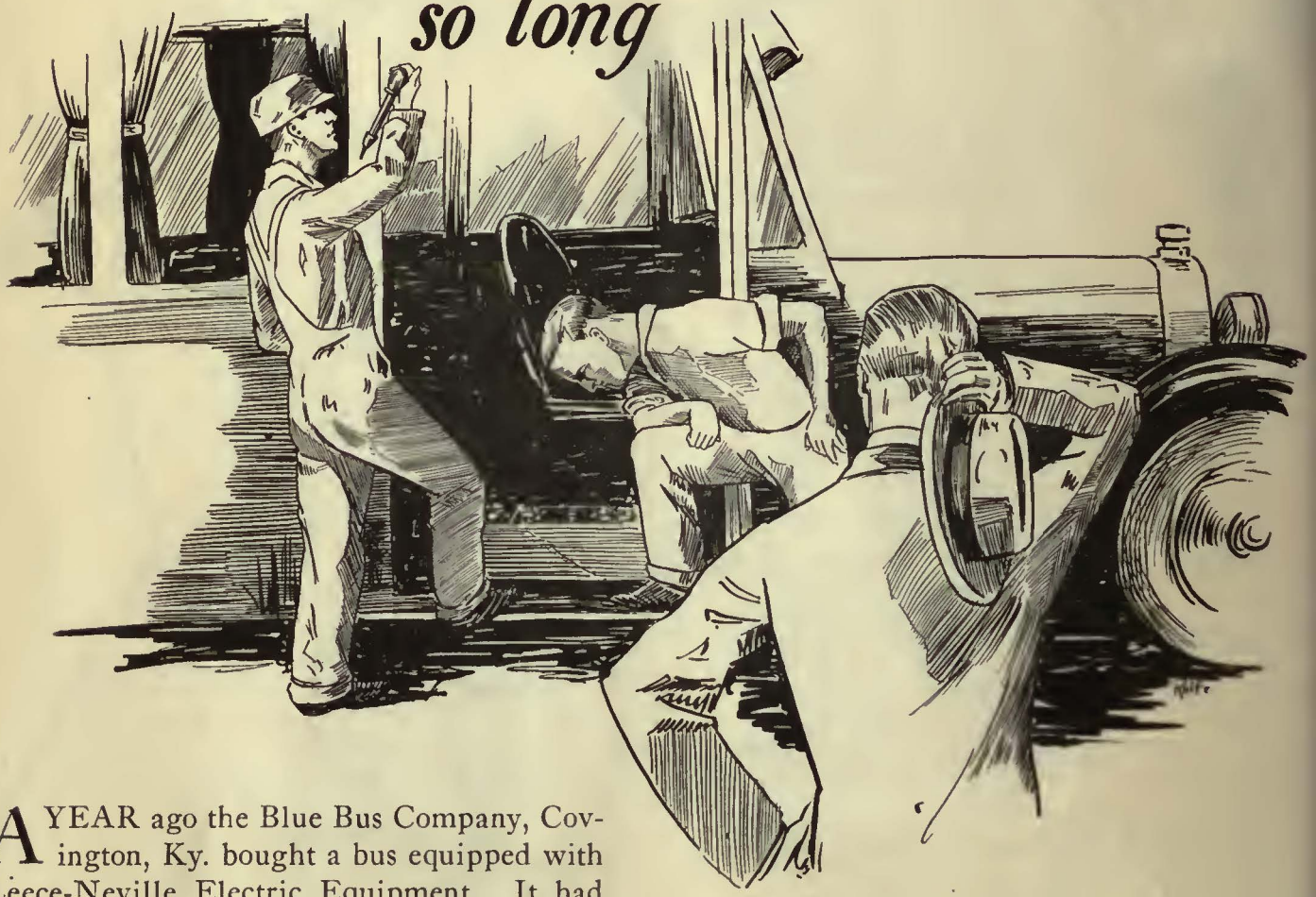
ELECTRIC RAILWAY JOURNAL
Convention Dailies
Dated October 5, 6, 7, 1926

ELECTRIC RAILWAY JOURNAL
Convention Report Number
Dated October 9, 1926

Write or wire for information on Electric Railway Journal's Complete Convention Service

ELECTRIC RAILWAY JOURNAL
Tenth Avenue at Thirty-Sixth Street
NEW YORK, N. Y.

They couldn't understand why the battery lasted so long



A YEAR ago the Blue Bus Company, Covington, Ky. bought a bus equipped with Leece-Neville Electric Equipment. It had been operated 50,000 miles as a demonstrator. Up to the time our representative looked the job over recently, it had travelled a total of 110,000 miles. The original battery was in the car—had never been out for recharging—and tests showed it to be fully charged and in good condition.

Officials of the Blue Bus Company, couldn't understand why it had not been necessary to replace the battery at 25,000 mile intervals (every five or six months.)

Leece-Neville patented Voltage Regulation was the answer.

Battery makers take pains to tell you that the life of a battery depends on the treatment it receives.

Leece-Neville patented Voltage Regulation attacks two battery destroyers — overcharge and undercharge. It absolutely prevents overcharge and by permitting current output at low operating speeds, goes as far as possible in keeping the battery charged.

Everywhere, Leece-Neville Electrical Equipment is improving bus operation.

Our Service Book lists a service station near you where the details of Leece-Neville Electrical Equipment will be explained to you. ***If you do not have a copy, write for it.***

The Leece-Neville Co.

CLEVELAND, OHIO

For cottage or mansion

THE increased demand for better lighting and a greater number of electrical conveniences in the American home, has created widespread interest in wiring details.

How easy then for the electrician to answer the question of safety and durability of a wiring job by the mere explanation—"It's Rome Code."

Contractors have long recognized the in-built quality of Rome Code Wire just as thousands of industrial engineers depend upon other Rome Wires and Cables.

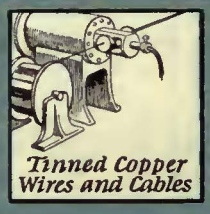
From the huge feeder cables to the smallest portable cords, the great variety of Rome Products are built to meet exacting requirements, in Rome Mills, under Rome supervision and inspection, from wire bar to finished copper wire.

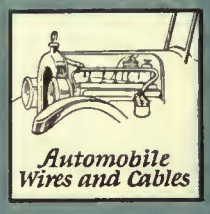
Rome Code Wires

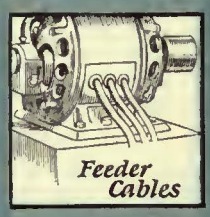
ROME WIRE COMPANY, ROME, N.Y.

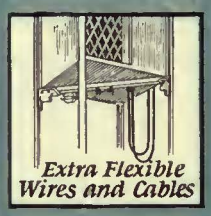
ROME WIRE

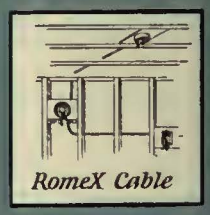
FROM WIRE BAR TO FINISHED COPPER WIRE

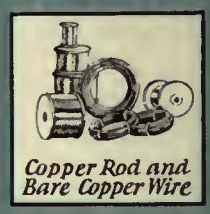


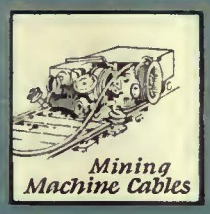


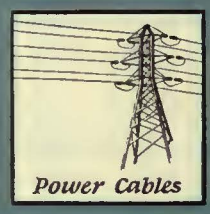












TO many in the electrical industry all code wire is alike. But to the initiated, Rome Code Wire stands out as a better-than-standards product.

The reason for such a reputation is easily understood when you study the organization back of all Rome Wires and Cables.

Twenty years of manufacturing experience—an organization composed of men who have made a life-time study of the construction and use of all types of wire. Twenty acres of manufacturing floor space, all under one centralized control assures you of ample stock, quick shipments and competitive prices.

If you will let us know what wires and cables, shown on this page, you are interested in, we will be glad to send you samples, catalogs, and other information that will be of help to you—while an opportunity to quote on any of your wire requirements will always be welcome.

Rome-Wire

ROME WIRE COMPANY

Mills and Executive Offices: ROME, N.Y.

Diamond Branch: Buffalo, N.Y.

New York — 50 Church Street
Boston — 1011 Little Building
Chicago — 14 E. Jackson Blvd.
Detroit — 25 Parsons Street
Cleveland — 1200 W. 9th Street
Los Angeles — J. G. Pomeroy, Inc., 336 Azusa Street
San Francisco — J. G. Pomeroy, Inc., 51 Federal Street

Southern Equipment Men Favor "Tool Steel" Gears and Pinions

At the Electric Railway Association of Equipment Men—Southern Properties—meeting at Mobile, February 26th, 1926, the question was asked—"What difference have member companies found in the life of gears and pinions? Tool Steel, ——"

(The names eliminated are competitive gears).

Note in the framing of the question, "Tool Steel" was put first. It always is.

Nine Equipment Men gave their experience, most of them very flattering to "Tool Steel," none of them finding any other gear superior.

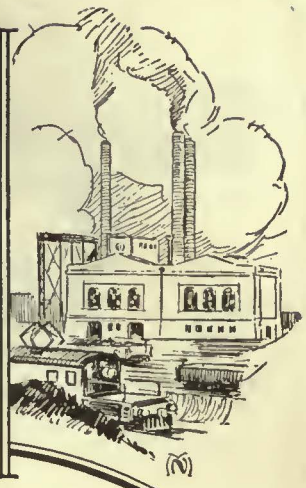
What the man who does not use them says—

"The good reports that we got in Mobile will bear fruit, and it certainly gives us something to think of when it comes to the replacement of gears and pinions."

This is the effect the discussion had upon one of the Members who had not been using "Tool Steel" Gears.

The Tool Steel Gear & Pinion Company
Cincinnati, Ohio

Accidents



WHEN a valuable piece of machinery is destroyed or injured by accident, the superintendent wants to know who was to blame. He knows that few accidents can really be classed as "unavoidable." But when a machine is injured or temporarily rendered useless by the premature wearing out of a bearing, no investigation is made, as a rule. It is taken for granted that machinery must wear out. If it wears out sooner than it should, it's just bad luck—or if anybody is to blame, it is the maker of the machine.

Some day, perhaps, knowledge of the science of lubrication will be so general that the premature wearing out of machinery will be looked upon in its true light—as an accident which could easily have been avoided by the more careful selection of lubricants.

Meantime, plant superintendents who have familiarized themselves with this modern science are saving money for their companies by using the correct grades of

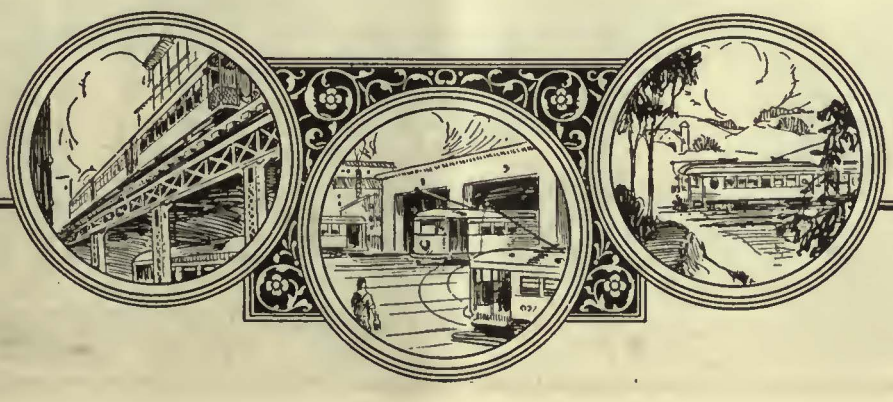
Standard Oils and Greases

Standard Oils and Greases are made in many grades to meet the lubrication requirements of every kind of machinery in use in modern industrial plants.

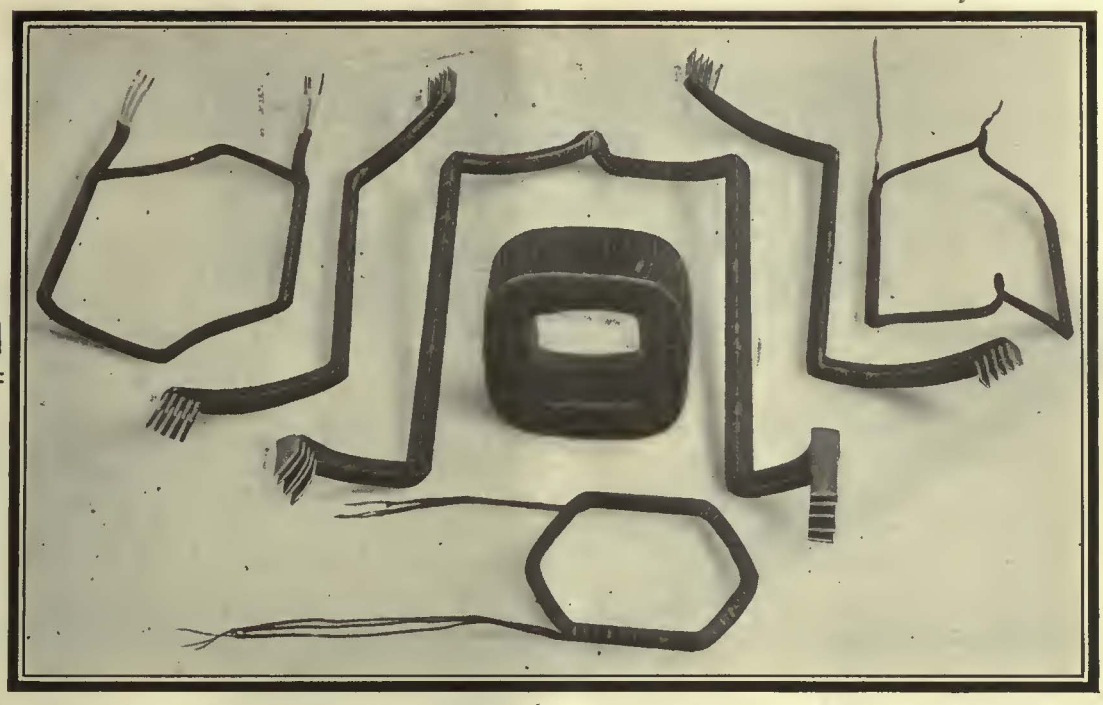
Our representative will recommend the grades of lubricants which will help to eliminate avoidable "accidents" of this kind in your plant.

STANDARD OIL COMPANY
(INDIANA)

910 South Michigan Avenue Chicago, Illinois



The Electric Railway Journal is a member of The A. B. P.



It's a Comfort to Find Coils

that are moulded or pressed to accurately fit the slot dimensions. The forcing of a coil into its slot may break the insulation and cause trouble on the road.

Columbia Coils are not only accurately formed to slot dimensions but are built up from the highest grade materials and reinforced in insulation at all points where trouble is most likely to develop.

The danger of shorting, therefore, is reduced to a minimum while Columbia manufacturing methods have been so fully standardized and simplified that you are likely to find an advantage in price as well as in quality.

We will be glad to quote you on Columbia Field and Armature Coils which, unless otherwise specified, are standard and interchangeable. We will also be glad to quote you on any of our other products. Our shops are yours to command.

The

COLUMBIA MACHINE WORKS

and Malleable Iron Company

Chestnut St. and Atlantic Ave. Brooklyn, N. Y.

ELECTRIC RAILWAY EQUIPMENT!

Railway Motors
25—Westinghouse 307's
G.E. 80's.

Tower Truck
1—2½-3 ton White. Three section. Fully equipped. New 1923.

Car Hoist
1—Universal. Columbia Mch. Co. make. Motor and control equipment included

Welding Machine
1—Railway Welding and Bonding Co. New 1923. Fully equipped.

When the operations of the

NEW YORK & LONG ISLAND TRACTION COMPANY

ceased,—all equipment was purchased by us for resale. This unusual opportunity was then created for railway companies to secure at unbelievable savings the little-used equipment shown here.

All is in excellent condition—and the low prices will surprise you. Write for complete information and prices on what you can use.

Birney Cars
4—32 seating capacity Westinghouse 508A motors. Fully equipped. Splendid condition.

Southern Cars
6—Double truck. 42 passenger. One man operation.

Sweeper
1—Double truck Snow Sweeper. Fully equipped

Track Grinder
1—Atlas Rail Grinder new 1923. Excellent condition

H. E. SALZBERG CO., Inc, 50 Church St., New York City

POSITIONS WANTED

ENGINEER with extensive experience in construction and maintenance of paved and open track, overhead lines, power plants, etc., desires position as engineer of way or roadmaster. PW-923, Electric Railway Journal, 1600 Arch St., Phila., Pa.

OFFICIAL PROPOSAL

Bids: Sept. 10.

Track Laying City Hall to and Including Fern Rock Terminal Yard

BROAD STREET SUBWAY
CONTRACT NO. 126
DEPARTMENT OF CITY TRANSIT
CITY OF PHILADELPHIA
11TH FLOOR, 1211 CHESTNUT STREET
Phildelphia, August 16, 1926.

Sealed proposals, addressed to the undersigned, at the office above mentioned, will be received until 11 o'clock a.m. (Eastern Standard Time), on Friday, September 10, 1926, and publicly opened immediately thereafter, for laying track in the Broad Street Subway, the Fern Rock Terminal Yard, and the Shops in the yard.

Plans and specifications may be seen at the office of the Department on the 12th floor, 1211 Chestnut Street, and copies of the same, with blank forms for proposals, will be supplied to intending bidders upon application. A deposit of Fifty (50) dollars will be required for the plans and specifications. This deposit will be refunded upon return of the plans and specifications in good condition.

Bidders must be skilled and regularly engaged in the class of work for which they are competing.

No bid will be considered unless accompanied by a certified check on a responsible bank or trust company in favor of the City of Philadelphia, to the amount of five (5) per centum of the sum of such bid, in accordance with the provisions of an ordinance approved March 7, 1924, as amended by ordinance approved July 2, 1924, and reprinted in full in the specifications.

The Director reserves the right to reject any or all bids, as he may deem best for the interest of the City of Philadelphia.

H. E. EHLERS,
Director.

WANTED

WANTED

One Man Single Truck Birney Cars

W-922, Electric Railway Journal
Star Bldg., St. Louis, Mo.

SERVICE TO THE INDUSTRY

THE LANG BODY COMPANY maintains a complete Service Department on repairing and refinishing of bus bodies. This special department is of ample size so that a complete bus can be driven to our plant and completely refinished. We will repair everything except the mechanical parts of the chassis. Speedy and accurate work is assured. For further information and estimates write

Service Department,

The Lang Body Company,
Cleveland, Ohio

BARGAINS

ASK FOR PRICES On This Equipment Located Near Boston

All in Excellent Condition

Putnam double head **Planer** and 1 side head, 36x36x10-ft.
Single head **Putnam Planer**, 24x24x6-ft.
Putnam Planer, 2 heads, size 36-in.x9-ft.
Putnam Planer, 24x24-in.x6-ft., single head.
38-in. center drive coach wheel **Lathe**, mfgd. by **Pond Co.**
Putnam Lathe, 16-in.x8-ft.
4-in. Hollow spindle **Gisholt Turret Lathe.**
Bennet Axle Lathe.
Putnam Lathe, 18-in.x8-ft.
Geo. H. Whitney, 78-in. driving wheel **Lathe.**
American Fox Lathe, 16-in. swing.
78-in. **Sellers** wheel **Lathe.**
Putnam Lathe, 20-in. swing, 8-ft. bed.
Putnam Lathe, 16-in.x8-ft.
Putnam Lathe, 20-in.x10-ft.
Putnam 12-in. **Shaper.**
36-in. **Putnam Upright Drill.**
Putnam Upright Sensitive Drill, 18-in. table.
Bausch Vertical Boring Mill.
Betts Slotter, 18-in. stroke.
Putnam Slotter, 14-in. stroke.
200-ton **Car Wheel Press.**
300-ton **Putnam Wheel Press.**
Rand single stage steam driven **Air Compressor.** Size 17x24-in.
8-ft. **Boiler Rolls.**

Full Particulars Upon Request.
Inquiries Solicited.

The S. Snyder Corporation
14-21 Mart Place, Rochester, N. Y.

TO HELP YOU

LOCATE COMPETENT MEN

"Searchlight" Advertising

G-3

Rails and Equipment

of the

K. & U. T. CO.

FOR SALE

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1—NEW, 32,000 pound one-man Passenger Interurban Car, West. 510-A motors, Safety devices.

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1—Rotary converter, Stationary, West. 300 KVA. 500 amp. 33,000-370 AC. Transformers, 600 DC., 25 cycle.

Address

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Urbana, Illinois

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Brill Built
West. 508 or G.E. 264 Motors
Cars Complete—Low Price—Fine Condition
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

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Westinghouse Air Brake Co.

Air Receivers & After-coolers
Ingersoll-Rand Co.

Air Springs
Cleveland Pneumatic Tool Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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Elec. Service Supplies Co.
Columbia Machine Works

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

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Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Illinois Steel Co.
Johnson & Co., J. R.
National Railway Appliance Co.
Standard Steel Works
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson & Co., J. R.

Axles, Steel
Bethlehem Steel Co.
Carnegie Steel Co.
Johnson & Co., J. R.
Ludlum Steel Co.

Babbitt Metal
Johnson & Co., J. R.

Babbitting Devices
Columbia Machine Wks.

Badges and Buttons
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International Register Co.

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American Bridge Co.

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Hyatt Roller Bearing Co.

Bearings and Bearing Metals
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Columbia Machine Wks.
General Electric Co.
Westinghouse E. & M. Co.

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Stucki Co., A.

Bearings, Roller and Ball
Hyatt Roller Bearing Co.
Timken Roller-Bearing Co.

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Consolidated Car Heating Co.

Bells and Gongs
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Railway Trackwork Co.

Bodies, Bus
Cummings Car & Coach Co.

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Elec. Service Supplies Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Bonds, Rail
American Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
American Bridge Co.
Columbia Machine Works
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
American Brake Shoe & Foundry Co.
Brill Co., The J. G.

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Columbia Machine Wks.
General Electric Co.
National Brake Co.
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Bridges, Steel
American Bridge Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Morganite Brush Co., Inc.
U. S. Graphite Co.
Westinghouse E. & M. Co.

Brushes, Graphite
Morganite Brush Co., Inc.
U. S. Graphite Co.

Brushes, Wire Pneumatic
Ingersoll-Rand Co.

Brush Holders
Columbia Machine Works

Buildings, Steel
American Bridge Co.

Bulkheads
Haskelite Mfg. Corp.

Bunkers, Coal
American Bridge Co.

Bus Seats
Hale-Kilburn Co.
Heywood-Wakefield Co.
S. Karpen & Sons

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American Car & Foundry Motors Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Fageol Motor Co.
Garford Motor Truck Co.
Six Wheel Co.
Studebaker Corp. of America
Yellow Truck & Coach Mfg. Co.

Bushings, Case Hardened and Manganese
Brill Co., The J. G.
Columbia Machine Works

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Irvington Varnish & Ins. Co.
Mica Insulator Co.

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Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co.

Cars, Gas, Rail
Brill Co., The J. G.

Cars, Passenger, Freight, Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Cummings Car & Coach Co.
Kuhlman Car Co., G. C.
National Ry. Appliance Co.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Cars, Self-Propelled
Brill Co., The J. G.
General Electric Co.

Castings, Brass, Composition or Copper
Columbia Machine Wks.

Castings, Gray Iron and Steel
American Steel Foundries.
American Brake Shoe & Foundry Co.
American Bridge Co.
Bemis Car Truck Co.
Columbia Machine Wks.
Standard Steel Works
Wm. Wharton, Jr. & Co., Inc.

Castings, Malleable & Brass
American Brake Shoe & Foundry Co.
Columbia Machine Wks.

Catchers and Retrievers, Trolley
Earll, C. I.
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Ceilings, Plywood Panels
Haskelite Mfg. Corp.

Chairs, Parlor Car
Heywood-Wakefield Co.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Columbia Machine Works
Dossert & Co.
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

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Brill Co., The J. G.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia Machine Wks.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Coils, Armature and Field
Columbia Machine Wks.
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.

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General Electric Co.
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Ingersoll-Rand Co.

Compressors, Portable
Sullivan Machinery Co.

Compressors, Gas
Sullivan Machinery Co.

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Columbia Machine Wks.
General Electric Co.
Westinghouse E. & M. Co.

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Elec. Service Supplies Co.

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General Electric Co.
Westinghouse E. & M. Co.

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General Electric Co.
Westinghouse E. & M. Co.

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American Steel & Wire Co.
Anaconda Copper Mining Co.
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American Brass Co.
American Steel & Wire Co.
Anaconda Copper Mining Co.

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Brill Co., The J. G.
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Elec. Service Supplies Co.
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Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cranes, Hoist & Lift
Electric Service Supplies Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Crossing, Frog and Switch
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Crossing Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Crossings, Track (See Track Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Morton Mfg. Co.
Pantasote Co., Inc.

Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co.
Lang Body Co.
Salzberg Co., Inc., H. E.
S. Snyder Corp.
John H. Thornburn

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Columbia Machine Wks.
Electric Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heating Co.

Doors and Door Fixtures
Brill Co., The J. G.
General Electric Co.
Hale-Kilburn Co.

Drills, Rock
Sullivan Machinery Co.

Drills, Track
Amer. Steel & Wire Co.
Elec. Service Sup. Co.
Ingersoll-Rand Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Ears
Columbia Machine Works
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electric Grinders
Railway Trackwork Co.

Electric Transmission Towers
American Bridge Co.

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American Steel & Wire Co.
Roebling's Sons Co., John A.
Rome Wire Co.

Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.

Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

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Archbold-Brady Co.
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Bylesby & Co., H. M.
Day & Zimmermann, Inc.
Drum & Co., A. L.
Ford, Bacon & Davis
Hemphill & Wells
Holat, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood, Inc.
Stone & Webster
White Eng. Corp., The J. G.

Engines, Gas, Oil or Steam
Ingersoll-Rand Co.
Westinghouse E. & M. Co.

Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Nat'l Ry. Appliance Co.
Perey Mfg. Co., Inc.

Fare Registers
Electric Service Sup. Co.

Fences, Woven Wire and Fence Posts
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Brill Co., The J. G.
Consolidated Car Fender Co.
Star Brass Works
Wood Co., Chas. N.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Flangeway Guards, Steel
W. S. Godwin Co., Inc.

Flaxlinum Insulators
Nat'l Ry. Appliance Co.

Floodlights
Elec. Service Supplies Co.

Floor, Sub.
Haskelite Mfg. Corp.

Floors
Haskelite Mfg. Corp.

Forgings
Brill Co., The J. G.
Carnegie Steel Co.
Standard Steel Works

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Funnell Castings
Wm. Wharton, Jr. & Co., Inc.

Furnaces, Electric Steel, Melting
American Bridge Co.
American Brown Boveri Elec. Corp.

Fuses and Fuse Boxes
Columbia Machine Wks.
Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co.

Fuses, Refillable
General Electric Co.

Gaskets, Asbestos
Westinghouse Tr. Br. Co.

Gas-Electric Cars
General Electric Co.
Westinghouse E. & M. Co.

Gas Producers
Westinghouse E. & M. Co.

Gates, Car
Brill Co., The J. G.

Gauges, Oil & Water
Ohio Brass Co.

Gear Blanks
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Standard Steel Works

Gear Cases
Chillingworth Mfg. Co.
Columbia Machine Wks.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Gears and Pinions
Bethlehem Steel Co.
Columbia Machine Wks.
Electric Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

(Continued on Page 64)

Generating Sets, Gas-Electric
General Electric Co.

Generators
General Electric Co.
Leece Neville Co.
Westinghouse E. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)

Greases (See Lubricants)

Grinders and Grinding Supplies
Metal & Thermit Corp.
Railway Trackwork Co.

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Guard Rails, Tee Rail and Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Guards, Trolley
Elec. Service Sup. Co.
Ohio Brass Co.

Hammers, Pneumatic
Ingersoll-Rand Co.

Harps, Trolley
Bayonet Trolley Harp Co.
Columbia Machine Works
Elec. Service Supplies Co.
Nuttall Co., R. D.
Star Brass Works
Thornton Trolley Wheel Co.

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Headlining
Columbia Machine Works
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heat. & Light. Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car, Stove
Smith Heater Co., Peter

Helmets—Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Hoists and Lifts
Columbia Machine Wks.
Ford Chain Block Co.

Hoists, Portable
Ingersoll-Rand Co.
Sullivan Machinery Co.

Horns, Car
American Stromberg Co.

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Traction Brake Co.

Ignition Units
Leece Neville Co.

Instruments, Measuring, Testing and Recording
American Steel & Wire Co.
General Electric Co.
Westinghouse E. & M. Co.

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General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
Standard Underground Cable Co.
Westinghouse E. & M. Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish & Ins. Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Electric Service Sup. Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
Okonite Co.
Okonite-Callender Cable Co. Inc.
Westinghouse E. & M. Co.

Insulation Slot
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.

Insulators (See also Line Material)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hemingray Glass Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Interurban Cars (See Cars Passenger, Freight Express etc.)

Jacks (See also Cranes, Hoists and Lifts)
Buda Co.
Columbia Machine Wks.
Elec. Service Supplies Co.
National Railway Appliance Co.

Joints, Rail (See Rail Joints)

Journal Boxes
Brill Co., The J. G.

Junction Boxes
Standard Underground Cable Co.

Lamps, Guards and Fixtures
Elec. Service Sup. Co.
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Arc and Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Elec. Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.

Lanterns, Classification
Nichols-Lintern Co.

Letter Boards
Haskelite Mfg. Corp.

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Leece Neville Co.

Lightning Protection
Electric Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Dossert & Co.
Electric Ry. Equipment Co.
Electric Service Sup. Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm. Wharton, Jr. & Co., Inc.

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Cummings Car & Coach Co.
General Electric Co.
Westinghouse E. & M. Co.

Locomotives, Oil Engine Electric Driven
Ingersoll-Rand Co.

Lubricating Engineers
Standard Oil Co. of Indiana
Texas Company
Universal Lubricating Co.

Lubricants, Oil and Grease
Standard Oil Co. of Indiana
Texas Company
Universal Lubricating Co.

Machinery, Insulating
Amer. Insulating Mach. Co.

Manganese Steel Castings
Wm. Wharton, Jr. & Co., Inc.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co., Inc.

Manganese Steel Switches, Frogs and Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Mica
Mica Insulator Co.

Motor Buses (See Buses, Motor)

Motor and Generator Sets
General Electric Co.

Motor Leads
Dossert & Co.

Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.

Motorman's Seats
Brill Co., The J. G.
Electric Service Sup. Co.
Hale-Kilburn Co.
Heywood-Wakefield Co.
Wood Co., Chas. N.

Nuts and Bolts
Bethlehem Steel Co.
Hubbard & Co.

Oils (See Lubricants)

Omnibuses (See Buses, Motor)

Oxy-Acetylene (See Cutting Apparatus Oxy-Acetylene)

Packing
Westinghouse Traction Brake Co.

Paints and Varnishes (Insulating)
Electric Service Sup. Co.
Irvington Varnish & Ins. Co.
Mica Insulator Co.
National Ry. Appliance Co.

Paints & Varnishes, Preservative
Joseph Dixon Crucible Co.

Panels, Outside, Inside
Haskelite Mfg. Corp.

Pavement Breakers
Ingersoll-Rand Co.
Sullivan Machinery Co.

Paving Guards, Steel
W. S. Godwin Co., Inc.

Paving Material
American Brake Shoe & Foundry Co.

Pickups, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Ohio Brass Co.
Westinghouse Tr. Brake Co.

Pipe Fittings
Standard Steel Works
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Electric Service Sup. Co.
National Railway Appliance Co.

Plywood, Roofs, Headlining Floors, Interior Panels, Bulkheads, Truss Planks
Haskelite Mfg. Corp.

Pneumatic Tools
Ingersoll-Rand Co.

Pole Clamps
Clark-Williams Eng. Co.

Pole Line Hardware
Bethlehem Steel Co.
Electric Service Sup. Co.
Ohio Brass Co.

Poles, Metal Street
Elec. Ry. Equipment Co.
Hubbard & Co.

Pole Mountings
Clark-Williams Eng. Co.

Pole Reinforcing
Hubbard & Co.

Poles and Ties Treated
Bell Lumber Co.
International Creosoting & Construction Co.

Poles, Ties, Posts, Piling and Lumber
Bell Lumber Co.
International Creosoting & Construction Co.
Naugle Pole & Tie Co.

Poles, Trolley
Bayonet Trolley Harp Co.
Bell Lumber Co.
Electric Service Sup. Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Elec. Ry. Equipment Co.
Electric Service Sup. Co.

Portable Grinders
Buda Co.

Potheads
Okonite Co.
Okonite-Callender Cable Co. Inc.

Power Houses
American Bridge Co.

Power Saving Devices
National Ry. Appliance Co.

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Pumps
A. S. Cameron Steam Pump Wks. (Ingersoll-Rand Co.)
Ingersoll-Rand Co. (A. S. Cameron Steam Pump Wks).

Pumps, Air Lift
Sullivan Machinery Co.

Pumps, Vacuum
A. S. Cameron Steam Pump Wks. (Ingersoll-Rand Co.)
Ingersoll-Rand Co. (A. S. Cameron Steam Pump Wks.)
Sullivan Machinery Co.

Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Rail Braces and Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.
Illinois Steel Co.
Ludlum Steel Co.

Rail Joints—Welded
Lorain Steel Co.
Metal & Thermit Corp.

Rails, Steel
Bethlehem Steel Co.
Carnegie Steel Co.
Illinois Steel Co.
Ludlum Steel Co.

Rail Welding
Metal & Thermit Corp.
Railway Trackwork Co.
Una Welding & Bonding Co.

Railway Paving Guards, Steel
Godwin Co., Inc., W. S.

Railway Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Rattan
Brill Co., The J. G.
Cummings Car & Coach Co.
Electric Service Sup. Co.
Hale-Kilburn Co.
Heywood-Wakefield Co.

Registers and Fittings
Brill Co., The J. G.
Electric Service Sup. Co.
International Register Co.

Reinforcement, Concrete
Amer. Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.

Repair Work (See also Coils)
General Electric Co.
Westinghouse E. & M. Co.

Replacers, Car
Electric Service Sup. Co.

Resistances
Consolidated Car Heating Co.

Resistance, Wire and Tube
American Steel & Wire Co.
General Electric Co.
Westinghouse E. & M. Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Mica Insulator Co.
Westinghouse E. & M. Co.

Roller Bearings
Hyatt Roller-Bearing Co.

Roofing, Car
Haskelite Mfg. Corp.
Pantasote Co., Inc.

Roofs, Car & Bus
Haskelite Mfg. Corp.

Sanders, Track
Brill Co., The J. G.
Electric Service Sup. Co.
Nichols-Lintern Co.
Ohio Brass Co.

Sash Fixtures, Car
Brill Co., The J. G.

Sash, Metal, Car Window
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Electric Service Sup. Co.

Seating Materials
Brill Co., J. G.
Hale-Kilburn Co.
Haskelite Mfg. Corp.
Heywood-Wakefield Co.
Pantasote Co., Inc.

Seats
S. Karpen & Sons

Seats, Bus
Brill Co., The J. G.
Hale-Kilburn Co.
Heywood-Wakefield Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Hale-Kilburn Co.
Heywood-Wakefield Co.

Second Hand Equipment
Electric Equipment Co.
Lang Body Co.
Salzberg Co., Inc., H. E.
S. Snyder Corp.
John H. Thornburn

Shades, Vestibule
Brill Co., The J. G.

Shock Absorbers
Cleveland Pneumatic Tool Co.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Side Bearings (See Bearings Center and Side)

Signals, Car Starting
Consolidated Car Heating Co.
Electric Service Sup. Co.

Signal Systems, Block
Electric Service Sup. Co.
Nachod & U. S. Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod & U. S. Signal Co.

Signals, Indicating
Nichols-Lintern Co.

Slack Adjusters (See Brake Adjusters)

Slag
Carnegie Steel Co.

Sleet Wheels and Cutters
Bayonet Trolley Harp Co.
Columbia Machine Wks.
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Electric Service Sup. Co.
Nuttall Co., R. D.

Smokestacks, Car
Nichols-Lintern Co.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia Machine Wks.
Consolidated Car Fender Co.
Cummings Car & Coach Co.

Snow Sweeper, Rattan
Heywood-Wakefield Co.

Soldering and Brazing Apparatus (See Welding Processes and Apparatus)

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co.
Wm. Wharton, Jr. & Co., Inc.

Spikes
Amer. Steel & Wire Co.
Illinois Steel Co.

Splicing Compounds
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs, Car and Truck
American Steel Foundries
Amer. Steel & Wire Co.
Brill Co., The J. G.
Standard Steel Works

Sprinklers, Track and Road
Brill Co., The J. G.
Cummings Car & Coach Co.

Steel and Steel Products
Carnegie Steel Co.
Illinois Steel Co.
Morton Mfg. Co.

Steel Car Doors
Morton Mfg. Co.

Steel Flooring
Morton Mfg. Co.

Steps, Car
Brill Co., The J. G.
Morton Mfg. Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.

Stop Signals
Nichols-Lintern Co.

Storage Batteries (See Batteries, Storage)

Strain, Insulators
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Street Cars (See Cars, Passenger, Freight, Express, etc.)

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Stands and Fixtures
Ramapo Ajax Corp.

Switches and Switchboards
Consolidated Car Heating Co.
Electric Service Sup. Co.
General Electric Co.
Westinghouse E. & M. Co.

Switches, Selector
Nichols-Lintern Co.

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track Special Work)

Tampers, Tie
Ingersoll-Rand Co.
Railway Trackwork Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

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WHAT AND WHERE TO BUY—Continued from page 64

Telephones and Parts
Electric Service Sup. Co.

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers & Destroyers
Electric Service Sup. Co.

Tickets and Transfers
Globe Ticket Co.

Ties and Tie Rods, Steel
American Bridge Co.
Carnegie Steel Co.
W. S. Godwin Co., Inc.
Ludlum Steel Co.
International Steel Tie Co.

Tie Plates
Illinois Steel Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tires
Fiek Tire Co.
General Tire & Rubber Co.
Goodyear Tire & Rubber Co.
Kelly-Springfield Tire Co.
Mohawk Rubber Co.

Tongue Switches
Wm. Wharton, Jr. & Co., Inc.

Tool Steel
Bethlehem Steel Co.
Carnegie Steel Co.

Tools, Track & Miscellaneous
Amer. Steel & Wire Co.
Columbia Machine Wks.
Electric Service Sup. Co.
Hubbard & Co.
Railway Trackwork Co.

Torches, Acetylene (See Cutting Apparatus)

Tower Wagons & Auto Trucks
McCardell & Co., J. R.

Towers and Transmission Structures
Archbold-Brady Co.
Westinghouse E. & M. Co.

Track Expansion Joints
Wm. Wharton, Jr. & Co., Inc.

Track Grinders
Metal & Thermit Corp.
Railway Trackwork Co.
Ramapo Ajax Corp.
Una Welding & Bonding Co.

Track, Special Work
Bethlehem Steel Co.
Buda Co.
Columbia Machine Wks.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co., Inc.

Trackless Trolley Cars
Brill Co., The J. G.

Transfer Tables
American Bridge Co.

Transfers (See Tickets)

Transformers
General Electric Co.
Westinghouse E. & M. Co.

Transmission Towers and Structures
American Bridge Co.

Treads, Safety, Stair Car Step
Morton Mfg. Co.

Trolley Bases
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Bases, Retrieving
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Buses
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Trolley Material (Overhead)
Electric Service Sup. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Trolley Shoe
Miller Trolley Shoe Co.

Trolley & Trolley Systems
Ford Chain Block Co.

Trolley Wheel Bushings
Star Brass Works

Trolley Wheels (See Wheels, Trolley)

Trolley Wheels and Harps
Electric Service Supplies Co.
Star Brass Works
Thornton Trolley Wheel Co.

Trolley Wire
American Brass Co.
Amer. Electrical Works
American Steel Foundries
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
Bridgeport Brass Co.
Roebling's Sons Co., J. A.
Rome Wire Co.

Trucks, Car
Brill Co., The J. G.
Cummings Car & Coach Co.

Trucks, Motor
International Motor Co.
Mack Truck, Inc.
Yellow Truck & Coach Mfg. Co.

Truss Planks
Haskelite Mfg. Corp.

Tubing, Yellow and Black, Flexible Varnish
Irvington Varnish & Ins. Co.

Turbines, Steam
General Electric Co.
Westinghouse E. & M. Co.

Turnstiles
Electric Service Sup. Co.
Perey Mfg. Co., Inc.

Turntables
American Bridge Co.
Electric Service Supplies Co.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Varnished Papers and Silks
Irvington Varnish & Ins. Co.

Ventilators, Car
Brill Co., The J. G.
Consolidated Car Heating Co.
Nat'l Ry. Appliance Co.
Nichols-Lintern Co.
Railway Utility Co.

Vestibule Linings
Haskelite Mfg. Corp.

Weatherproofing
Morton Mfg. Co.

Welded Rail Joints
Electric Railway Improvement Co.
Lorain Steel Co., The
Metal & Thermit Corp.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Welders, Portable Electric
Electric Railway Improvement Co.
Metal & Thermit Corp.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welders, Rail Joint
Ohio Brass Co.
Railway Trackwork Co.

Welding Processes and Apparatus
Electric Railway Improvement Co.
General Electric Co.
Metal & Thermit Corp.
National Railway Appliance Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welding Steel
Electric Railway Improvement Co.
Railway Trackwork Co.
Una Welding & Bonding Co.

Welding Wire
American Steel & Wire Co.
General Electric Co.
Railway Trackwork Co.
Roebling's Sons Co., J. A.

Welding Wire and Rods
Railway Trackwork Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Cast Iron

Wheels, Car Steel & Steel Tire
American Steel Foundries
Carnegie Steel Co.
Illinois Steel Co.
Standard Steel Works

Wheels, Trolley
Bayonet Trolley Harp, Co.
Columbia Machine Wks.
Elec. Ry. Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Nuttall Co., R. D.
Star Brass Works

Wheels, Wrought Steel
Carnegie Steel Co.
Illinois Steel Co.
Ludlum Steel Co.

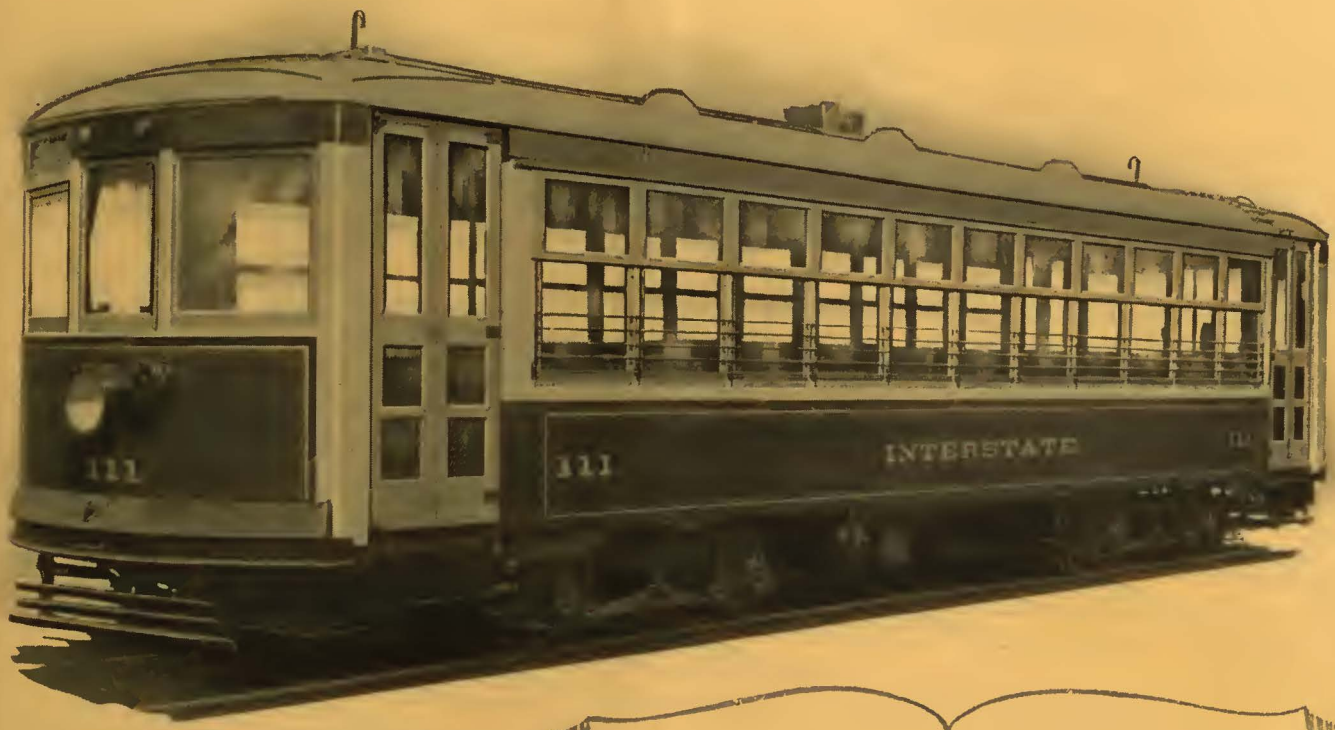
Whistles, Air
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Window Sash Locks & Racks
Morton Mfg. Co.

Wire Rope
Amer. Steel & Wire Co.
Roebling's Sons Co., J. A.

Wires and Cables
American Brass Co.
Amer. Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
Bridgeport Brass Co.
General Electric Co.
Okonite Co.
Okonite-Callender Cable Co.
Roebling's Sons Co., J. A.
Rome Wire Co.
Standard Underground Cable
Westinghouse E. & M. Co.

"Builders of Financial Stability"



NEW CARS—

Operating Costs OLD CARS Jan.—Feb.—March 1925	Per Car Mile
Way and Structures	4.10c.
Equipment	8.11c.
Power	8.80c.
Conducting Transportation	13.06c.
General and Misc.	3.52c.
Total	37.59c.

Operating Costs NEW CARS Sept.—Oct.—Nov. 1925	Per Car Mile
Way and Structures	2.38c.
Equipment	3.14c.
Power	5.43c.
Conducting Transportation	9.02c.
General and Misc.	5.93c.
Total	25.90c.
Annual saving	$54,812
Investment	84,000
Gross return	65%

Interstate Street Railway, Attleboro, Mass. introduces modern cars with remarkable success.

Displacing its 45,000 lb. double-truck cars with five new 31,000 lb. 44-passenger and three new 16,000 lb. 32-passenger one-man operated cars, all Wason built, this New England property not only has reduced its operating cost sufficiently to effect an annual saving equal to 65 per cent of the capital invested in the new equipment, but in addition the month of March, 1926, showed an increase of 17 per cent in passenger revenue.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

Of all the phases of modernization, increased schedule speed has the most far-reaching effect on earnings. It boosts your "production" per man-hour, and thereby reduces operating cost per car-mile. Most important of all, *it sells more service.*

Do modern cars increase schedule speed?

Here are reports from six roads. Each has improved its schedules during recent years. In each case modern cars were necessary. General Electric car equipment is used on every road.

"New equipment was necessary to maintain the increased schedule speeds in most cases."

LEVIS (P. Q.) TRAMWAYS CO.

"New light-weight cars, weight 32,000 pounds using GE-258 Motors, have been purchased and these accelerate much faster than the older, heavy type of car."

MORRIS COUNTY (N. J.) TRACTION CO.

"Schedule speeds increased by a gradual cut in running time; also through new equipment affording better acceleration."

NEW ORLEANS (LA.) PUBLIC SERVICE, INC.

"Schedule speeds slightly increased. By reducing stand time; also by the use of new equipment."

BIRMINGHAM (ALA.) ELECTRIC CO.

"Our schedule speed has been increased. Made possible by better track conditions; improvements in equipment such as light-weight all-steel construction and improvements in the motor design which give the car a faster acceleration and running speed; giving more attention to schedule maintenance and construction; a more thorough study of traffic conditions."

SAN ANTONIO (TEX.) PUBLIC SERVICE COMPANY

"Schedule speed increased from 8 miles to 9.2 miles an hour. This was accomplished by making a survey and finding every possible place where the speed could be increased, and also by using new equipment in the form of safety cars with a quick pick up and by eliminating all unnecessary lagging."

WISCONSIN POWER & LIGHT CO.

The resources and the service of the entire G-E organization are available to consider the problems of modernization and co-ordination—to find the most effective means of transportation and to build appropriate equipment.

330-19

GENERAL ELECTRIC