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ELECTRIC RAILWAY JOURNAL

June 16, 1923

2272 MILES

Track Reconstruction in San Diego

Steel Tie Construction Used as Standard—Weather Conditions Permitted Work to Be Carried on Actively During Recent Months

DURING the past few months several interesting track reconstruction jobs have been done by the San Diego Electric Railway, notably the Adams Avenue and the University Avenue-East San Diego lines.

The Adams Street line is the one on which the track was torn up during the night last summer by the company's track forces as the climax of a long controversy between the city officials and the company over paving and other matters of dispute. After a court battle, a compromise was reached through the mediation of the State Railroad Commission, and reconstruction of the line was begun. The line will be double-tracked throughout its length to the end at Kensington Park, outside the city limits. Service was resumed on the line Dec. 23, 1922, although it was but partially completed at the time. This was a great relief to the patrons, who had been depending upon uncertain bus service, which could not be maintained in rainy weather because the adobe soil, used for roadway in the unpaved streets, is sticky and slippery when wet.

The reconstruction work was carried out in accordance with the standards adopted by the company for all recent construction. The track construction comprises the use of twin steel ties, spaced 6 ft. center to center, with 93-lb. high T-rails for all straight track, 114-lb. rails for curves and 127-lb. guard rails for all special trackwork. All joints are electrically welded and the rails are electrically welded to the ties. All special trackwork is bonded with 350,000 circ.mil cable, and the welded tracks are cross-bonded every 500 ft. with cable of the same size.

(Continued on page 7 of Advertising Section)

This article is reprinted from the Electric Railway Journal, issue of April 28, 1923.

Impregnating Tank for treatment of Field Coils

How the Quality of Westinghouse Field Coils is maintained

Westinghouse Field Coils, sold for renewals, are made with the same expert workmanship, with the same materials, and under the same processes as the original coils entering into the construction of complete Westinghouse Motors.

Copper conductors of correct size are always used, thus assuring the right current-carrying capacity. The exact number of turns are used, assuring the proper magnetic field strength.

The insulation is reinforced at all bends and cross-overs to give added protection. The cable leads are anchored inside the coils, making the use of heavy brass terminals unnecessary.

The coils are carefully gauged to assure the proper clearance in the frame and a snug fit on the pole. Each coil is tested for short circuits.

After the first taping the coils are impregnated with a gum of high melting point to make the coil one solid mass. This treatment consists of drying out the coils in a vacuum, thereby removing all moisture as well as all air. The hot gum is then admitted to the coils under pressure, which assures that the gum penetrates and fills all intervening spaces between the turns and layers of the coils.

The coils are then given three layers of treated cambric, one-half overlapped, and an additional layer of cotton tape slightly overlapped. After this coils are dipped in a high-grade insulating varnish and baked for a definite period. This treatment is repeated three times. This further seals the coils against the entrance of moisture.

Testing Westinghouse Field Coils

Guaging Westinghouse Field Coils

W WESTINGHOUSE ELECTRIC

Westinghouse Electric & Manufacturing Co.
East Pittsburgh, Pa.

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA

Westinghouse

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ELECTRIC RAILWAY JOURNAL

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MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1923

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Keeping Abreast

AT A RECENT meeting of one of the important committees of the American Electric Railway Association, engaged in the investigation and standardization of electric railway material, the sponsor asked for the last issue of ELECTRIC RAILWAY JOURNAL. When it was brought he turned to a certain article and said:

"Gentlemen, a new development is described here which I think this committee should investigate and determine its value. It seems to me that this is an improvement in construction which may be of greatest importance in our future work."

This is not an isolated case; it is a circumstance that occurs frequently. The JOURNAL is the clearing-house of ideas for electric railway men. Not only are new developments in the industry mentioned in its pages, but they are described in all the detail they seem to warrant and their application and significance pointed out.

This is another reason why every electric railway man must have the JOURNAL and use it in order to keep abreast of developments and have the knowledge at hand on occasion for the advancement of his own company—and himself.

Circulation of this issue, 7,050

SAFE Bus Operation

THE widespread adoption of motor buses by street railway companies, for auxiliary service, brings before the traction industry the necessity of bus-braking facilities that will correspond in safety to those which have contributed so largely to the success of the street car.

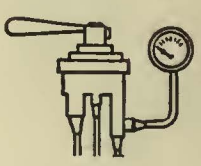
Such facilities have been provided in the form of the Automotive Air Brake.

The Automotive Air Brake carries out the principle of the standard Westinghouse Air Brake in fundamental design and operation, and is applicable to any type of bus.

Hundreds now in service attest to highly dependable, satisfactory performance under any condition of load or road.

For further details, write or wire—

Westinghouse Traction Brake Company
Automotive Division, Wilmerding, Pa.



WESTINGHOUSE
AUTOMOTIVE AIR BRAKES

National Trolley Guard is an inverted copper or galvanized iron wire mesh mounted above the trolley wire. It catches the trolley wheel, should it leave the wire and being energized carries the car to safety.

They decided on National Trolley Guard for this Crossing

THIS is rather an uncommon combination of circumstances at a railroad crossing. Street Railway, Elevated and Steam Road meet. The ordinary hazard of a crossing was made worse by the high stringing of the trolley wire. The danger of damaging the trolley pole on the elevated structure lessened the chances of the street car conductor getting the trolley wheel back on the wire, should it fly off with a locomotive approaching. The railway officials "took out" safety insurance to overcome this condition. They installed National Trolley Guard.

The Ohio Brass Co.
Mansfield, Ohio, U.S.A.

New York Philadelphia Pittsburgh Charleston, W.Va. Chicago Los Angeles San Francisco Paris, France
Products: Trolley Material, Rail Bonds, Electric Railway Car Equipment, High Tension Porcelain Insulators, Third Rail Insulators

Continued from Front Cover

A reprint from Electric Railway Journal of April 28, 1923

Soft Spot in Adobe Soil, Filled In with Broken Concrete Preparatory to Laying of Track Structure

Electrically Welded Joint as Used in San Diego Electric Railway Standard Track Construction

The trench for the track is excavated approximately 18 in. deep. Two feet outside the outside rails a trench is excavated 12 in. below the sub-grade and in it is laid a 4-in. concrete drain tile. The trench is then filled with crushed and disintegrated granite to within 14 in. of the grade.

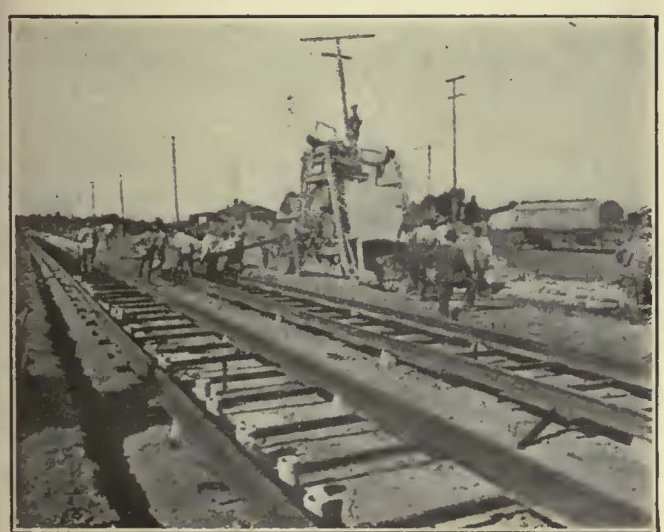
The rails are set on concrete pyramid-shaped piers spaced 12 ft. apart and are adjusted to exact grade by means of double cast-iron wedges placed between the rail bottom and the top of the piers. When they are finally adjusted the rails are firmly braced in place and a 14-in. layer of concrete is poured. The concrete is worked up against the under side of the head of the T-rail, but the balance of the concrete surface is left 2 in. below the street grade to allow for paving.

On Adams Avenue the Company has been relieved of the paving obligation. The track is, therefore, being surfaced with disintegrated granite, a material which is plentiful locally, and which makes a good roadway.

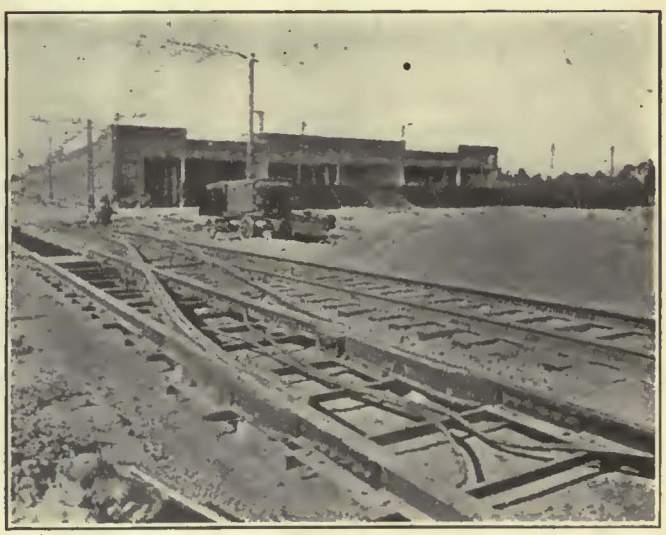
The reconstruction of the University Avenue-East San Diego line presented considerable difficulty due to the heavy traffic, the heaviest in the city, which it carries. The problem was solved by reconstructing one track at a time from Park Boulevard to the end of the line in East San Diego. A block signal system was installed to facilitate dispatching, and dispatchers with extra telephones were stationed at the turnouts where the eastbound and westbound cars are passed. Trains of two cars each were operated during the rush hours and a fourteen-minute headway was maintained, with extra tripper service added.

One of the special problems encountered by Engineer H. M. Kuehmsted, who was in charge of the work, was the caring for soft spots in the adobe soil. Generally these were caused by leaky water mains. The difficulty was overcome by excavating the soft soil until firm soil was reached and filling up to sub-grade with broken concrete.

The first work done by the San Diego Electric Railway under the new specifications was the reconstruction of the Broadway line from the Union Depot to Third Street, which was followed by the reconstruction of the Logan Avenue line, beginning last May. This work was described in the ELECTRIC RAILWAY JOURNAL at the time. Then came the Adams Avenue and University Avenue jobs, which will be followed by the construction of the Park Boulevard line, work on which is now due to begin. Then will come the new construction of the Sixteenth Street cutoff and the reconstruction of the Market Street line.



Track Reconstruction on Adams Avenue, San Diego, Showing Method of Supporting Track Previous to Pouring of Concrete



New and Old Track Construction on Adams Avenue, Showing Special Trackwork Near Carhouse

ELRECO

COMBINATION POLES

Ornamental and Economical

To put the finishing touches of adornment on that new bridge or highway, install Elreco Combination Railway and Lighting Poles. Avoid the mistakes of former years, whereby otherwise fine-appearing streets and avenues have been cluttered up with a veritable forest of wooden poles and a maze of electric wires. Combine your railway and lighting poles in one — Elreco Poles. It is an artistic as well as a sound economical policy to follow.

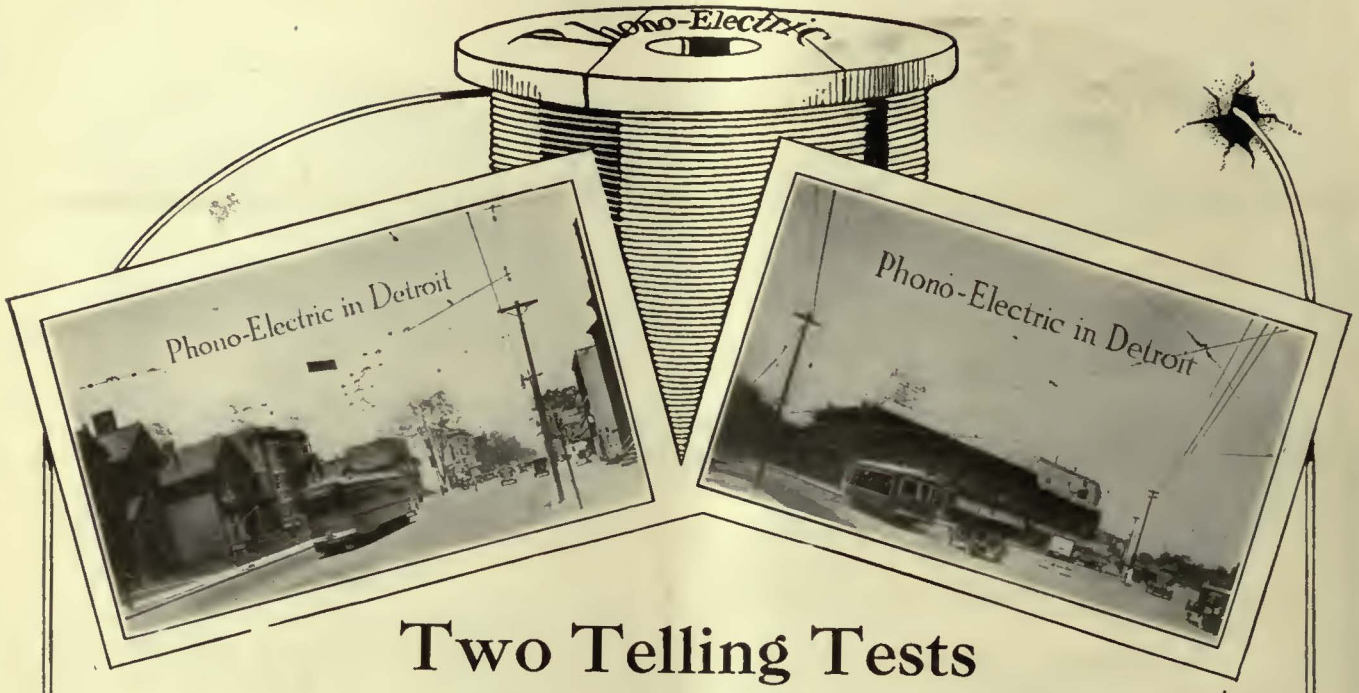
Elreco Poles are provided with the finest G. E. Novalux lighting fixtures. Elreco Poles are strongly built, yet light in weight. Their initial cost is reasonable, their maintenance cost a minimum.

Let us send you all the data

The Electric Railway Equipment Co.

Cincinnati, Ohio

30 Church St., New York



Two Telling Tests

On Charlevoix Avenue

From Aug., 1921, to Dec., 1922, copper trolley showed a reduction in area of 6.64% while Phono-Electric under identical service showed only 3.91%.

Only about ½ the loss.

On Myrtle Avenue

From Aug., 1921, to Dec., 1922, copper trolley showed a reduction in area of 9%, while the Phono-Electric under identical service showed only 3%.

Only about 1/3 the loss.

A life three times that of copper

These actual Detroit tests prove that wear on Phono-Electric reduces its area only one-third to one-half as fast as the wear on hard-drawn copper trolley. The minimum tensile strength of Phono-Electric is 80,000 lbs. per sq.in., against 52,800 lbs. for copper.

The Expert said—

Called in to investigate the City-owned system, a well-known consulting engineer recommended the use of long-life alloy wire. Here are some quotations:

"Throughout the country the use of alloy wire at locations of exceptional wear is the rule and not the exception.

"Such wire costs a little more than copper, but is good for double and even triple life.

"Far more valuable is the greater protection against breakdowns of service."

Detroit orders

Phono-Electric

To improve service, and stop losses and criticism due to service interruptions, Detroit's street railway officials installed Phono-Electric to withstand the excessive wear at curves and heavy traffic sections.

Phono-Electric will prove equally satisfactory and economical on your system. Write us for further information and for quotations.

Bridgeport Brass Company
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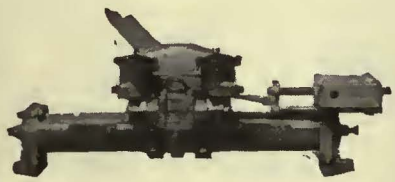
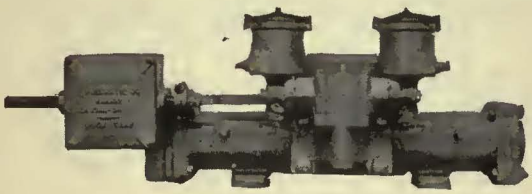
"Bridgeport"

Standard Type of NATIONAL PNEUMATIC Door Engines





Speed and Safety

National Pneumatic Door and Step Operating Mechanisms, Motorman's Signal Lights and other devices are being used by hundreds of the leading electric railway companies here and abroad.

Let us study your particular operating and equipment problem. We will make recommendations, and refer you to other roads where problems like yours have been solved with resultant increase in speed and safety by means of National Pneumatic Equipment.

Write today

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SAN ANTONIO

ORDERS

ECONOMY METERS

With Car Inspection Dials

To Completely Equip Entire System

Economy Meter with Power Saving and Car Inspection Dials

These meters will be used to measure the individual energy consumption of every car on the San Antonio Public Service Company's property. They will afford data of high engineering value and provide a convenient means for car inspection on the basis of actual work done (Kw. hours).

The Watchdog of Your Power and Equipment

This is a rugged watt-hour meter. Top dials for motormen's power-saving records. Lower dials for car inspection use.

When the meter-driven hand on Dial A reaches the marker set for this car at 6, the barnman knows that the brakes and controllers have done their work and are due for an inspection equivalent to that otherwise made daily.

Likewise Dial B shows when the car has done sufficient work to require oiling. This supplants the usual time or mileage period for oiling.

Dial C shows when the car has done sufficient work to require general inspection.

After any inspection the meter-driven hand is set back to zero by means of its reset rod at the bottom of the case. A lock prevents unauthorized resetting of inspection dials.

The Economy meter with car inspection dials is readily adaptable to any electric car or locomotive operating condition.

It is a "power-saving device" with a double value.

Let us quote you prices and answer detailed questions.

Economy Electric Devices Company

L. E. Gould, *President*

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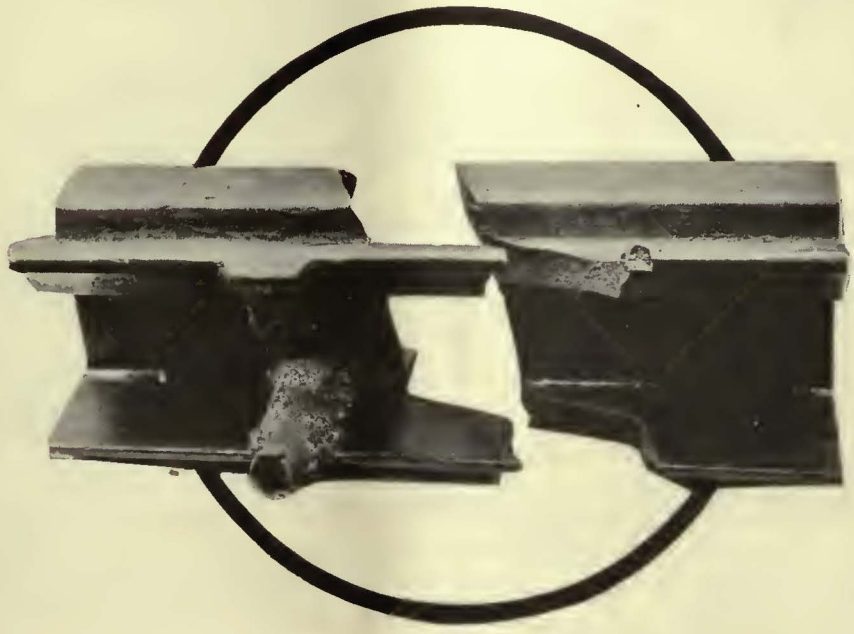


Stronger than the rail itself

Why railway companies are getting such satisfactory results with Thermit Welds is well illustrated by this experiment, recently made by the engineers of the Washington (D.C.) Railway & Electric Co.

The Thermit Weld
withstood this severe test

Bent in the testing machine under a relentlessly increasing pressure *applied directly to the side of the weld* the tortured rail finally broke as shown, entirely outside of the weld itself.

Thermit Rail Welds are practically indestructible. They entirely eliminate the joint, making a perfect, permanent connection, both mechanically and electrically, a connection which lasts as long as the rail itself.

"The first cost is the last cost"

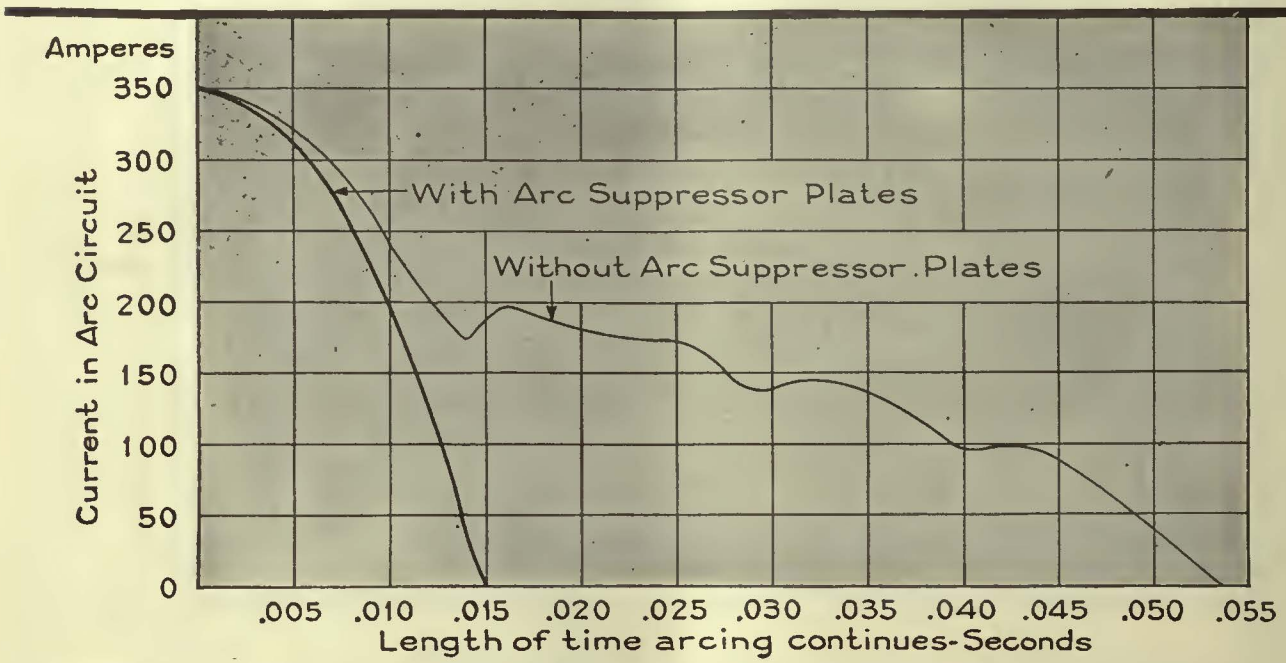
Write for interesting figures on that first cost.

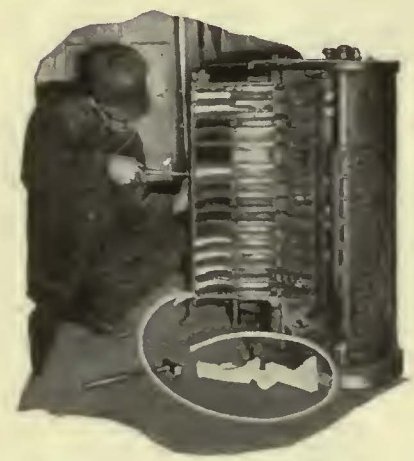
Metal & Thermit Corporation

120 Broadway, New York

PITTSBURGH CHICAGO BOSTON S. SAN FRANCISCO TORONTO

What G-E Arc Suppressor Plates Do





G-E Arc Suppressor Plates are installed opposite the fingers where there is the most arcing. They narrow the arc passages, which increases the resistance of the arc and the cooling effect of the plates.

NOTE the difference in time required to disrupt the arc in a K-35 controller as shown by actual test. This difference means there's considerably less burning of controller fingers, segments, and arcing plates when the equipment is protected with G-E Arc Suppressors.

Consider the value of these auxiliary plates in reducing maintenance costs. They reduce carbonization and eliminate much of the trouble from pitting of contacts. Modern controllers are equipped with them to give better, longer service.

Arc Suppressor Plates can be used to advantage in any G-E controller having individual finger blowouts. Installation requires only a few minutes. They are inexpensive. Try them.

General Electric Company

General Office Schenectady, N.Y.

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New York, Saturday, June 16, 1923

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HENRY W. BLAKE and HARRY L. BROWN, *Editors*

Volume 61
Number 24

Maintenance Cost Reduced by Reclamation of Parts

ACCORDING to J. T. Porter, one of the speakers at the convention of the street and interurban railway section of the Southwestern Public Service Association, all maintenance is reclamation. The distinction usually made is merely in degree, maintenance being applied to the operating units of the property. Mr. Porter has carried the idea to some of the smaller parts that usually are neglected. On his road a department has been organized to repair parts usually kept in stock, and reissue them when they can be used to advantage. By so doing the costs of maintenance have been cut some 20 per cent for the first quarter of the current year, although more work has been handled in the shops than last year. The details of this were published in this paper June 2, page 931.

Many roads have an accumulation of abandoned parts removed in the process of maintenance that in their usual state are of no value. Yet no one in authority wants to see them thrown out, as they may be useful "some day." In other words, the shop yard is like the old-fashioned housekeeper's attic, full of old furniture, bric-à-brac and clothes that are hauled out periodically but seldom used. But Mr. Porter's plan gets the material used, if it is worth reclamation, or sold to the junk man, if it is beyond economical repair.

In this season of the year, when much attention is being paid to clean-up weeks, it will be well for railways to take the matter up and see if a reclamation department may not be established to utilize those parts that are good and get rid of the remainder, thus conserving time and money.

Remodeling Obsolete Cars of Questionable Economy

A NUMBER of companies have been pulling cars virtually out of the junk heap to remodel them for one-man operation. This is an attractive proposition, they say, because the rehabilitation and equipment with some safety devices, air brakes and platform doors, and rearrangement for one-man operation, can be done for about one-third the cost of a new one-man safety car.

If the result were anything like the equivalent of a new car, then it would be a very sensible way to conserve investment while securing additional rolling stock. But unfortunately such is not the case; and it is feared that such investment may be of questionable value, or even a waste. The reason is that it is impossible to get modern riding qualities, acceleration, and economy of maintenance and energy consumption with the motors and trucks and excessive weight of a date ten to twenty years back.

The old motors are slow and heavy. They consume much more energy than modern ventilated motors of about half their weight per horse-power. They require considerably more expense in maintenance and are the cause of more pull-ins, the cost of which in loss of revenue and increase of ill-will is not readily estimable.

The old trucks gallop and nose if it is attempted to operate at speeds in keeping with the times, particularly when the track is uneven. The large wheels make the steps high, and boarding and alighting are correspondingly slow. The body is heavy and it does not give even the appearance of a new car.

Hence, by the remodeling plan, the attraction which the public attaches to new, modern cars is not gained. Nor are the speed and comfort of the service appreciably improved from the public standpoint. And the operating economies possible in new cars from lower energy consumption and less maintenance and the possibility to get more car-miles per car-hour are not realized. In other words, neither the public nor the company gains much by the further investment in obsolete cars. The public is not fooled much by the fresh paint and the platform doors, even though the railway management may be.

If further investment in rolling stock is justified at all, it would seem that this should be put into truly modern cars, not into the process of camouflaging what ought to be burned, not restored.

Inclosed Car Storage Assists in Giving High-Grade Service

THAT the question of how best to store active surface cars is not settled may be seen from the study made by this paper and published in this week's issue. This study was undertaken upon learning that certain companies were giving serious consideration to the construction of carhouses, although they previously had adopted outdoor storage.

Based alone on the comparison of the cost items as far as they can be definitely estimated, open storage frequently appears attractive. The investment is materially less and the insurance rates are lower. That maintenance costs are increased is not denied, but usually it is estimated that the saving in interest and other charges is more than sufficient to offset this.

Possibly some of the designs employed for carhouses have been more elaborate than necessary, and hence more costly. On the other hand, the fire insurance authorities recommend permanent fire walls to divide open storage space into bays containing, say, three tracks each. If this construction is adopted the additional cost of a roof is not very great, nor is the fire hazard materially increased, as sprinklers can be used to give a high degree of protection.

The fundamental problem, however, is not settled so easily. It is necessary to find which method of storage

will result in the ability to earn the greatest net revenue over a period of years. So many indeterminate factors enter into this consideration that it is difficult, if not impossible, to formulate an exact statement, and the answer becomes a matter of opinion.

No one can tell in exact figures the money value of clean windows, for instance, or whether it will be enough to justify the expense of washing them. More serious are the delays that may occur when cars have been improperly inspected and maintained due to the natural slighting of such things when men are forced to work under unfavorable conditions, such as are inevitable with open storage.

The accumulative experience with open storage seems to be tending to swing opinion back more decidedly in favor of closed storage. In fact, if equipment and transportation men were free to select the type of storage, it is probably safe to say that it would require a much greater saving in favor of open storage than can be shown, to overcome their preference for inclosed storage from the maintenance, operating and merchandising standpoints.

Since the function of a street railway is to give service first of all, it is worth careful study to determine just how much should be sacrificed in this direction in reducing the costs that can be tangibly figured.

Systematic Space Allotment and Ample Handling Equipment Will Expedite Shop Work

A LARGE amount of the time and labor consumed in repair shop operations is spent in setting up and handling the material. A study of the various operations will often disclose the fact that substantial savings can be made by a rearrangement of certain machine tools. An efficient shop is arranged so that the operations performed most frequently will require the fewest possible movements and so that the route of the material through the shop will be as short as possible.

Care needs also to be taken to prevent interference between different jobs. Crowded conditions are quite common in electric railway shops, largely because the amount of work handled has increased without additional facilities being provided. These crowded conditions can be remedied somewhat by a systematic allotment of definite spaces for different materials and by arranging so that handling operations are not interfered with. Unnecessary accumulation of scrap uses much valuable space and also gives the appearance of neglect and disorder. Miscellaneous parts scattered over the floor while work is being done on other parts interfere with the work and help to increase the congestion.

Where the same operation is being performed constantly, jigs and special fixtures will save much time. There are very few electric railway shops where frequent operations have been specialized. When the same man is used continuously on one class of work he becomes particularly efficient in its performance, and if he is provided with special tools and fixtures for doing the job his interest is aroused to accomplish larger amounts of work in a given time.

The value of ample handling devices in a shop can hardly be overestimated. Auxiliary jib cranes are not expensive to install and a few additional may save much time due to waiting for crane service. It is also very desirable to reduce trucking operations as much as possible, for these consume many man-hours. Sometimes relatively inexpensive changes in shop layout will enable material and equipment to be handled from one machine to the next by a crane or overhead traveler where otherwise trucking is necessary.

It would be well to study present shop arrangements with the idea of reducing delays and labor. It is one of the best sources of maintenance economy.

Railways Should Use Welding Wire Specifications Drawn by Welding Society

A GREAT deal of the success of electric welding depends upon the material of the metal rods used. Yet, in spite of the advances made in the art as to the requirements for satisfactory welding wire, many users still seem to think that almost any kind of metal will do the job. Satisfactory results are sometimes obtained without giving particular attention to the wire used, but it is generally conceded that most careful consideration must be given to both physical and chemical characteristics in order to secure uniform results.

Among the many desirable characteristics sought in welding metal, two qualities are particularly essential: One of these is that the material should be of such a composition that it will be suitable for the particular work being done. The other is that it should possess the qualities for going into the weld and combining with the parent metal without "bubbling" or "sputtering."

With these facts in mind the welding wire specifications committee of the American Welding Society has spent nearly two years in collecting data and formulating specifications. Chemical analyses of welding wire in general use for both gas and electric welding have been studied carefully. Physical properties have been analyzed and tests specified which include microscopic examination of the metal deposited. Various qualities and service results obtained from the use of the wire have been tabulated and analyzed. As a result of this extended research four specifications for welding wire have been issued by the society.

Electric railways seldom possess experimental staffs adequate for a thorough investigation of such a subject as welding rod specifications, and purchasing agents have little knowledge of the requirements and must necessarily work in the dark unless some such specifications as those of the welding society are followed. Of course each manufacturer has some "talking point" about his welding material, for it must possess some advantage not possessed by competitors in order to sell. The result is a great diversity of welding materials on the market, which merely emphasizes the need to be guided by the recommendations of a competent authority.

The American Welding Society committee gave special consideration to arranging the specifications so that inexperienced users as well as purchasing agents would find them a complete guide to their requirements. Furthermore, the specified materials are now available, for the manufacturers have not been slow in taking advantage of the opportunity to provide welding wire which would meet the specifications of the American Welding Society and thus have this society's approval. Many manufacturers are now advertising wire which will meet these specifications.

An Example of Recent Closed Storage Construction. Callowhill Carhouse, Philadelphia

Inclosed Storage Favored from Standpoint of Service Reliability

Survey of Experience and Opinion Discloses Apparent Swing Back to Protected Storage, Though It Is Difficult to Justify the Investment on Basis of Tangible Savings—This Explains the Use of Open Type in Practically All Recent Construction

FOR several years the tendency with regard to car storage facilities has been to favor the open type, but more recent developments have indicated that a change of opinion may be bringing a reversion toward closed storage as the more practical plan. Accordingly, the ELECTRIC RAILWAY JOURNAL has made a study to determine whether or not this condition really exists. Information was secured on several definite points from a number of representative railways in various parts of the United States. Answers to certain specific questions are given in the accompanying table.

The first question that comes to mind in the comparison of the two methods of storage is the effect on the exterior painting of the cars. The study made indicates that there is a general agreement that the cost of painting is increased due to open storage. One large company in the East states that the cost of painting is increased materially, particularly the maintenance of roofs and all exterior iron work, and that cars should be shopped on shorter periods in order to maintain an appearance equal to that of cars kept in closed storage. Even in the South the general opinion is that car painting cost is increased. On the Pacific coast it is stated that the life of paint is doubled with closed storage. An interesting commentary is that closed storage of trailers which are used only a few hours a day results in notably longer life of the paint.

MAINTENANCE OF AIR EQUIPMENT

Regarding the maintenance of air brakes and air apparatus, there is not quite the same unanimity of opinion. Some of the large systems throughout the country state that the cost of this item is increased materially in open storage, while others in similar territory do not find any increase in such expense. Proper drainage of the air system as soon as the car is turned in from service will prevent much of the trouble due to freezing of the piping and other parts of the air system. One company states that the installation of cooling coils which remove moisture from the air system has reduced freeze-ups to a minimum. Another does not think that there will be any noticeable increase in the cost of this item until the temperature has reached 10 to 15 deg. below zero (F). At that stage, and colder, an increased amount of friction is bound to result by the time enough heat is given off to start lubrication, even with a special low cold test oil. While this is probably a small feature in the maintenance of the individual car it becomes an important item to consider in the aggregate.

There is very general agreement that other items of maintenance are increased in cost by open storage. One company states that this applies particularly to doors, steps and step control and windows. The continued action of the weather on the windows causes warping and swelling, resulting in an excessive amount of broken glass due to sash and doors sticking. Windows and ventilators are likely to be left open during storms, and the weather beating on the interior of the car is bound to cause considerable damage. Maintenance of electrical equipment, life guards and roof canvas is also said to be greater.

In the South there is much more rapid deterioration of the car bodies due to the woodwork developing rotten spots, steel sheathing becoming pitted with rust, and canvas roofs cracking and leaking badly. In the North, cars are occasionally taken out with brakeshoes frozen to the wheels, which causes flats and increases wheel

maintenance. Certain motor failures may be caused by snow blowing in the ventilating covers when the cars are stored outdoors, as there is insufficient heat remaining in the motors to vaporize the water as the snow melts. Chilled and frosted metals such as axles, wheel flanges and journal boxes are subject to breakage. If due allowance is made to provide over-sizes for extreme cold climates, then there is a higher cost for hauling the excess weight. One company reports that there is a great deal of trouble with electric couplers on account of moisture getting in the plugs and freezing. This may be caused by drippings from the car roof, due to melting of snow by the heat in the cars, or from condensation, etc. This frequently is the cause of cars being late for service and the cause of delays after they are in service. High snow and ice in the yards causes much trouble from interference with doors and step mechanisms.

Open Storage Has Some Added Problems of Maintenance

There does not seem to be any general agreement on the question whether it is harder to secure proper maintenance with open storage. One company states that many small jobs which are taken care of by inspectors under covered storage are either patched up or neglected entirely during bad weather, thus causing pull-ins. Another reply is that open storage increases the difficulty of keeping clean cars on the road. Comment on this is: "I have on a number of occasions observed in some of our large storage terminals a complete yardfull of clean cars emerge from a dust and rain storm with the appearance of never having been cleaned, and the work of the car cleaners entirely lost for that day." Another company, on the Atlantic seaboard, states that during very cold weather and when it is snowing or raining, it is naturally more difficult to work on cars in the open than when they are under cover. It is believed that this must to a certain extent increase the maintenance costs, as well as make it difficult to obtain proper inspection and maintenance.

A company in the Middle West states that open storage means extra labor to secure proper maintenance. Cars housed under cover in the winter get a chance to free themselves of mud and snow picked up on the runs, and are in better condition to work on and under after they have stood in the carhouse a while. But by laying out a regular inspection schedule so that the cars due for inspection will be placed under cover that night, the storing of cars outdoors or indoors is not of such great consequence in taking proper care of maintenance.

A superintendent of equipment who has had wide experience in different climates says that even based on adequate room and well-equipped, warm inclosures for inspection work, the cars taken in from open storage probably cannot stand a sufficient time to dry out, or thaw out, and inspection will not be as satisfactory as if cars were stored in warm inclosures during their entire period of rest. Another company reports that precipitation, whether of rain, snow, or even of dew, dripping from a car roof is likely to get on the windows and sides of a car, and the money and effort previously expended in cleaning the outside of the car are entirely thrown away, because the results are destroyed before the public can see it. The same company states that since the introduction of the practice of storing cars in the open the number of men employed on car cleaning work has been very materially increased, yet the standard of cleanliness of the outsides of the cars is far below what it was when all covered storage was used.

Maintenance Standard May Fall in Severe Weather

The indications are that the maintenance standard is likely to fall during stormy weather when open storage is used. In this connection the following statement is typical: "Men do not like to work in open yards during stormy weather, and at such times a large number of men report that they are unable to work on account of sickness." Another company states that while abnormal weather conditions are usually accompanied by excessive equipment failures in any case, it is undoubtedly true that the effect of such conditions is worse on cars in open storage than on cars housed under cover, even though in an unheated building. Another comment was this: "During abnormal weather we have more equipment failures, also accidents, both resulting from less thorough inspection and repairs." The human element is also indicated in this answer: "In this day and age, unless men are working under the most favorable conditions, which in bad weather means that cars must stand for several hours before they can dry out or thaw out, it is inevitable that some of the work will be slighted, and car failures usually are the result of the lack of good inspection."

While with open storage there is some additional cost for car heating if the cars are to be sent out on the road in comfortable condition, this is offset largely by additional heat required in the carhouses for a longer period. The extra cost of car heating depends to some extent on the type of heater used. With hot water or hot air, the time required to get a car warmed up is considerably longer than with electric heat. But with any type of heater, cars frequently are put in service while still cold. One observation is that this does not affect the earning power of the car, although it is safe to say that it will not tend to engender kindly feelings on the part of passengers toward the company.

Open Storage May Lower Fire Risk

The fire hazard is an item of considerable moment in the comparison of the two kinds of storage. Several serious fires in the past year have occurred in carhouses. Open storage permits the use of water towers, giving fire control over a large area. On the other hand, a building construction for inclosed storage can be provided which is entirely fireproof. In that case the installation of automatic fire sprinklers reduces the hazard materially. In fact, some companies believe that the installation of sprinklers in a fireproof carhouse makes the protection greater than for open storage with fire towers but without sprinklers. The insurance rates, however, indicate that the insurance authorities believe the hazard is substantially less with open storage.

There does not appear to be a general agreement on the financial results to be obtained by the substitution of open for inclosed storage of cars. An increase in the total cost of maintenance is admitted in practically all cases, but the saving due to open storage may or may not equal this, so that it is doubtful whether one or the other is cheaper, when considered as a general proposition. The answer seems to depend on the individual road, and the methods employed for inspection and repair work.

One reply states: "For cars that are in regular

REPLIES OF NINETEEN COMPANIES TO SPECIFIC QUESTIONS

Company	Is the Cost of Painting Increased by Open Storage?	Is the Cost of Maintaining Air Equipment Increased?	Are Other Maintenance Costs Increased?	Is It Harder to Secure Proper Maintenance with Open Storage?	If So, Are Abnormal Weather Conditions Accompanied by Excessive Equipment Failures?	Is the Cost of Car Heating Increased?	Does the Saving in Interest Charges More than Offset Any Added Costs of Open Storage?
New England							
1	Not materially	No	Slightly	Very little	No	Short period	Largely
2	Yes	Yes	Yes	Yes	Yes	Yes	No
Eastern							
3	Considerably	No	Greatly	Yes	Yes	Not materially	Probably not
4	Yes	Yes	Yes	Yes	....	Yes	Questionable
5	....	....	Yes	....	....	Yes	Yes
6	Yes	Depends on location	Yes	Yes	Yes	Yes	Depends on construction
7	Yes	Yes	Yes	Yes	Yes	Yes	No
Southeastern							
8	Greatly	Some	Yes	Yes	Yes	Slightly	No
9	Yes	Not if drained	Bodies	No	Yes	Not materially	Questionable
10	Greatly	....	Much	....	....	....	Depends on climate
11	Yes	Yes	Yes	Yes	Yes	Yes	Cannot say
Middle Western							
12	Yes	No	Yes	No	No	Yes	Yes
13	Yes	No	Yes	No	No	Not locally	....
14	Yes	Cannot say	Not much	Yes	No	No	Yes
15	Yes	Yes	Yes	Yes	Yes	Yes	Yes
16	Yes	Yes	Yes	Yes	Yes	Yes	Yes
17	Yes	Yes, at 10 deg, F	Yes	Yes	Yes	Yes	Questionable
Pacific Coast							
18	Yes	Yes	Yes	No	No	No	Yes
19	Double	....	....	Yes	Yes	....	....

service eighteen hours a day or in tripper service for several hours each day, closed storage, in my opinion, is not warranted. For every car so stored there is an expenditure of from $2,000 to $4,000 required, and the savings effected will not warrant such an expenditure. Most of the failures where open storage is used are due to the methods of handling the situation rather than to the open storage."

Closed Storage Preferred by Operating Men

A company in the Middle West states: "We have several outside storage yards. To equip these yards with facilities for inside storage would cost a large sum of money. This question has been gone into, and we are thoroughly satisfied that for a town located as we are as to climatic conditions, inside storage would not be justified. While there is additional expense with open storage the saving on these items would not justify the interest charges for the necessary buildings for inside storage."

Another reply gives the matter a different aspect. "The correct answer to this question is a matter of careful study. I believe that when the cost of the delays and unsatisfactory service rendered by open-storage cars is added to the cost of other increased maintenance, it will be found that the sum is in excess of the interest charges on suitable covered storage." One significant statement from a company operating in New York State is: "We are at present considering covering all our open storage yards."

A company on the Atlantic seaboard writes: "This is a difficult question to answer from our limited experience with open storage, but we believe the increased cost of maintenance in open storage will be greater than the interest charges of capital investments for carhouse buildings."

Another company in the Atlantic region states: "It probably would be more economical to use open storage, but very much harder to keep the cars looking in good condition; and in my opinion this is one of the most important points in city operation. There is no question but that the well-painted, clean, quietly-operating car tends to attract passengers, particularly those who desire to ride a short distance; and the additional cost of keeping this equipment, particularly the paint, in good condition should be considered very strongly and weighed against the saving that might be made due to the use of open storage." This is from a company notable for its success in building up a short-haul business.

The same thought is given in a different way in the following: "Our calculations have always indicated that the saving in interest charges more than offsets any added costs of open storage, although my personal opinion is that we cannot get a true measure of all the factors. In the capacity of superintendent of equipment I would like to see all cars housed every night just the same as we house all of our automobile equipment; but we must concur in what is shown by figures to be the most economical thing to do. With storing cars out in the open yard, we of course have difficulty on winter mornings in getting cars out on time. Unless the tracks are salted carefully the cars will freeze in, or the brakeshoes will freeze to the wheels. The roofs are covered with snow and the cars do not look as well as though they had been in the house all night; but after they have been on the street for a few hours on a stormy day it is hard to tell which was inside or outside the night before."

A superintendent of equipment who has had wide experience in various sections of the country sums the matter up as follows: "I feel that in all Southern climates, up as far as Washington and perhaps Ohio, open storage is the most economical in the end, and logical, but in all cases the inclosed place for inspection work should be ample and well equipped so that the work can be carried on with comfort. All carhouses should be double end, that is, arranged so that the cars will come in one end of the carhouse and out the other. This is also particularly important with open storage. In the extreme eastern and northwestern sections of the country I have always felt that while open storage may prove economical, there is such a demand nowadays for high-class, uninterrupted service that the railways should provide themselves with 100 per cent inclosed storage. In a number of cases in the past I believe more money has been put into the buildings than was absolutely necessary for a street car house."

Some Comparative Costs

It is difficult to obtain concrete figures for comparison of the costs of maintenance in the two cases. According to one company that has used both kinds of storage for several years, the average cost per 100 ton-

miles for shifting, car cleaning and similar items was 4.7 cents for a covered storage house, while similar costs for an open storage yard handling approximately the same total ton-miles was 6.9 cents per 100 ton-miles. These figures cover a period of two years. Thus these costs are increased 47 per cent with open storage. The cost of repairmen for the same locations are 6.5 cents per 100 ton-miles for the inclosed storage and 8.6 cents per 100 ton-miles for the open storage, or 32 per cent more.

It is stated that the effect of open storage on operation is a serious matter, the cost of which is difficult to determine. It affects the proper maintenance of schedules and the delays attributable to storage conditions come at the very times that the failures due to severe operating conditions are most numerous, thus pyramiding the trouble. For instance, in a sleet storm there is no way to keep the wires in the storage yards clear of sleet, and in order to move the cars it is necessary for men to get on the tops of the cars and pound the wires with clubs.

One company figures that a fireproof cover for a 50-ft. car will cost, at present prices, about $700. Taking interest, taxes, depreciation and maintenance at 15 per cent gives an annual carrying charge of $105 per car. Against this must be set the saving in car cleaning expense and car maintenance expense, amounting to $150 per car per annum. It is also estimated that there is an additional value for the car stored under cover on account of better operation amounting to $50 per annum. Thus in this particular case the annual net value per car due to the inclosed storage is $95, over and above the charges on the structure.

This may be an extreme case, as the location is where the winters are comparatively severe, although there is little weather with temperatures much below zero.

In general, it would appear that while open storage is cheaper and may give lower rates for insurance, the increased cost of maintenance will largely offset this, and there is a distinct advantage in having the cars stored under cover so that work can be done on them under the most favorable conditions. Whether the monetary value of having cars in better condition for early morning service in the winter months is sufficient to throw the scale one way or the other depends largely on the climate, as indicated in one of the answers.

Remodeling Obsolete Cars for One-Man Operation

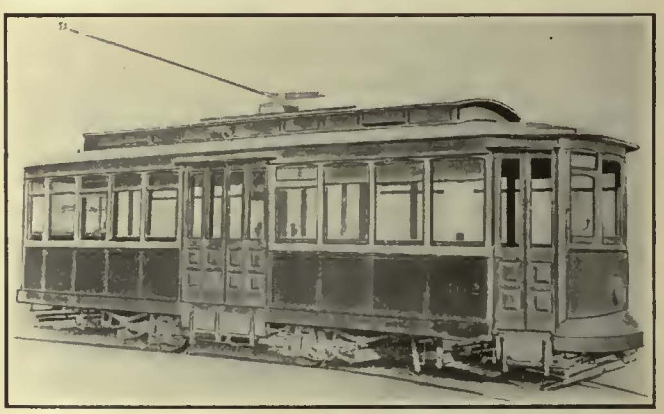
The Lehigh Valley Transit Company Has Converted Several Types of Obsolete Single-Truck Cars for One-Man Operation—Several New Features Have Been Worked Out in Connection with the Control and Fare Collection Systems

THE rehabilitation program of the Lehigh Valley Transit Company, Allentown, Pa., includes the reconstruction and remodeling of a considerable number of the company's old-type cars which are now considered obsolete. The single-truck cars are being converted for one-man operation. Up to April 1, 1923, fifteen cars had been completed and additional cars will be changed over as rapidly as conditions will permit. The cars which have been changed over were originally of three types. Some of these were open cars, some were center entrance and others the usual form of single-truck closed car. The accompanying illustrations show the varying types of construction which were necessary in remodeling the different types. In general, the design and equipment after they are converted for one-man operation are similar, and a description of the conversion of the 400 type will serve as a good example of the work accomplished.

The 400 type cars were originally arranged for center entrance and were purchased in 1908, and served their purpose until they were placed in the storage yard as obsolete. In order to return these cars to service a complete overhauling would have been necessary, and the officials felt that in attempting this they could be changed to one-man operation at a figure of approximately one-fourth the price of the present standard safety car and that under these conditions the expenditure was warranted.

Changes in Car Body Construction Found Necessary

The center-entrance doors and steps were removed and the side panel made continuous. Two windows were added in the place originally occupied by the door.



Single-Truck Center-Entrance Car Before Remodeling

The original bulkhead sliding doors were removed and an open header construction was substituted. By this construction the original strength of the car was retained and at the same time the objectionable sliding doors were eliminated. Two additional side sills were placed under the car body to give greater strength and rigidity, as the original design was weak in this respect and the cars were found to be sagging at both ends. The original folding doors on the front right and rear left sides of the platform were rearranged so as to permit operation by pneumatic door engines. A beveled dash was installed on the exterior over the bumper. This adds considerably to the appearance of the car and also serves to prevent small boys from stealing rides on the rear end of cars.

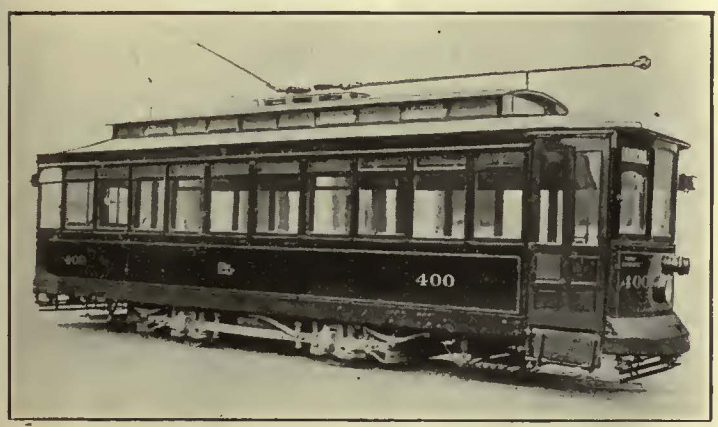
The seats originally were fitted with a carpet covering. This was removed from the backs and cushions, and after remodeling and considerable scrubbing these were

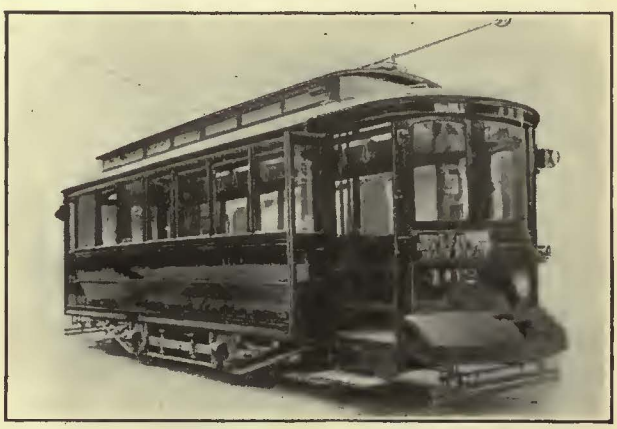
finished in cherry and varnished to give a sanitary construction. Originally the headlining was finished in robin's egg blue. Continued service had turned this to a green. This was refinished in a buff color, which is standard with the company. The leather hand straps were replaced with a sanitary celluloid type furnished by the Railway Improvement Company.

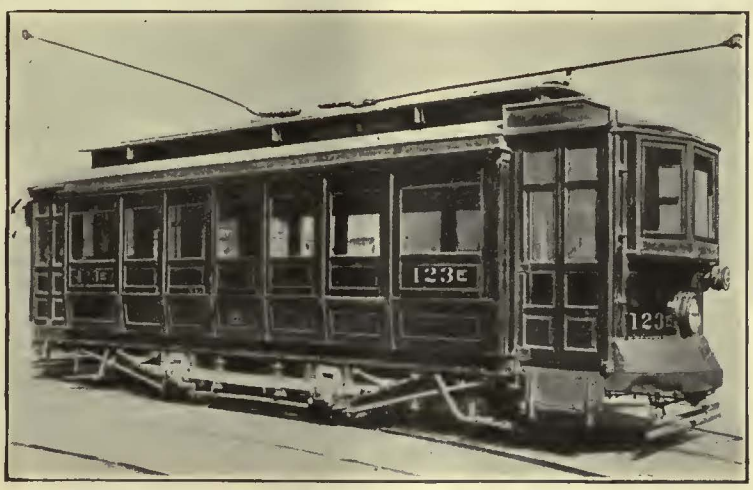
Six stanchions were installed in each platform. Two of these are arranged one each side of the door for the convenience of passengers entering and leaving the car. These also serve as supports for the National Pneumatic door engines, which are installed in a closed compartment over the door entrance. The stanchions also contain the air pipes leading to the door engines and the control rod for operating the door. Two stanchions are placed back of the motorman and serve to support the motorman's seat. One is installed at the motorman's right for supporting the fare box and one is placed at the right of the bulkhead opening to serve as a grip for the passengers who are standing.

The position of the door engines is convenient for inspection and is also so located that there is little danger from freezing during the winter months. The folding step is connected with the main door shaft and operates in synchronism with the door. Two of the panels in each door were fitted with plate glass so as to give the operator a view of the step and also give a view of small children outside the car when the doors are closed. The doors are controlled through a small shaft which extends vertically in front and to the right of the operator. This shaft is provided with a small handle at the top for hand operation and a small lever at the bottom for foot operation. A slight movement of this shaft controls the opening and closing of the door, and no particular care is required in this movement. The engines are equipped with pneumatic cushions to prevent slamming of the doors in either direction.

The original monitor decks of the cars which were fitted with Cathedral glass ventilators have been retained in their original condition, as it was felt that this type of construction was quite satisfactory. The vestibule is arranged with three front observation windows. The left-hand side, which originally contained folding doors, was paneled solid and a comfortable operator's folding seat was installed. Platform equipment was relocated so as to provide for the installation of the air-brake valve, register operating button, fare box, air sanders, hand brake, etc. The piping at the front end is surrounded with a wooden housing. The top of this serves as a sort of desk for the operator, and he uses this for his transfers and other necessary equipment. The original type Brill 21-E trucks have been retained.







Three Types of Cars After Remodeling for One-Man Operation
The car at the left was originally a two-man closed car. The car at the right originally was of center-entrance type, and the one at the bottom an open car.

New Equipment Installed

The original electrical operating equipment was maintained on the car and in addition a General Electric Company's line switch was installed. This removes the making and breaking of the control circuit from the platform controller and prevents carbonizing and short-circuiting troubles. Its use also provides a convenient method for interlocking the operation of the doors and steps with the control equipment.

A complete straight air-brake equipment was installed consisting of a General Electric Company's CP-27 compressor, a G.E. type S form L1 brake valve, type ML form A1 governor and 8-in. x 10-in. brake cylinders. The original brake rigging was retained and the air brakes were connected into this system. The hand-brake equipment consists of a Horne double-acting hand brake which is located at the left-hand side of the operator's seat, in a convenient location so that it can be readily reached at all times.

Since these cars are arranged for double-end operation, special provision is made for cutting off the air supply and locking the various parts of the equipment on the non-operating end. This is accomplished through a locking shaft which is operated by a handle. When

the operator goes to the other end of the car he takes this handle with him. A 90-deg. turn of the locking shaft closes two air cocks. One of these is for the supply of air for that end of the car and the other for the brake pipe which holds the air in the brake cylinder until released. In addition to these two air cut-outs two mechanical locks are located on the locking shaft underneath the vestibule platform. One of these locks the folding step and pneumatic door and the other locks the main rod of the rear wheel guards. This prevents the rear wheel guard from dropping and dragging along the pavement.

Platform Apparatus Is Locked on Rear End

By means of this locking shaft all apparatus is locked and released at one time and thus it is impossible for the operator to forget some individual parts. Over the top of the motorman's brake valve are two levers which form a part of the Ohio Brass Company's sander equipment. One of these operates the air sander and the other controls a pneumatic gong. These levers are also locked through the movement of the locking shaft.

The fare-box stanchion is located in the center of the platform convenient for both passengers and operator and supports a Johnson fare box which records dimes, nickels and pennies. The totalizer, reading in dollars and cents, affords a double check in conjunction with the register. The stanchion for supporting the fare box is constructed of 1-in. pipe at the top and bottom. The section immediately behind the fare box is made of 1½-in. pipe and contains a 110-volt lamp of the tube type.

This lamp is approximately 6 in. long and is 1 in. in diameter. Five ⅜-in. holes are drilled in the stanchion to permit light from this lamp to shine into the examination compartment of the fare box. This affords light for the operator to view the coins deposited at night without having the glare of the light on the front windows of the car. The fare box lamp is connected in the same circuit with the headlight and changes from end to end when the headlight switch is thrown. Located on this same stanchion above the fare box is an extended mirror. This can be placed in either a vertical or a horizontal position as desired by the operator so that he can view the main portion of the car body to see that passengers are seated before starting the car and also to see passengers as they approach for exit.

Electro-Pneumatic Fare Register Used

A register of the International R-5 type records cash and transfers and has been rearranged to operate by electro-magnets. The current for these magnets is controlled by a pneumatic switch located in the vestibule convenient to the operator. By using the combined air and electric device a positive contact is insured for the electric circuit, and the locking feature, as already described, is more conveniently taken care of. The turning of the locking shaft, as previously referred to, prevents the register from operating when that end of the car is locked. In regular operation the operator presses buttons marked "Cash" and "Transfers," but when in the locked position these buttons can be pressed, but there will be no response by the register.

Another feature of the equipment is the use of an Electric Service Supply Company's pneumatically operated gong. The operation of this gong is controlled by one of the fingers of the Electric Service Supply Company's double-valve, gong and sanding attachment located over the brake valve. This method of operation is of great convenience to the operator and relieves him from the continual pounding of the pedal.

The lighting of the car has been rearranged and the original cluster design of fixture has been replaced by Electric Service Supply Company's fixtures with shades extending in one line down the center of the car. These cars are provided with electric signals and tail lights. These are of a design made by the Lehigh Valley Transit Company and are arranged to give a red, green, white or dark signal on either end, or on both at the same time, as desired. A description of this lighting fixture, together with the diagram of the connections, will be published in a subsequent article. Under normal

Arrangement of Platform on One of the Remodeled Cars

conditions these lights are operated from the main lighting circuit of the car, but in order to provide for keeping them lighted in case the trolley pole should leave the wire, a storage battery is also used. This is of the Ohio Brass Company's type and a line relay regulates the turning on and off of the storage-battery circuit whenever power from the trolley wire is interrupted.

A passenger signal system has also been installed as a part of the equipment, with push buttons between each pair of windows and additional buttons at the bulkhead for convenience of passengers as they leave the car. Electric Service Supply Company's high-voltage buzzers are used, the current being supplied direct from the trolley circuit. The cars are equipped with electric heaters, which are controlled by thermostats and have automatic regulators. The thermostats are set so as to keep the temperature of the car between 65 and 70 deg.

The original equipment of HB wheelguards were retained on these cars with the exception of the location of the operator's tripping and resetting pins. The cars are equipped with two trolley poles in place of one used originally, and Ohio Brass Company's trolley retrievers are used. The use of two poles for the car relieves the operator of the inconvenience of turning a pole around when changing operating ends.

In order to accelerate passenger movement and to relieve the operator of additional trouble in fare collection, a large sign is located on the right front end of the car reading "Front Entrance—Have Exact Fare Ready."

Carrying Safety to the Public—VI*

Newspaper Publicity Has Proved a Most Effective Method of Making the Public Realize the Personal Feature of the Safety Campaign—Signed Articles by Prominent Persons, News Items and Cartoons Used Advantageously

By C. W. Price
Vice-President in Charge of Public Safety
Elliott Service Company, New York City

IN ANY organized community effort to promote safety the newspapers constitute one of the three most direct and effective mediums through which to carry the safety message into the homes every day in the year.

Because of the alarming increase of accidents and the aroused public interest, the newspapers in most communities, if properly approached, are willing and glad to sponsor the campaign to promote public safety, just as they sponsor similar campaigns to combat other evils that menace the life of the community.

In order to secure the intelligent and whole-hearted co-operation of the newspapers it first is necessary thoroughly to acquaint their editors with the plan and purpose of the campaign, and to outline with them a definite program of publicity.

Much of the material must be prepared for the press. It goes without saying that items regarding the campaign which have direct news value are the ones most sought after by the papers, and will be given a prominent place each day.

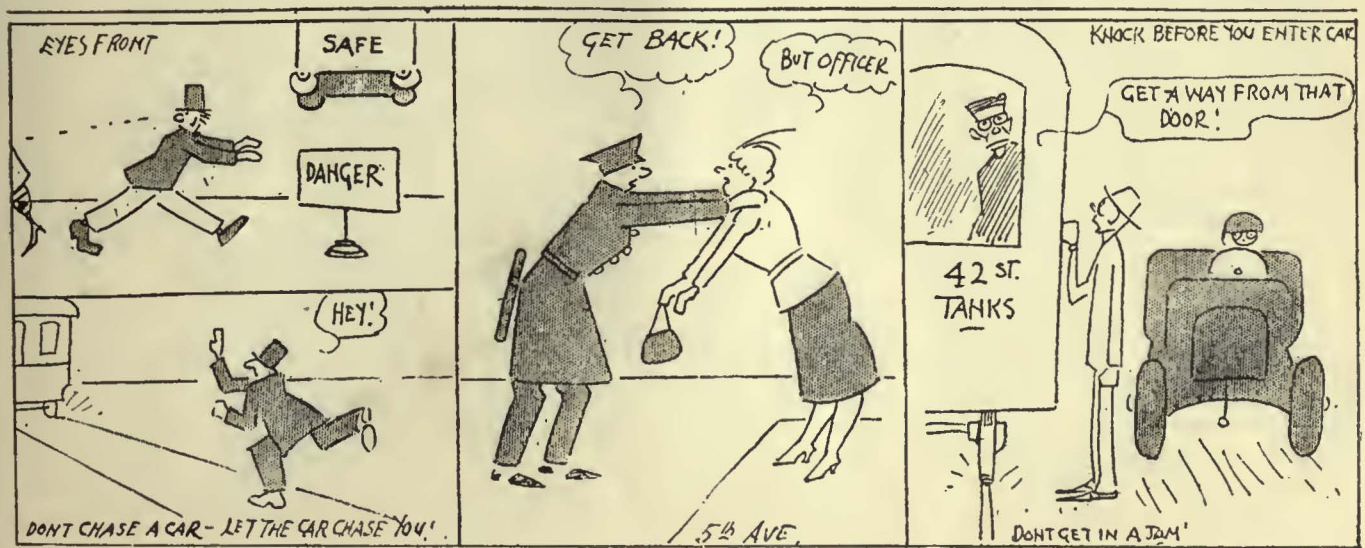
Often a newspaper will assign one reporter to handle all news items on safety. This reporter soon becomes familiar with the various phases of the work and the point of view of those who are promoting the campaign. Thus he can add much to the effectiveness of the publicity.

In the initial stages of developing an organization, it has been found advisable to release to the press a complete story on each feature of the program when it has developed to the point where it can be announced. For instance, when the school authorities have agreed to introduce safety instruction into the schools, a col-

*One of a series of ten articles.

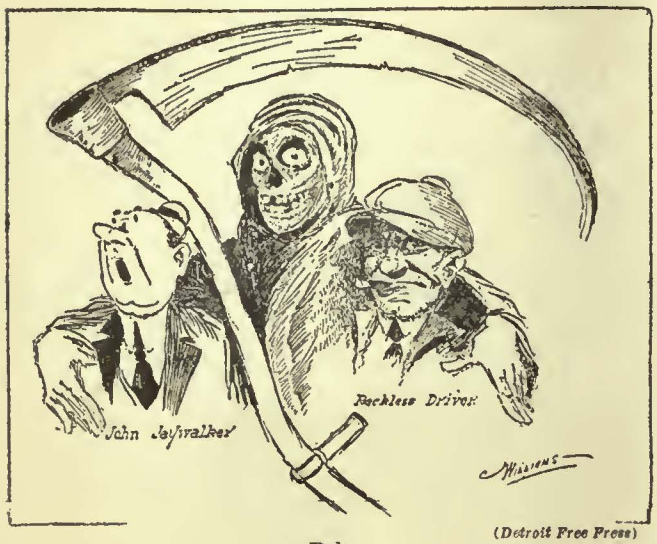
(*Cassel in New York Evening World*)

Safety Week!



Safety First—This Is Watch-Your-Step Week

(*Powers in New York Evening Journal*)



Pals

umn article should be released announcing this fact. The method of instruction can be outlined in detail, and the far-reaching effect of this instruction in carrying the safety message into the home can be emphasized.

Thus there gradually will be built up in the minds of the more intelligent citizens a comprehensive idea of the scope of the campaign and confidence in its success.

After the campaign is under way, it is advisable to arrange for a series of articles, each of which should present an adequate picture of some important feature of the campaign. These articles should be signed by prominent citizens whose positions render their views authoritative. For instance, in Washington the articles were prepared by the District commissioners, the commissioner of police, the superintendent of schools, the chairman of the women's committee of the Washington safety council, the chairman of the committee representing the federal departments, and others. Each of these writers discussed the safety campaign from a different viewpoint, and urged co-operation.

"Two-Minute Safety Talks to Mothers," signed by the chief of police, and printed in a box each day on the front page of leading newspapers, have proved most popular and effective. Each talk should cover some one hazard to children in the home or on the street. Pictures of children doing hazardous things on the street are good for the illustrated page or Sunday supplement.

If the newspaper cartoonists become interested in the campaign they can exert a powerful influence in ridiculing the people regarding their careless and reckless habits. Under some catchy title such as "Spark Plugs," pointed hints for drivers can be seen, such as these:

Fools used to blow out the gas, now they step on it.

Drive carefully, you may meet a fool.

Drive as if your boss were sitting in the back seat.

Fools rush in where wise men use the brake.

Each month an analysis by causes of the accident experience of the previous month should be published, with editorial comment covering some of the more flagrant cases of violation of safety rules.

At frequent intervals the newspapers should carry articles instructive in character, covering such topics as safety in the home, rules of the road, safety of children and industrial safety. The editors can do much to establish the campaign in the confidence of the people if occasionally, say once a month, they will give recognition in the editorial columns to its importance.

Stories of accidents which occur from day to day, if properly handled, can be made to play an important part in arousing the people to a realization of the seriousness of the situation and the necessity of taking action.

Two-Minute Safety Talk to Mothers

Did you ever think of this?

What is the use of teaching your baby to walk and to talk and then teaching him to read and write and figure, and then training him to be clean, and moral, and industrious; I say what's the use if after all this effort you have not taught him the perfectly simple lesson of keeping from being killed.

The first duty of a mother is to train her child to protect his life and limb.

FORREST BRADEN,
Chief of Police.

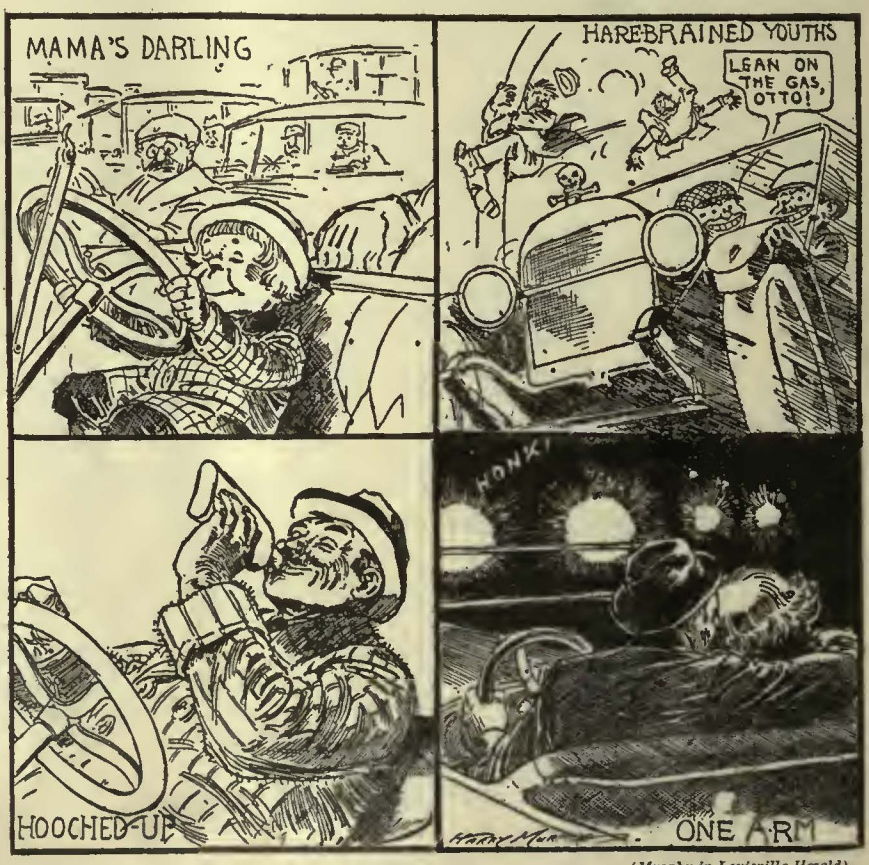
Two-Minute Safety Talk to Mothers

A mother who allows her children to play in a street where there are street cars and automobiles is exposing them to great danger. She might almost as well let them play with fire arms.

Why is it so dangerous for children to play in the streets? Because a child at play is utterly unconscious of everything except the game he is playing and will not look out for danger.

If you allow your children to play in the streets you are morally responsible if they are killed or injured.

CHARLES D. GAITHER,
Commissioner of Police.



(Murphy in Louisville Herald)

Drivers We Can Spare

Revarnishing Preserves Body Paint for Six Years

How Careful Application of Initial Coat and Proper Maintenance on Laurel Line Eliminate Need of Frequent Painting in Spite of Unfavorable Conditions

THE frequency with which it is necessary to repaint cars and keep them looking well is a matter that has received much attention in these days of high costs. In this connection, the achievement of the Lackawanna & Wyoming Valley Railroad (Laurel Line), where the period between two successive paintings of the same car has been prolonged to approximately six years, is of particular interest. And this has been done under circumstances which are in many ways unfavorable.

This line operates between Wilkes-Barre, Pa., and Scranton, Pa., through the anthracite mining country along the Susquehanna River, with a branch line running to Dunmore. Private right-of-way exists for the entire length of the line and power is furnished from a third rail except for a short distance in the city of Wilkes-Barre, where an overhead trolley is used. The third rail is uncovered and on that account the friction of the collecting shoe against the steel rail causes steel oxide dust to be deposited on the lower part of the car body, giving it a very drab appearance. This discoloration is similar to that described in the ELECTRIC RAILWAY JOURNAL for March 31, 1923, in connection with the New York, Westchester & Boston Railway, resulting there from the use of steel trolley wire.

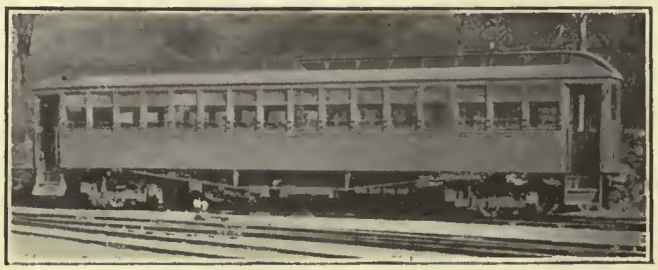
Another feature of the situation which makes it difficult to preserve the attractive appearance of the cars is the presence of mine gas in the air. The continual use of explosives in the mines creates large quantities of sulphurous and nitrous fumes, which have an extremely corrosive effect and soon destroy the luster of the car exterior.

But in spite of these unfavorable conditions, the Laurel Line has fresh, clean-looking cars, Pennsylvania Railroad maroon in color. The equipment is repainted only once in six years. Each car, however, has a very thorough varnishing once every two years. This work is carried on in the company shops at Scranton under the supervision of C. D. Shellabarger, master mechanic. Because it is desired to have all available rolling stock in service on the road during the summer months, painting is done between Nov. 1 and May 30 only. From June to November, therefore, the painters are occupied with outside work along the line, painting stations, bridges, etc.

The program followed in the regular revarnishing which each car receives every second year is as follows: The car is thorougly washed with soap and caustic soda. Then the surface is sandpapered, holes puttied up, and glazing done with Valentine's knifing surfacer where it is needed. All glazed areas are next sandpapered, puttied, and retouched with flat color. A coat of color varnish, HL gloss, is applied. The stripes and letters are then touched up, and finally a coat of Valentine's heavy body finishing varnish is applied.

Once every six years, however, a car is entirely repainted. All the old paint on the outside is burned off down to the wood, which is then closely sandpapered. Next a coat of Du Pont No. 1 surfacer is applied. Holes are puttied up and glazing is done where necessary. The surface is again closely sandpapered, after which comes a coat of Du Pont No. 2 surfacer. A repetition of this operation follows, the surface being reputtied, resandpapered, and another coat of the surfacer applied. It is then sandpapered once more, and dusted off, and painted with Du Pont No. 3 body color. The striping and lettering are done next, and afterward one coat of Valspar outside rubbing varnish is applied. The process ends with a coat of Valspar outside heavy body finish.

The interior of the car is stripped bare of everything which can be removed. Only the fare register rod and its brackets are allowed to remain. All surfaces are thoroughly sandpapered, dusted off and touched up with shellac. A coat of Valspar interior car varnish



Paint Still in Good Condition After Six Years

is then applied and the floor is given a coat of Valspar floor paint.

Doors and sash are removed before the painting job begins. Both sides of the sash are sandpapered and touched up with Du Pont No. 1 surfacer. They are then given a coat of Valspar interior finishing varnish and a coat of Kay & Ess sash color. After this comes a coat of rubbing varnish, and lastly the heavy body finishing varnish. For the doors the same process is followed with some slight additional putty and glazing work, if that is needed.

The vestibule is thorougly sandpapered, and touched up with Du Pont No. 2 surfacer. Next is applied a coat of Valspar color varnish, and finally a coat of one-half rubbing and one-half heavy body finishing varnish. After the roof has been scraped it receives an application of Sherwin-Williams deck paint. The trucks are cleaned and then painted with Valspar iron preserver.

The frequency of revarnishing and repainting depends entirely upon the appearance of the individual car. No attempt is made to place it on either a time or mileage basis. Under average conditions, however, each car is varnished about once in two years and painted once in six years. Considerable economy is effected by lengthening the painting period in this way. for the revarnishing costs only about one-third as much as a repainting job. Moreover, a car can be revarnished in five and one-half days, whereas it takes nine or ten for repainting. This is an important item on a road of moderate size which desires to keep ready for service as many cars as possible.

The Havana Electric Railway formerly indicated the different routes on its cars by colors and the destination signs were painted with these colors and the same color combination was carried in the head end of the monitor deck. The increase in the number of routes, however, made the changes necessary, as all the practicable color combinations have been exhausted. Now the divisions are indicated by a letter, and a figure shows the destination. This numbering permits the separation of the system into as many divisions as are convenient, up to twenty-six, and allows the use of nine lines per division. These route signs are illuminated at night.

It Pays to Treat Wood Poles and Ties

Experience of Chicago, Lake Shore & South Bend Railway During Fifteen Years Shows Treatment Insures Life of Thirty Years Under Local Conditions

BY HOWARD H. GEORGE*
Engineer Maintenance of Way Public Service Railway, Newark, N. J.

IN VIEW of the recent activities of the American Electric Railway Engineering Association in the field of wood preservation and of the efforts of the special committee on wood preservation this year to recommend definite specifications for treatment of wood poles, it will probably be of interest to a great many to know of the experience of one electric railway with pressure-treated poles. The data and views accompanying this description were collected by W. A. Underwood, electrical engineer of the Chicago, Lake Shore & South Bend Railway, and were furnished the writer through the courtesy of P. R. Hicks, secretary-manager of the service bureau of the American Wood Preservers' Association. They relate to treated pole installations on the line of the Chicago, Lake Shore & South Bend Railway.

The poles were of Southern yellow pine, about 40 per cent loblolly; they were 45 ft. long, and measured at least 29¼ in. in circumference at the top and at least 39½ in. 6 ft. from the butt. The treatment was by the full-cell pressure process, with 12 lb. absorption per cubic foot. They were treated at Pascagoula, Miss., and Slidell, La.

A total of 2,500 poles were set with an average spacing of thirty-two poles per mile. They were installed between Kensington (Chicago), Ill., and South Bend, Ind., a distance of about 75 miles. The line runs through a slightly rolling country. In the section between New Carlisle and South Bend the soil is sandy clay and black loam. Between Kensington and Hammond the soil is black mud, and between Hammond and New Carlisle it is sand.

POLES IN GOOD CONDITION AFTER FIFTEEN YEARS

The poles were set in 1907 and carry an average equipment of two 10-ft. crossarms supporting single-phase and three-phase 33,000-volt circuits, telephone and signal lines, as well as mastarm trolley, etc. The poles were all set in concrete because of ground conditions.

The last official inspection was in November, 1922. At that time sixty poles had been removed, mostly due to the presence of woodpecker holes and consequent decay. A few had been burned by transmission lines, arresters being defective. At that time, the inspection report stated that there were a few more poles that should be renewed, but that the line generally was in fine condition and should easily give fifteen years more service.

Of the poles, 1,290 (about 40 per cent loblolly) were treated at Slidell, La., in the following manner: The poles were first steamed six hours at 30 lb., 274 deg. F. They were next subjected to a vacuum for four hours at 26 in. Oil pressure was then applied for one-half to one hour at 60 to 90 lb. English coal-tar creosote was used, and showed the following analysis:

DISTILLATION	
Temperature, Deg. C.	Per Cent
0 to 170	1.00
170 to 205	5.00
205 to 210	4.50
210 to 235	38.50
235 to 300	26.00
Above 300, residue	24.50
Loss	.50
	100.00
Specific gravity at 38 deg. C.	1.04
Tar acids, per cent	8

The oil used for treating 1,500 poles at Pascagoula, Miss., showed the following analysis:

DISTILLATION	
Temperature, Deg. C.	Per Cent
0 to 210	1.50
210 to 235	42.50
235 to 270	24.50
270 to 318	11.50
Above 318, residue	20.00
	100.00
Specific gravity at 35 deg. C.	1.047

These poles were treated without any preliminary seasoning, that is, some of them had been cut two weeks and some two months. The majority were cut from longleaf yellow pine or second-growth longleaf pine, although about 40 per cent were loblolly. They were steamed twelve hours at 35 lb., followed by a vacuum period of six hours at 23 to 24 in. It required from two to four hours at 100 to 125 lb. pressure to impregnate with 12 lb. oil per cubic foot.

The accompanying illustrations show the pole and track construction used and also the type of overhead. One view also shows the condition of creosoted ties, which were installed about the same time.

This installation of treated poles is extensive, and is a striking example of what can be expected from treat-

*Chairman special committee on wood preservation, A.E.R.E.A.

These Poles and Ties Treated with Wood Preservative Have Given Good Service
At left, part of 2,500 creosoted poles set in 1907. In center, track on C., L. S. & S. B. Ry. with cresoted tiees fifteen years old. At right, fifteen-year-old pole which is good for another fifteen years

ment of wood poles. When, after fifteen years of service, only sixty poles, or 2.4 per cent, have been removed from all causes out of a total of 2,500 originally installed, and the remainder of the line gives every evidence of another fifteen years of service, this is conclusive evidence of the ultimate economy of using treated poles.

In connection with the claim made that the principal cause of removal was decay, starting from holes made by woodpeckers, it is of interest to quote from a letter written by Roger F. Hosford of the American Telephone & Telegraph Company. Discussing this claim, Mr. Hosford writes:

The first time I saw any woodpecker attack on a creosoted pine pole was in 1910, when, in a party with Howard Weiss and several others, I looked at several poles near Flanders, N. Y., while we were making an inspection of the Poughkeepsie-Newton Square line. In this case a woodpecker had started to enlarge an unused bolthole but had not gone very far. I think that, if we totaled up our whole experience, we would find many more cases of attack of this kind than of any serious damage. As you probably know, there are several species of woodpecker whose habit is to make their homes in pieces of available timber, such as poles, posts, etc. When a woodpecker has hollowed out a nest for itself in the upper part of a pole it has probably cut away enough of the wood to represent a substantial impairment of strength at that particular section. We have not, however, found many woodpecker nests in creosoted pine poles. I saw one last month in a pole near Fredericksburg, Va., but in this case the top of the original piece had been cut off and decay had run down to about the point where the woodpecker had entered and cut out its nest. The pole must have been more than twenty years old when this happened.

The fairly considerable number of cases where a woodpecker starts at a bolthole or some similar point and cuts away a little wood, as compared with the relatively few cases where it goes so far as to make a nest inside the pole, lead me to believe that whatever woodpecker attack we encounter in creosoted pine holes is due to the woodpecker seeking a nest. For example, a bird notices a bolthole and, needing a home, thinks it can get one by enlarging the opening. In most cases the bird soon gives up the attempt and searches for an easier piece of wood to build a home in. If treatment is thin at the point where the woodpecker starts working, the result might be an opening for decay. Usually, however, the point of attack seems to have been one where there would be no basis for expecting irregularity of treatment, so that nothing important results from the woodpecker's activities.

I have seen occasional articles appearing in periodicals, where reference is made to serious trouble from woodpeckers attacking creosoted poles. I do not know whether the people who report these experiences make the distinction which I do between a woodpecker hole and woodpecker nest, which is very substantial from the structural strength viewpoint, or whether the regions in which the experience has been reported are comparatively devoid of timber suitable for nests so that the woodpecker has to do considerable damage to the pole if it is going to have a nest at all.

Keeping 95 per Cent of the Cars in Service

Complete and Convenient Records Speed Up Inspections and Repairs —The Maintenance Practices of a Small Company Which Keep the Number of Cars Out of Service to a Very Small Percentage

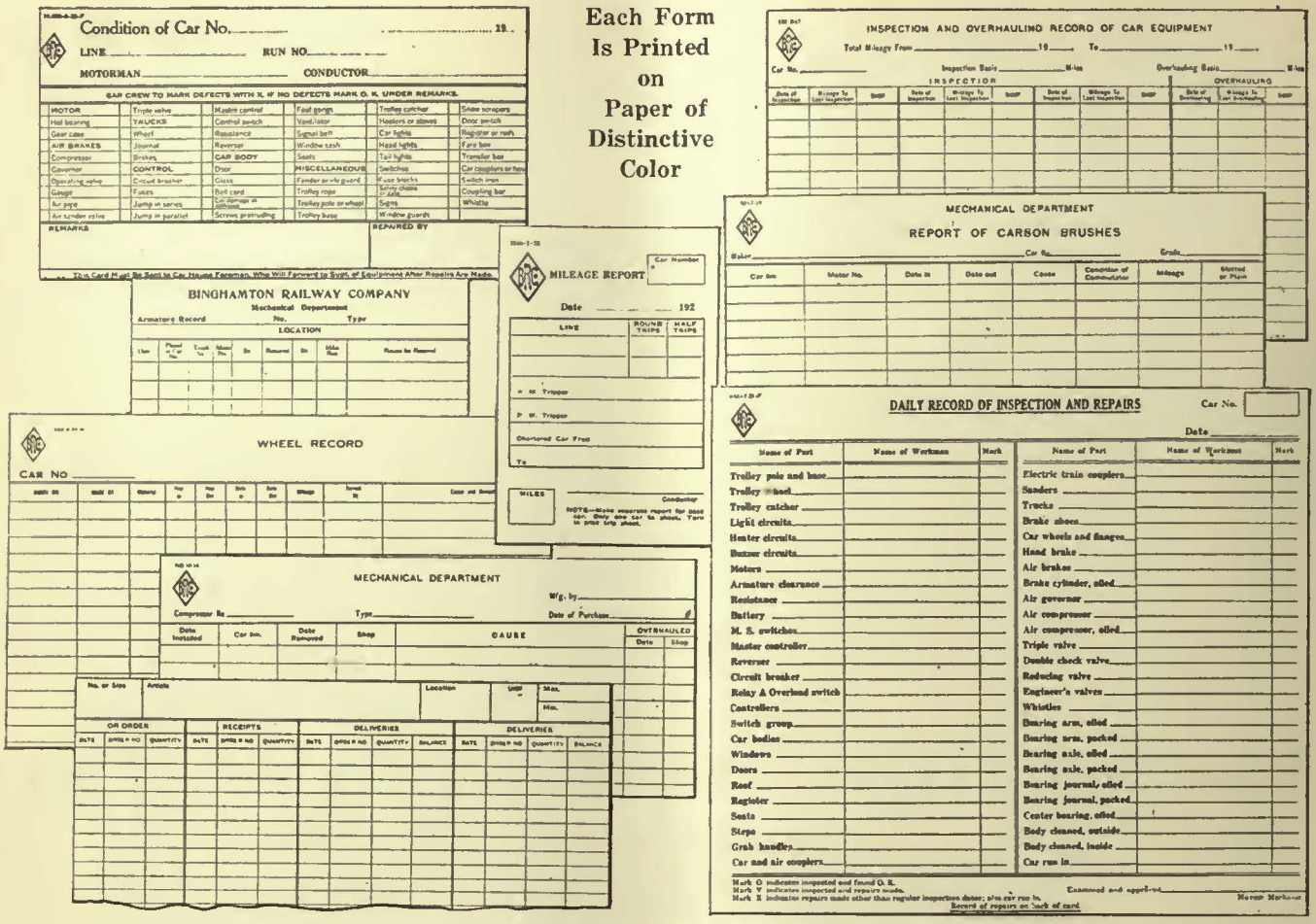
THE weekday schedule of the Binghamton (N. Y.) Railway calls for the operation of forty-two cars in the middle of the day, with twenty-one additional trippers in the evening rush hours, or sixty-three cars in all. Inasmuch as the company possesses altogether only sixty-three closed cars, some of which are always being overhauled and painted, the shop department has a never-ending problem to keep the transportation department supplied with as nearly as possible the full sixty-three cars. If a car is pulled in crippled at any time during the day it must be put back in shape for service again before five o'clock in the afternoon.

A good example of this is furnished by a recent incident. A modern steel car, No. 514, was in collision with a heavy auto truck in the early morning, with the result that the body corner post was stove in, the side sheeting badly crumpled and some glass broken. The car was pulled into the carhouse at about 9:30. Immediately the shopmen set to work. The corner seats were removed and the steel heated in place. Then the blacksmith hammered out the bent steel plates and the seats were replaced. Meanwhile another workman had replaced the broken glass. Next the car was run into the paint shop and a coat of paint applied over the area where the damage had been done. At 4:30 in the afternoon, when the dispatcher called for cars to go out on the road, No. 514 was sent out with scarcely a trace remaining of the morning mishap.

In order to accomplish the quick repairs necessitated by the shortage of cars and to maintain the equipment in the excellent condition for which the Binghamton rolling stock is noted efficient shop methods are required. Two salient points stand out as fundamental principles of policy. In the first place a complete and convenient car index system is used to keep a record of all work done in the shop. Great pains have been taken to make the forms so simple and easy to use that they shall really be time-saving devices. In the second place, an ample number of spare parts for replacement is always on hand. These two factors, each depending upon the other, are the foundation of the maintenance practice.

The primary step in the record system is the "Condition of Car" report, which is made by the car operator whenever he turns in a car at the carhouse. As will be seen in the accompanying illustration, this form provides space to mark any ordinary defect. If no defects exist, the operator signifies that fact by the notation "OK" under remarks. But in any case, whether or not there are defects, a report must be made out when the car is turned in. Severe disciplinary action is taken against a man who fails to turn in a "Condition of Car" card. For that reason, and also because it is so easy to note on them any little defect, these cards are a valuable aid to the mechanical department.

Such a card for each car goes to the night foreman of the shop. He looks through them and at once gets a general idea of the work to be done that night. As a result, he is able to distribute his force of workmen in the most efficient way. But still more important, he knows with reasonable certainty that the job for which he has arranged will be all the work necessary to be done that night. He does not have to fear the discovery just before morning of some defect that was not reported. After all defects have been repaired, the inside of each car is swept and sprayed with West's disinfect-



The Forms Are So Simple and Easy to Use that They Really Save Time

ant. The exterior is dry wiped, and every third night the windows are washed. Brook's renovator is used about once in sixty days to brighten up the paint.

Inspection and overhauling are done on a mileage basis, and here again accurate records play an important part. Every time a trainman turns in a car at the carhouse he must fill out a small slip giving the car number, the route on which he is running and the number of trips he made. A clerk at the office converts the latter figure into miles, and the slips are then filed by cars. An inspection of these slips at any time will show the number of miles run since the date of the last inspection. One thousand miles operation is the basis of inspection and 50,000 miles is the basis for general overhauling.

Each car has a yellow card in the master mechanic's file, showing the date of the last inspection and the date of the last overhauling, as well as the mileage prior thereto. A general overhauling requires three or four days, and one car at a time is taken out of service for this work. Painting is done periodically, once in two years, even though the car retains a fairly presentable appearance. Eight days are required for painting and two cars are always in the paint shop.

An experiment which has proved successful in Binghamton is the use of green headlining instead of white on the front platform. This has materially improved the motorman's vision at night.

A "Record of Inspection and Repairs" card, such as shown in the accompanying illustration, is filled out every time a car is inspected. These cards are filed by car number in the shop and the master mechanic can tell at any time from them the name of the shopman who last examined any particular piece of apparatus on a given car, the condition in which he found it and what repairs he made. This record is valuable in case of breakdown of equipment to determine exactly when and by whom it was previously inspected.

The repairs made when a car is inspected or overhauled are carefully noted on the proper card in the file. Different color cards are used for keeping records of the various apparatus. For example, wheel-record cards are orange; compressor cards, red; carbon-brush cards are blue, etc. The wheel record card is perhaps typical. Like most of the other records, these are filed by car number. The card shows the wheel number, the maker's name, the material, the size when installed and the size when removed, the dates of installations and removal, and the mileage run during the period of service. Other records are kept with similar simplicity and accuracy. The records of such equipment as compressors, however, which are frequently transferred from one car to another, are filed by the manufacturer's number.

Keeping Stocked with Spare Parts

Another phase of the maintenance practice of this company, just as important as that of keeping accurate records, is that of having always on hand an ample supply of spare parts for replacement. These two fundamentals of shop practice are closely linked together because it is the comprehensive record system of past repairs that enables the master mechanic to forecast his future needs. Except for such material as is ob-

tainable locally, it is the general policy to keep on hand in the storeroom a sixty-day supply of parts for replacement.

The value of having this rather unusually large stock of spare parts on hand was well illustrated during the past winter, when five journal boxes were broken in one week. Normally such a number would not be broken in six months, and only the unusually large supply of extras in stock prevented the laying up of several cars. It is claimed also that this practice is economical in several ways. In the first place it permits the immediate substitution of a new part for a damaged one, and thereby forestalls a more serious and more expensive repair job later. In the second place, it permits the storekeeper to make many of his purchases when the market is favorable. The card index plays its part in this end of the business also, as a complete record is kept of all orders, receipts and expenditures for material. For this purpose the ordinary stock card furnished by the Library Bureau is used.

Actual experience has convinced the Binghamton Railway that systematic maintenance is worth much more than it costs. The comprehensive card records really save time and money as well as make easier the task of keeping the rolling stock in first class condition. The high standard of maintenance has helped materially to produce increased patronage and a generally friendly attitude of the public toward the company, as told in the ELECTRIC RAILWAY JOURNAL for May 5, 1923.

Combined Electric Welder and Grinder

Welding and Grinding Equipment Mounted on a Ford Chassis Can Be Moved Rapidly—Both Operations Are Done Simultaneously by Two Men Without Interference

THE welding and grinding of rail joints now constitutes a considerable portion of the track maintenance work of electric railways. The tendency is to provide equipment designed to insure quick transport from point to point and economical handling by few operators. Among the essential requirements for a satisfactory welding and grinding machine are: Easy portability to prevent interference with normal car operation; rapid transportation to and from the job, and operation with a minimum amount of labor.

The mounting of welders and grinders on wheels so that they may be handled to and from the job easily is quite common. Where the welder and grinder are

Welding and Grinding Operations Performed at the Same Time

separate units, two men are usually employed for each unit, and when they are hauled by trucks an additional driver is necessary. By mounting both welder and grinder on a 2-ton Ford chassis, Walter Uffert, master mechanic New York & Harlem Railroad, New York, N. Y., has provided for many of the most essential features and has produced a unit that can be handled by two men.

Accompanying illustrations show the equipment at work on a job. Both welding and grinding operations can be carried on simultaneously. Welding leads of 100 ft. in length are provided, so that the welder can work on joints for this distance ahead of the truck. The grinding operation is performed at the rear of the truck so that this can follow the welding without interference.

The welding and grinding equipment is mounted on a substantial angle-iron framework in the rear of the driver's cab. Six frames of grid resistance are mounted in two tiers immediately behind the cab. Circuit breakers are placed in the welding circuit ahead of the equipment and the current graduations are obtained by knife switches.

The New York & Harlem Railroad uses the underground conduit contact system, and current for welding is obtained directly from the contact rails by use of a plow. Four receptacles are provided on the left-hand side of the truck. Two of these are for the plow leads and the other two for the welding leads. Plugs with substantial wooden handles are used for plugging in to obtain the necessary connections. Copper rods with substantial porcelain insulators are used for all connections to the resistor grids and to the switches and circuit breakers. There is thus no danger of charring insulation from too much heat and at the same time this method of construction is neat and compact.

In mounting the grinding wheel, special attention was given to flexibility so that the grinding wheel can

At Left—Receptacles for the Contact and Welding Leads Are Provided at the Lower Edge of the Chassis. At Right—Sheet Iron Curtains Close In the Equipment During Bad Weather and While Being Transported to and from the Job

be removed from one rail to the other and can be pushed backward and forward without the necessity of shifting the truck. A 3-hp. 600-volt General Electric motor is used for driving. This is belted to a countershaft mounted just behind the grid resistors. This countershaft is made of a 7-in. solid axle and has ball bearings. Another countershaft at the rear of the chassis has a loose pulley which slides from side to side. By this arrangement the grinder can be thrown from one rail to the other for grinding as desired without shifting the position of the truck. The grinding wheel is mounted at the rear of an extension arm, which is pivoted at the lower end of a support fastened to the countershaft on which the loose pulley slides. The grinding wheel can thus be shoved ahead or pulled back a distance of 24 in. either side of its neutral position.

The grinding wheel is supported in its normal position a few inches above the rail by a chain and spring attached to a swinging arm. This supporting arm pivots about an upright in the upper center part at the rear of the truck and has a brace running from the outside end to the bottom of the fulcrum. The use of a spring in connection with the suspension of the grinding wheel permits this to be pushed down so as to perform the grinding operation, and when it is necessary to shift the truck the operator needs only to let go of the wheel and it automatically clears itself. The arm on which the grinding wheel is mounted has a bent portion extending over the top of the wheel. This acts as a safety guard for the workman and also provides for attaching a handle to facilitate the grinding operation. All bearings except those on the main driving shaft are equipped with grease cups.

The principal members of the framework are of 5-in. channels. The supports for the grid resistors and for the driving axle are two 3-in. x 3½-in. angles. The smaller members which constitute the side frames are 1¼-in. x 1¼-in. angles. All parts were forged in the railway company's shops.

The sides are of sheet iron arranged to fold up and lie on top of the roof. These give protection to the equipment during stormy weather or when it is being transported to and from the job. The arm with the grinding wheel folds up and is held firmly in position by a hook connection, and the swinging arm supports can be reversed so as to extend inside the covered portion of the truck. A curtain at the rear can be lowered as a protection to the equipment. A circuit of five lights is provided. This not only affords illumination to the equipment during dark periods, but also serves as a warning that the contact shoe is in place so that the operator will not attempt to drive away without removing his plow from the contact slot.

Electrification in Japan

ELECTRIC railroad construction is a live subject now in Japan and the prospects are that by the end of the summer there will be a considerable addition to the miles of electric track in the Japanese Empire. According to the *Japan Times and Mail* of April 28, 1923, during 1922 thirty-three new companies were licensed to construct electric railways that have a total length of 436 miles and nineteen of these companies have begun construction on 83 miles. The same paper publishes a list of railways which electrified 116 miles of line in 1922 and eight other companies licensed to build or electrify 66.8 miles of line.

Devices to Prevent Lamp Theft

A Base that Does Not Fit the Ordinary Fixture May Be Used—Lock Sockets Have Given Satisfaction on Several Railways

THE problem of preventing the theft of lamps from railway cars, stations, etc., is today largely a matter of discouraging those who supply their own homes by stealing the company's lamps. At one time serious losses were suffered because boys unscrewed lamps and threw them in the street for amusement. Occasionally stealing has been done on a regular money-making basis, large numbers of the stolen lamps being resold at a low price to unscrupulous second-hand dealers. Neither of the latter two factors now appears to be of such importance as the theft by people who take lamps for their own use.

Four general remedies for the situation have been tried. The simplest consists in marking lamps in some conspicuous and ineradicable manner. A second plan is to use a base that will not fit a standard fixture. Under these circumstances the lamp is useless to the thief. Lock sockets are a third means of preventing theft. A fourth is the installation of lamps of unusual voltage or wattage, not suitable for ordinary use.

Etching the name of the railway in the glass of the lamp is a long-established custom on some properties. It is no doubt the cheapest of the numerous methods of preventing the theft of lamps. These railways claim that the mere presence of the company's name on the glass keeps people from stealing their lamps. The Bamberger Electric Railroad, Salt Lake City, uses an interesting variation of this idea by marking its lamps "Stolen from B.E.R.R." It must be admitted, however, that etching the name on the glass is not always efficient to prevent serious loss of lamps, and a number of companies favor more elaborate remedies.

Next in point of simplicity is the plan of equipping lamps with an unusual base, so that they cannot be put into the ordinary commercial socket. This may be accomplished by use of a left-hand thread or by other means. Several serious objections exist, however, to the use of a left-hand thread. Such a lamp is used in the New York subway for the 40-volt emergency lighting system to prevent the regular 130-volt lamps from being put into the emergency sockets and vice versa. The experience of the Interborough Rapid Transit Company shows the additional cost to be about 3¼ cents for each lamp. This would be a continuing charge, and if added to the price of all lamps used by the railway would be a formidable annual expense. It is doubtful, therefore, whether the value of the left-hand thread would equal the original cost of altering the sockets plus the increased cost of manufacture.

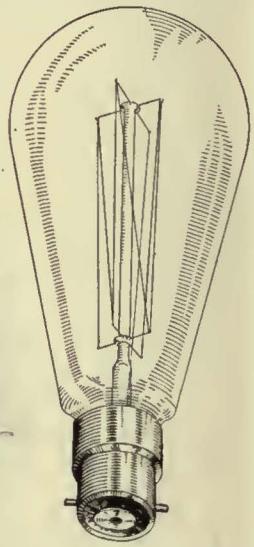
To change the thread on only a portion of the lamps used by a railway would not be a feasible arrangement. The difference in appearance between the two types would be scarcely noticeable and confusion would be the inevitable result if a stock of each kind was kept on hand. This similarity of appearance would to some extent spoil the plan as a preventive of stealing, for many left-hand thread lamps would undoubtedly be taken under the impression that they were the ordinary type.

There is, however, a similar expedient which is distinctly more promising. American manufacturers are now making for signal purposes on the railroads lamps with a medium bayonet base, such as is used in Europe. So far as is known, there is no socket for these lamps

now on the market in this country, as the signal manufacturers make a special design for their own work. It is safe to say, however, that the socket makers would be glad to supply the demand if it existed.

The fact that these lamps are actually being manufactured at the present time is a point in favor of the bayonet base plan. From a railway point of view the change from a right-hand thread base to the medium bayonet base would be no more complicated than the change to the left-hand thread. The bayonet base would have the advantage of being readily distinguishable from an ordinary base. No confusion would be caused in the supply and a thief would see at once the folly of stealing such a lamp as it would be of no use.

There are two protective features common to all lock sockets. The first is that it is always difficult, although not altogether impossible, to remove a lamp without using the key. Second, the mere fact that an article is locked fast acts as a deterrent to persons who would not hesitate to grab a loose article. A disadvantage common to all lock sockets is the time required to change lamps. Various types of lock sockets are in use.



G.E. Lock Socket Used in Brooklyn. At Right, Bayonet Base Lamp.

One of these, made by the Benjamin Electric Company, has a slot cut in the side of the shell through which a pointed steel dog is pressed against the lamp base. The dog is so pivoted that it permits a lamp to be inserted without interference, but bites when an attempt is made to unscrew it. A key releases the dog. In the "Arrowlock" socket, the lamp is held fast by a clamp which has to be screwed up by a key after the lamp has been inserted, and must be loosened in the same way before it can be withdrawn.

A General Electric Company lock socket which works on an entirely different principle has been used for several years by the Brooklyn Rapid Transit Company. The feature of this device is that the interior shell of the socket turns freely within the outer casing. Hence a lamp cannot be screwed in or out until a key is inserted to engage the slotted base of the interior shell and prevent its rotation. Because the socket shell simply turns with the lamp, a would-be thief is not tempted to force the lamp and thereby break it. The experience of the B.R.T. shows that the saving of lamps pays for the installation of this lock socket.

Brief consideration of the matter shows that it would not be feasible for railways to use lamps of higher than standard voltage, nor those of lower voltage. The former would be too fragile and the use of the latter with the ordinary 550-volt current would necessitate the connection of altogether too many lamps in a single series. The failure of one lamp would put out half the lights in the car. Moreover, the difference between such lamps and the standard 110-volt lamp would not be very noticeable and many would probably be stolen in spite of their different voltage.

The use of high-wattage lamps, however, is entirely feasible and serves nearly the same end. Many electric railways now use a lighting scheme first tried several years ago by the Cleveland Railway. Five 94-watt Mazda "B" lamps are arranged along the center line of the ceiling of a typical center-entrance car, and a spare lamp is located over the well which can be cut in if one of the other lamps fails. Theft is much reduced because the size of the lamp at once proclaims it to be something different from the ordinary.

Local conditions which affect the theft of lamps must determine the most effective remedy. In general, it may be said that the least expensive of these plans, that of etching on the lamps the name of the company, is likely to be also the least satisfactory. It has, in fact, been given up by many companies that formerly used it. The bayonet base is regarded favorably by the manufacturers, because it is already a standard product, although not largely used in the United States. Its effectiveness to prevent the theft of lamps has not been demonstrated, but expert opinion seems to approve it as the most promising of the less expensive plans.

The other two remedies that have been tried are more expensive. The installation of lock sockets would cost more than the installation of bayonet sockets because the former are a more complicated article. They are, however, effective, and experience shows that on a city property where many chances exist for lamps to be stolen, this plan more than pays for itself. Still more expensive is the scheme of center lighting with large lamps. This, of course, necessitates rewiring the lighting circuits throughout the car, and few railways are likely to favor so ambitious an undertaking for old cars. On new cars, however, it is an excellent device for preventing theft, and affording other advantages.

Track Costs Reduced to Units of Work

In Cleveland the Plan of Basing Costs on Units Done per Man-Hour Has Assisted in Keeping Down Total Expenditures for Maintenance

IN DETERMINING costs of construction and maintenance, it is very desirable to have available some simple basis by means of which a comparison of different methods may be made. With rates for labor and prices of materials changing as rapidly as they are at the present time, total costs do not necessarily reveal the true relative value of different methods unless a new calculation is made for each job to bring them to the same conditions of cost.

In order to simplify such comparisons, and get a true picture of the various methods in use, Charles H. Clark, engineer maintenance of way Cleveland Railway, has studied the various classes of work done by employees in the track department. As a mean of eliminating the various elements subject to fluctuation, all comparisons have been made on the basis of the number of units of any specified operation performed per man-hour expended. To obtain this information an analysis was made of forty-four separate operations. His results, which have been collected and tabulated, are presented in the data given on page 1008.

An examination of these unit figures shows that there are wide divergencies due to the employment of different methods. For instance, operation No. 1, tearing up old pavement, is done in Cleveland by two methods, the first one being by hand, and the second by the use of a special paving plow. The figures show that one man, working by the usual hand method, will be able to tear up 17.3 ft. of stone paving per hour, whereas with the special plow developed for this purpose he can tear up 113.2 ft. of the same paving. The economy resulting from the use of the machine method is so obvious that it is easy to see why the company now does little of this work by hand.

The result of careful study in this manner of methods of construction and maintenance has eliminated many wasteful and inefficient methods. In Cleveland the general application of machinery and labor-saving methods has prevented the cost of the work from rising anything like so high as it would have done had the old methods been retained. The total cost of way maintenance, with labor at 50 cents per hour, is only some 58 per cent greater than the total cost was for doing the same work with the old methods, when 19 cents was the current rate for labor. In other words, wages have increased 163 per cent, but track costs only 58 per cent, in Cleveland.

The Cleveland Railway, Units of Work per Man-Hour, 1922

	Operation	Part of Roadbed	Material	Type of Construction	Units per Man-Hour
1.	Tearing pavement with plow	Track	Stone		113.2368 ft. of track
	Tearing pavement with plow	Track	Brick		143.0674 ft. of track
2.	Clearing pavement	Track	Stone		17.2911 ft. of track
	Clearing pavement	Track	Brick		20.6388 ft. of track
3.	Tearing and clearing pavement by hand	One-half devil strip, track and outside	Stone		2.1267 ft. of track
	Tearing and clearing pavement by hand	One-half devil strip, track and outside	Brick		4.4984 ft. of track
	Tearing and clearing pavement by hand	One-half devil strip and outside	Stone		4.9031 ft. of track
	Tearing and clearing pavement by hand	One-half devil strip and outside	Brick		4.4390 ft. of track
	Tearing and clearing pavement by hand	One-half devil strip, track and outside	Concrete		2.1291 ft. of track
	Tearing and clearing pavement by hand	Outside	Asphalt		2.1672 ft. of track
4.	Tearing and clearing curb		Concrete		18.0761 ft. of track
5.	Excavating; paving charge	One-half devil strip, track and outside	Sand		7.7112 ft. of track
6.	Breaking concrete by hand	One-half devil strip, track and outside	Concrete	Oak ties and sand base	3.4850 ft. of track
	Breaking concrete with pounder	One-half devil strip, track and outside	Concrete	Oak ties and sand base	45.8084 ft. of track
	Helping pounders	One-half devil strip, track and outside	Concrete	Oak ties and sand base	115.2619 ft. of track
7.	Cutting rail with burner				3.4936 cuts
	Cutting rail; helping burner				11.4428 cuts
8.	Digging jack holes		Sand	Oak ties and sand base	1.9851 holes
	Digging jack holes		Concrete	Oak ties and sand base	1.8322 holes
9.	Tearing up rail and ties		Sand	Oak ties and sand base	7.1570 ft. of track
	Tearing up rail and ties		Concrete	Oak ties and sand base	6.9267 ft. of track
10.	Excavating by hand	One-half devil strip, track and outside	Sand	Oak ties and sand base	3.3270 ft. of track
	Excavating by hand	One-half devil strip, track and outside	Sand and concrete	Oak ties and sand base	2.6856 ft. of track
11.	Dapping ties for joint plates		Oak ties	Oak ties and sand base	5.2382 ties
12.	Laying rail			Oak ties and sand base	4.7522 ft. of track
	Laying rail			Steel ties and concrete base	4.2014 ft. of track
13.	Reaming holes with electric drill				9.6711 holes
14.	Aligning track			Oak ties and sand base	45.6980 ft. of track
	Aligning track			Steel ties and concrete base	51.1615 ft. of track
15.	Surfacing track			Oak ties and sand base	17.8755 ft. of track
	Surfacing track			Steel ties and concrete base	8.8081 ft. of track
16.	Filling sand for tamping		Sand	Oak ties and sand base	14.9408 ft. of track
17.	Tamping by hand			Oak ties and sand base	5.0345 ft. of track
	Tamping with electric tool			Oak ties and sand base	6.5781 ft. of track
18.	Finishing sand base for concreting	One-half devil strip, track and outside		Oak ties and sand base	13.0947 ft. of track
	Finishing sand base for concreting	One-half devil strip, track and outside		Steel ties and concrete base	5.0506 ft. of track
19.	Concreting with machine—crossovers	One-half devil strip, track and outside		Oak ties and sand base	4.0302 ft. of track
	Concreting with machine—crossovers	One-half devil strip, track and outside		Steel ties and concrete base	2.5560 ft. of track
	Concreting with machine—side track	One-half devil strip, track and outside		Oak ties and sand base	3.1982 ft. of track
	Concreting with machine—side track	One-half devil strip, track and outside		Steel ties and concrete base	1.9252 ft. of track
	Concreting by hand	One-half devil strip, track and outside		Oak ties and sand base	1.3790 ft. of track
20.	Unloading rail, splices, bolts, etc.		62-ft. rail		79.2255 ft. of track
	Unloading and piling ties		Oak ties		25.9169 ties
	Unloading rail, ties, bolts, etc.		62-ft. rail, oak ties		31.1514 ft. of track
	Unloading rail, ties, bolts, etc.		62-ft. rail, steel ties		39.3192 ft. of track
21	Unloading cement				37.8351 bags
22.	Unloading and shoveling gravel—crossovers				1.7936 cu.yd.
	Unloading and shoveling gravel—side track				1.6073 cu.yd.
23.	Loading dirt by hand—crossovers		Dirt		1.3628 cu.yd.
	Loading dirt and concrete—crossovers		Dirt and concrete		1.5889 cu.yd.
	Loading dirt and concrete—side track		Dirt and concrete		1.1244 cu.yd.
24.	Loading paving blocks—crossovers		Stone		1.9008 cu.yd.
	Loading paving blocks—crossovers		Brick		1.6502 cu.yd.
	Loading paving blocks—side track		Stone		1.8687 cu.yd.
	Loading paving blocks—side track		Brick		1.9313 cu.yd.
25.	Loading old rail, splices, etc.		30-ft. pieces		2.3012 pieces
26.	Loading old ties		Oak ties		11.6839 ties
27.	Laying end rail (for crossover or turnout)			Oak ties and sand base	0.2317 ft. of track
28.	Rolling sand base				52.0027 ft. of track
	Rolling sand base—helping rollers				81.0864 ft. of track
29.	Cutting rail by hand				0.4722 cuts
30.	Repairing tile drain				33.4653 ft. of track
31.	Drip drains				0.3732 drip
32.	Riveting				0.9910 joints
	Helping riveters				5.9269 joints
33.	Welding				0.7576 joints
	Helping welders				3.1850 joints
34.	Laying and maintaining-crossovers				0.0165 crossovers
					13.9382 ft. of track
35.	Laying and maintaining—side track				3.7941 ft. of track
36.	Maintenance of temporary crossings—crossovers				19.1148 ft. of track
					0.1638 crossings
	Maintenance of temporary crossings—side track				17.3028 ft. of track
					0.1185 crossings
37.	Moving tools				38.9246 ft. of track
					0.0222 moves
38.	Laying temporary pavement				3.1912 ft. of track
39.	Cleaning brick				4.0881 ft. of track
40.	Toothing pavement		Stone		34.2417 ft. of track
41.	Cleaning up street (does not include tearing of crossover or side track)				10.0198 ft. of track
42.	Idle time				33.3572 ft. of track
43.	Indirect labor (foremen, bosses, watchmen, etc.)				0.8304 ft. of track
44.	Miscellaneous operations				64.9868 ft. of track

Equipment Maintenance Notes

Boosting Rail Joints

THE plan of placing a length of rail underneath the joint and connecting it at the ends of the angle bars by clips, so as to permit the driving of steel bars underneath the joint to boost it, has been used with some modifications by the Lehigh Valley Transit Company, Allentown, Pa.

This plan was used with an inverted rail, without supporting ties, the old ties having been cut out at approximately the center line of the track and the bracing rail, clips, etc., imbedded in a dry concrete to a depth of some 6 in. below the bracing rail. Good results have thus been secured for individual joint repairs where extensive rehabilitation of tracks was not made.

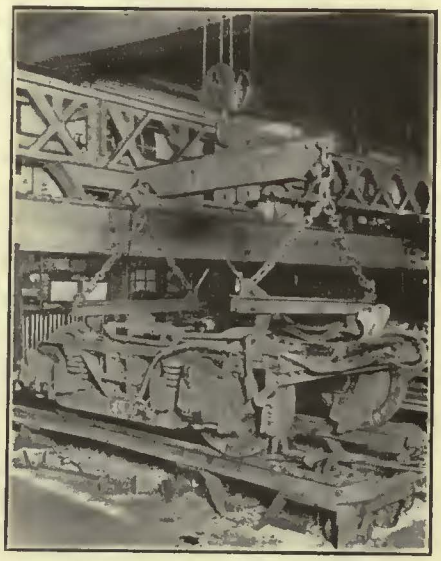
Where an extensive stretch of track was entirely rehabilitated, a supporting tie construction was preferred. Where the rail was found to promise from five to six years longer life, the expense of installing new crossties and a filler block under the rail opposite the joint was thus considered advisable. The accompanying line cut shows this type of construction. The bracing rail is placed with the head side uppermost, of such a length that the repair clips can be placed just outside the end of the angle bar.

A 6-in. x 10-in. filler block, long enough to span two joint ties, is used on the opposite rail, and crossties are installed underneath the entire construction. Stone ballast to a depth of 6 in. is used underneath these crossties. After the joint had been boosted by driving in the supporting steel bars, these are spot welded to prevent shifting. The bolts of the angle bars are renewed and the nuts, together with those on the clips, are spot welded. No lock washers are used. Cupped rail heads are welded and ground off to complete the joint.

Lifting Trucks by the Wheels Prevents Hot Bearings

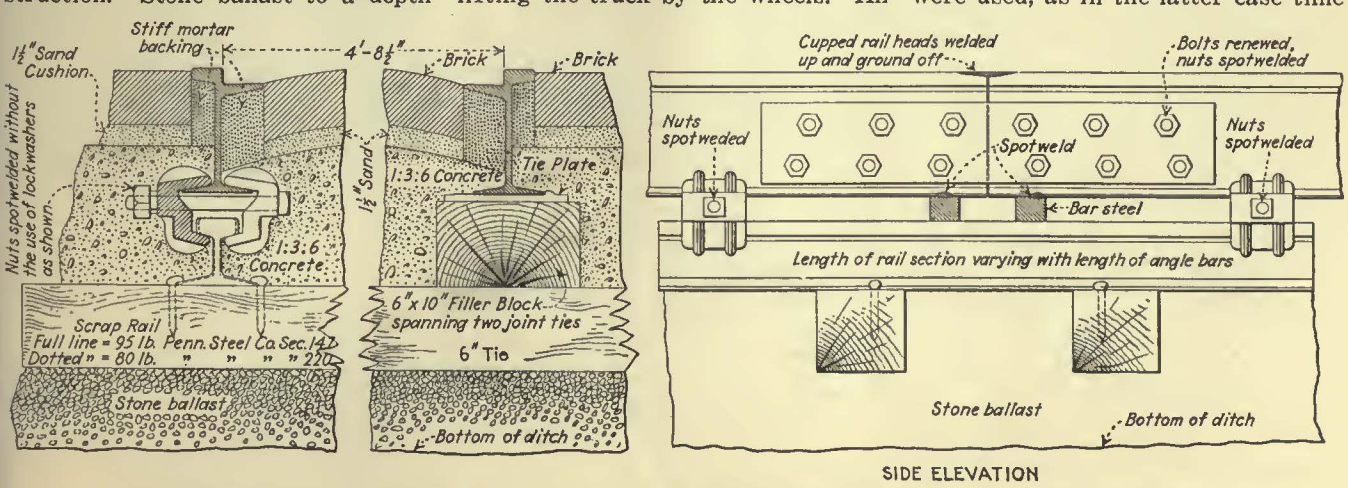
WHEN trucks are overhauled it is the general practice to repack the axle bearings before they are reinstalled under cars. Where the work of overhauling is done by placing the truck on stands or horses, it is necessary to lift the trucks and place them on the track for moving under the car bodies. If this lifting is done by attaching the crane rigging to the truck frame, the weight of the wheels and axles causes the waste to be compressed and may result in hot axle bearings soon after the car is returned to service. With heavy wheels the trucks are also likely to be given excessive strains as a result of the lifting where the rigging is attached to the framework.

In order to do away with the danger of such troubles, the New York Consolidated Railroad, in its Thirty-ninth Street shop, Brooklyn, N. Y., uses a rigging which permits lifting the truck by the wheels. An



Rigging Used for Lifting Trucks by the Wheels

accompanying illustration shows this rigging in place. Two hooked levers fit into the grooves under the treads of the wheels. These have handles projecting outward so that they can be readily adjusted, and their cam-like surface holds them firmly in position when once installed. The two end supports are held together by channels. Chains run from the end supports to links fastened to a supporting beam which has provision for attaching the hooks from the overhead crane. In addition to preventing troubles which may later occur from lifting, this rigging is attached to the trucks much more quickly than if individual chains were used, as in the latter case time



Joint Repairs with Bracing Rail Supported on Ties and Fastened to Operating Rail by Cast Steel Clips

would be consumed in hooking the chains to the trucks, and frequently in order to obtain uniform lifting it is necessary to hook the chains in different positions after a trial lift.

Shunts for Carbon Brushes

BY JOHN S. DEAN
Renewal Parts Engineering, Westinghouse Electric & Manufacturing Company

PRESENT-DAY practice in regard to carbon brushes for modern railway motors is to use a plain carbon without any copper plating and without shunts or pigtails. On some of the older types of motors shunted carbons were originally applied, and

At Left, Imbedded Type of Shunt. Center and Right, Clamped Type

on many properties carbons with shunts are still being used in connection with these old motors.

The most common shunt connection used on the carbons of these old motors is a clamped type which grips the top of the carbon and is held in place by a bolt as shown in the accompanying illustration. With this construction it is a simple operation to replace an old worn-out carbon by a new one; however, there is the likelihood of the clamping bolt not being drawn up tightly by the workman and thus the clamp will make a poor contact with the carbon. A further possible danger which might cause trouble with this type of shunt is that even when the clamp is made tight at the start there is a tendency for it to work loose due to vibration and arcing and thus the shunt soon becomes of little value to help carry the working current to the carbon.

An improved type of shunt which is being used quite extensively in connection with modern industrial motors and generators is also shown in the illustration. This shunt is commonly known as the imbedded type as the end of the braided cable forming the pigtail is imbedded in the carbon. The end of the cable is placed in a hole drilled in the top of the carbon, and a good mechanical and electrical contact is obtained by tamping or ramming a prepared copper compound in the hole between the cable and the carbon to fill the intervening space.

For motors operating with the original type of brush-holders designed for the use of carbons with pigtails, the use of carbon brushes fitted with the imbedded type of shunt in preference to the clamped type is favored. In this connection, admitting that the clamped type may be replaced more readily, operators will find that by using the imbedded connection fewer replacements will be repaired due to a more permanent contact between the pigtail and the carbon brush.

Experience has shown that the detachable or clamped type of shunts are quite often found to be loose in service, thus making a poor contact. Operating under these conditions the shunt might just as well be left off entirely and results in service would not be noticeably changed. In fact, some operators have discarded shunted carbons entirely for their older motors and operating results are very satisfactory. For some of these motors a new brush-holder has been designed to use carbons without shunts. These new brush-holders are fitted with a type of flexible braided shunt connecting the contact tip on the pressure finger with the main body of the brush-holder.

Flat Wire Increases Motor Capacity

THE West Penn Railways, Connellsville, Pa., uses Westinghouse No. 56 motors on its interurban cars. The armatures of these motors were originally wound with round wire, two wires being placed in parallel and connected to the same commutator bar. In rewinding these armatures the company has replaced this round wire with a flat strap, having approximately the same outside dimensions as the two round wires it replaces. This change increases the section of copper 20 per cent. It also cuts the time of winding to but little more than one-half, and produces an armature mechanically stronger and more rigid.

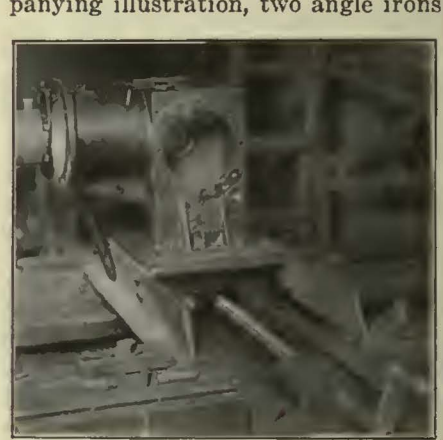
The coils are wound with the strap on edge in a former, which produces a flat coil. After winding and insulating, the coils are pulled out on a machine puller, which opens the sides to give the correct throw and curves them to provide the necessary clearance on the ends. They are then dipped in benolite and baked, which impregnates the inner insulation thoroughly, after which they are insulated with fish paper, dipped and baked again.

The method of pulling the coils makes the loops at the ends parallel with the shaft in a radial direction. These loops are left open, so that a fan action is provided which circulates the air within the motor case. While this is not the equivalent of modern ventilated construction, it is of material advantage in cooling the motor over the original design with the coil ends entirely inclosed. The additional copper, due to the flat wire, also adds to the capacity, so that the motors are able to handle materially heavier loads than they originally were designed to carry.

Reboring Air Compressors

A JIG has been devised in the shops of the Metropolitan West Side Elevated, Chicago, to hold the D-3-E-G Westinghouse air compressor casting for reboring. The simplicity of the jig in construction and the ease with which it is mounted on the carriage of the lathe are the outstanding features of this apparatus.

As will be seen from the accompanying illustration, two angle irons



Mounting of Compressor on Lathe for Reboring

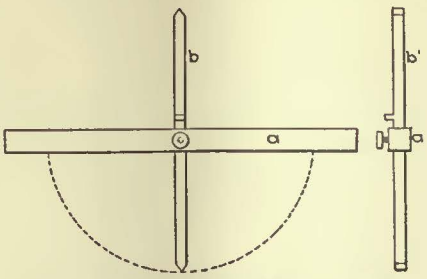
2½ in. x 5 in. form the main support of the jig upon the carriage. Cross members constructed out of 3-in. x ⅜-in. flat iron support a bedplate upon which the air compressor frame is bolted. Through bolts connect this bedplate to the compound of the lathe in such a manner that tight-

ening them up locks everything. Four small dogs hold the main parts of the jig to the carriage. An adjustable prop, also shown, is located directly beneath the cylinders in order to steady them while boring.

In setting up the apparatus for operation the cylinder of the air compressor is brought up flush against the faceplate of the lathe, thus squaring the jig in that direction, while shims are placed under the front bolts in order to square the casting in a vertical direction. Loosening the dogs previously referred to allows the crossfeed of the lathe to be used and the casting can be moved so that the boring bar will align with either cylinder.

Gage for Boring Motor Bearing Housings

WHEN the bearing housings of railway motors become badly worn after considerable use, it frequently is necessary to build up by electric welding and rebore the motor shell to make an exact fit, since the wear, being uneven, usually gets the housing out of true. The West Penn Railways, Connellsville, Pa., has found that the upper half of the frame is usually worn but little, the major portion of the wear coming on the lower portion. All bearings are, therefore, realigned to the upper half of the frame. The parting line is taken as a reference, and all measurements are referred to it.



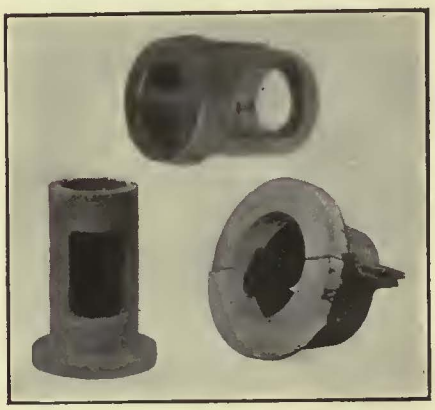
This Gage Shows the Necessary Clearance and Cut in Reboring Motor Bearing Houslngs

To facilitate lining up the bearings, a gage is used, as shown in the accompanying drawing. This consists of a bar of steel, *a*, ½ in. square. A square hole is cut in this at its center, and the gage *b* is inserted at right angles. This is of the ¼-in. section, with a small projection near its center. To line up the motor frame for boring, this gage is placed on the frame as shown. The end of the gage, resting on the bearing fit, leaves a clearance between the lug and the crossbar of the gage. This shows at once the amount of the cut that must be taken to bore to the standard diameter, and the tool may be set to approximate this as closely as may be desirable for the roughing cut.

The boring is done with a solid boring bar, having two tools at each end. The first tool gives the roughing cut, and the second, which is placed opposite and slightly behind it, makes the finishing cut. This bar is mounted in a jig which is bolted to the half of the motor frame, so that when the amount of the cut has been determined by the gage the two ends of the frame may be bored out simultaneously. The boring is done on an engine lathe, the boring jig being clamped to the frame and the frame to the lathe carriage. The boring bar is then held to the headstock, and the feed accomplished by means of the carriage, which can be adjusted for any desired feed.

Bronze Linings for Armature Bearings

THE accompanying illustration shows a satisfactory method of relining armature bearings by forcing bronze sleeves into position, as used by the Easton division of the Lehigh Valley Transit Company. The sleeve before finishing is shown



Armature Bearings and Collars
Top, armature bearing with bronze lining. Left, bronze sleeve before finishing. Right, Axle collar with welded steel face.

You Have to Convince the G. M.

STROLLING down the nicely marked aisle of the machine shop of the Jinxville Electric Railway one morning recently, Bill Jones, the foreman, noticed that "Whistling Dick" Singer, the veteran lathe hand, was not looking as spry as usual. "What's wrong, Dick," he said, "you're all bent up this morning."

"Got a crick in my back yesterday helpin' to lift an armature into place in my lathe. Ole Olson's got a bad hand today, too. Pinched it settin' a motor shell on the bedplate of his radial drill yesterday afternoon."

"Sorry, Dick, that's hard luck!"

"Sorrow ain't enough, Bill. You ought to do something to make it easier to handle things around this here shop. You thought you did a great thing gettin' that radial drill, and it's all right, but there are more labor-savers we ought to have and they wouldn't cost much, either. You ought to get around more to see what they're doin' in other shops, Bill."

"I guess there's something in that."

Approaching Olson, the foreman greeted him: "Hello, Ole, what you been doing to your hand?"

"Dot hand, Mr. Yones, I got caught behind a motor and I yust got one bad smash yet."

"Too bad, Ole. Dick's kind o' laid up today, too, lifting something too heavy for him. You fellows ought to be more careful. It don't pay to get hurt."

"You're right, Mr. Yones, but dem motors' blame heavy. Yes?"

Jones had a thoughtful look on his face as he slipped into the office of William Redfield, the general manager, who greeted him with the query: "Something on your mind, Bill? You look worrried."

"There is that, Mr. Redfield. Two of our good machinists are out of shape today partly because there's too much hand moving of heavy pieces to do around the shop. Ever since I went over to Norfolk and saw the simple and cheap, but practical, jib cranes and trolley hoists in the machine shop there, it has seemed to me we ought to do more of our liftin' and carryin' by machinery. Our shop work is altogether too slow, anyway, and it's mainly because we're doing too much of the horse work by main strength and awkwardness. Ole and Dick might easily have got a serious injury and cost us more than a whole outfit of hoists. They're men I'd hate to lose, too. Dick was talking of quitting the other day because he said he was tired of goin' along 'forever' without any decent tools to work with."

"Well, what do you want me to do about it?" said Mr. Redfield.

"If you would O.K. that purchase order for some new hoists and cranes, it would put us in good spirits again. You see it's pretty hard trying to make a showing for you on low shop costs when we have to do so much heavy work by hand—and run the risk of killin' the men in the bargain."

"Well, Bill, maybe we *had* better do something about it. You send that order over to me again and I'll see if we can't buy the stuff you want."

at the left and the finished bearing at the top. Of course, this method can only be used on bearings where the wall is of sufficient thickness to permit reboring to the extent necessary for inserting the sleeve.

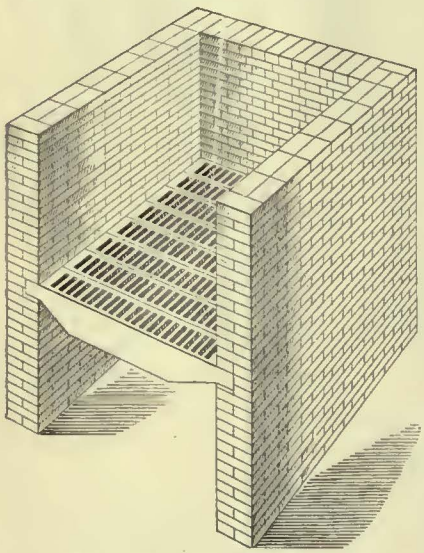
A Westinghouse-306 axle collar is shown at the right in the illustration. This has a steel face welded to it. Originally this type of bearing was provided with a fiber collar.

These methods were developed by C. A. Doud, master mechanic.

Good Combustion for Burning Rubbish

MANY railways burn rubbish, insulation of wires, etc., by placing it in a pile and making a bonfire of it. This method is more or less unsatisfactory, as complete combustion is seldom obtained, and a slight breeze will scatter ashes about the premises.

The Beaver Valley Traction Company, New Brighton, Pa., has developed a very convenient furnace for this purpose that has been found of considerable advantage in getting good combustion and confining the ashes.



Furnace Gets Good Combustion and Confines Ashes

The furnace is built of brick to a height of about 4 ft. above the ground, being open at the top and on one side. At some 2 ft. above the base a grate is inserted in the brick work. This is made of old furnace grates, and while it has openings large enough to permit a good draft, very little ash sifts through.

One use of the furnace that has shown its value is in burning insulation from scrap wire in order that the copper may be reclaimed.

Convenient Type of Welding Room

THE welding room in the Madison Street shops of the Lehigh Valley Transit Company, Allentown, Pa., is in the middle of the shop and is served by an overhead traveling hoist.

Tracks also lead to the opening which, in the accompanying illustration, is shown curtained at the left so that heavy parts can be brought alongside the welding room and handled directly from cars into position for welding. This welding room has openings on three sides for convenience in handling material. These openings are closed with sliding curtains which can be readily folded back to permit bringing in material.

The floor of the welding room is provided with trap doors, through which irregular parts of unwieldy pieces can be allowed to project, so as to facilitate the placing of work for welding.

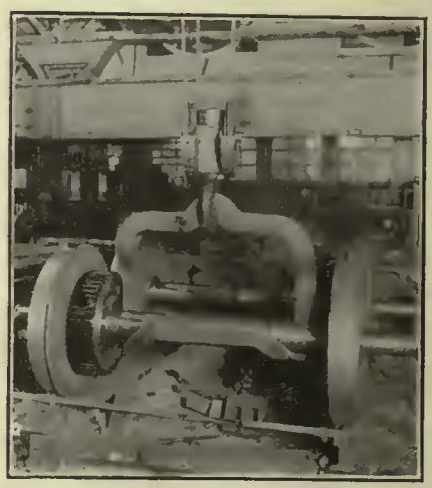
A closet in the left-hand corner of the welding room is used by the operator for his clothing and also for locking up the various welding tools used. A small rack at the side of this small room has shelves for various types of welding rods. Portable tables and stands are used for the convenience of the welder to hold his tools in position so that they can be reached without inconvenience while he is working.

The back of the room is occupied by a lathe with gearing and belting used for building up axles and flanges of wheels, as described in a separate article. (See issue of ELECTRIC RAILWAY JOURNAL for June 9, page 974.

Welding Room in Shop of Lehigh Valley Transit Company

Safety Attachment for Lifting Wheels

WHERE wheels are lifted by attaching a chain to the crane hooks, there is danger of this chain slipping and causing accidents. The accompanying illustration shows a device used in the Thirty-ninth Street shop of the New York Consolidated Railroad for lifting wheels which has proved a great time saver and also eliminated danger of accidents. The lifting rigging is made of ½-in. x 6-in. flat iron and is shaped

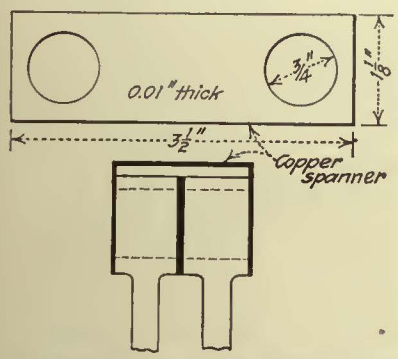


Equipment Used for Lifting Pairs of Wheels in Brooklyn

so as to provide a sling to go underneath the center part of the axle. The upper section has a notched portion in which the hook from the overhead crane fits to keep the crane block centered.

Insuring Proper Contact Between Resistor Grids

TROUBLE is frequently experienced from improper contact between the various grids of car resistors. A common method is to use several copper gauze washers between



Copper Spanner Used for Joining Grids

the grids which are to be connected. The accompanying illustration shows a form of copper spanner which is placed on the outside of two adjoining grids and has been used with considerable success by the Cleveland Railway. It is supplementary to the copper washers.

These spanners are punched out of thin copper and are 1⅛ in. wide by 3½ in. long and 0.01 in. thick. Two holes of sufficient diameter to fit over the insulated rods supporting the grids are punched at either end of the spanner.

Painting Machine Tools to Improve Lighting

IN THE machine shop of the West Penn Railways at Connellsville, Pa., the plan has been adopted of painting all machine tools and other fixtures about the shop with a white gloss paint, in addition to painting walls and ceilings the same color. The use of the white paint on the machines has an important effect in assisting to light up the shop. This not only gives it a more cheerful appearance, but it encourages a higher grade of work on account of the ability of the workmen to see close work better. There is less danger of accidents, as the darker metal parts being worked on are more conspicuous against the general light tone of the shop.

New Equipment Available

Convenient Car Signal Push Button

AN ACCOMPANYING illustration shows the type of car signal push button being marketed by the Fahnestock Electric Company, Long Island City, N. Y. These are designed for high-voltage signal systems using the trolley circuit and are arranged for installation on the window posts. The casing is of insulation composition with no metal parts exposed. The well-known Fahnestock

High-Voltage Push Button, Switch

connectors are used, which enables quick disconnecting of leads without the use of tools. This feature is considered of value for the push button switch, so it can be removed readily for painting or repairing purposes.

New Type of Lantern

THE V. & N. Lantern Company, Inc., New York, N. Y., has recently brought out a new type of lantern for safeguarding building or railway construction work where a red light is needed as a danger signal. A solid ruby globe is used inside the clear glass globe, this colored globe being screwed tightly into a collar so that it can be raised and lowered by means of a lever and spring. The releasing of the lever causes the red globe to rise by the spring action. The movement is slow so as to minimize the danger of breaking. If a white light is desired, the lever is pulled all the way down and latched.

The lantern frame is made of cold rolled steel, tinned or galvanized, or of solid brass or gun metal, as desired. Particular attention has been given to the construction of the fuel tank and burner. Either signal oil or kerosene can be used, according to the burner desired. The construction is such that it is impossible for the light to be blown out by the wind. The lantern burns for more than twenty hours with one filling.

No Weak Spots in Seamless Tape

A SEAMLESS bias tape recently put on the market by the Irvington Varnish & Insulator Company has several advantages for use in wrapping armature coils. It is a varnished cambric tape cut by a special process from a continuous woven roll of fabric, and it is therefore of uniform thickness throughout. The inconvenient bulkiness of the ordinary seam is thus eliminated and there are no weak spots where two pieces are sewn together.

Device for Chucking Irregular Shapes

A NEW universal vise for chucking irregular shapes in lathes has just been placed on the market by Bruce, Dawson & Co., London, England. This is of Swiss manufacture and will grip irregular shapes in the lathe with a single movement.

The vise contains a number of jaws which are operated by the turning of the handle. These jaws have an individual spring action and can be tightened until they touch all over the piece to be held. Two large nuts on the sides are then used to tighten the chuck so that the relative position of the jaws is fixed.

The vise is designed so that it can be bolted directly to the bed plate, table or slide of any standard machine tool in the same manner as is used with an ordinary vise.

It is supplied in three different types, one with a rectangular base for various machine tools, a second for use on lathes and a third for attachment to a bench vise.

Association News & Discussions

Utility Advertising Given New Impetus

Publicity and Advertising Men Hold First Meeting of New Organization Independent of the Utility Associations and Under the Auspices of Organized Advertising Men

THE first annual convention of the Public Utilities Advertising Association, held at Atlantic City, N. J., last week, in conjunction with the annual convention of the Associated Advertising Clubs of the World, with which the former is affiliated, represented the initial definite and concerted action toward bringing the major public utilities of the country under the banner of organized and systematic advertising.

Specific plans were outlined by the directors of the new association for presenting the needs and advantages of the use of the printed word in gaining the sympathetic understanding and support of the people. The principal feature of the plan is to secure the co-operative support of the various utility associations, state committees on public utility information and individual public service corporations which are now using advertising regularly, with a view of convincing the non-advertising utilities of the practical and economical value of paid advertising in making their own problems easier of solution.

The various speakers appearing on the convention program laid emphasis on the extraordinary value of regular and persistent advertising for all kinds of utility corporations for the same reasons that have made advertising the greatest motive power in modern business of all kinds. Considerable attention was also given by the speakers to the need on the part of electric railways, gas companies, light and power enterprises and telephone companies of devoting more thought and energy to the business of developing good will on the part of the customers of these utilities through the medium of truthfully told advertisements.

Veteran advertising experts and publicists contributed valuable papers on the four definite kinds of advertising that are of particular interest to the public utility industry at the present time, these four being as follows:

1. Service advertising to gain volume by exploiting advantages and uses of the service.

2. Merchandise and appliance advertising, in the case of electric and gas companies, to sell goods at retail.

3. Financial advertising to sell the securities that must be disposed of to provide the necessary extensions and additions to plant and equipment.

4. Institutional advertising to lend background and support to the other three.

It was pointed out that the youth of the public utility industry is probably one reason why its advertising methods and practices are not farther advanced, when its field is so inviting. No branch of the industry except gas service is more than forty to forty-five years old, and the gas service, as we have it today, primarily for domestic and heating purposes, is no older. This business has grown amazingly fast. Companies have had to concentrate upon providing the physical facilities required to satisfy public demand for their service. Hence, the need or desirability for advertising has not been acutely felt as it would be in manufacturing, and especially in a young merchandising business.

Another reason presented for the backwardness in utility advertising was that the advertising fraternity itself had been blind to the opportunities offered for promoting and developing business among the utilities. Consequently, public utility advertising has lacked the stimulus of contact with promoters of advertising.

The possibilities of development of systematic advertising among the public service corporations was shown by one of the speakers who called attention to the fact that if the individual companies embraced in the four major utilities expended only one-half of 1 per cent of their annual gross for advertising, it would represent the impressive sum of nearly $20,000,000 a year.

In outlining the origin and development of the present movement, W. P. Strandborg, president of the association, prefaced his report by stating:

"For practically seven years the advertising fraternity in the public utility industry has been nothing more nor less than a bunch of maverick steers roaming the range and milling around trying to horn into the regular herd. We have finally stampeded into the corral and have been branded by the eagerly sought identifying monacker 'O A,' meaning 'Organized Advertising.'"

One of the most impressive features of the convention was the splendid display of utility advertising material. It was assembled and installed under the joint auspices of the three great national utility organizations — the American Electric Railway Association, American Gas Association and the National Electric Light Association, with a number of individual telephone exhibits. The display was unquestionably the most comprehensive and representative utility advertising exhibit ever assembled. It embraced a total of 720 sq.ft. of space, making it one of the largest and most attractive units in the international exhibit. Principal credit for this remarkable presentation of the work of the utility industry is due to E. J. Cooney of Lowell, Mass., who was chairman of the exhibit committee.

At the business session of the convention the following directors were re-elected to serve for three years:

Labert St. Clair, director advertising section, American Electric Railway Association; George F. Oxley, publicity director National Electric Light Association; Charles W. Person, secretary publicity and advertising section, American Gas Association.

W. P. Strandborg, Portland Railway, Light & Power Company, Portland, Ore., was re-elected president; J. C. McQuiston, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., was re-elected vice-president, and B. J. Mullaney, Peoples Gas Light & Coke Company, Chicago, was continued as treasurer.

Frank LeRoy Blanchard, J. C. McQuiston and B. J. Mullaney were re-elected delegates to the National Advertising Commission, and Mr. Blanchard was chosen to represent the utility industry on the joint assembly of the Associated Advertising Clubs of the World.

The report of the secretary showed that in less than six months the association had secured a membership of 169 men engaged in the publicity, advertising or public relations work of the utilities, representing thirty-three states of the Union and three Canadian provinces. Plans are now under way to increase the membership to 1,000 by the end of the year.

PAPERS AND DISCUSSIONS DIGESTED

James O'Shaughnessy, executive secretary of the American Association of Advertising Agencies, gave an informal talk in which he outlined the economic advantages to be derived from co-operation between a reputable, well-organized agency on the one hand and a public utility company which has no established advertising department on the other. Mr. O'Shaughnessy contended that the company which desires to start its advertising activities on a sound business basis can not only save money but can also accomplish very

much more effective results through consultation with an agency which has made a specialty of analyzing public utility organizations and their problems than to "go it alone." He advocated persistency in advertising, also the use of the various recognized media, and called attention to several effective campaigns that had been handled through co-operation with agency people.

The necessity for advertising during prosperous times in order to cultivate the public good will, which may be greatly needed in time of trouble, was the thought running through speeches made at the session. The public utilities field offers an invitation to the best brains in advertising according to Bernard J. Mullaney, who presided, but up to the the present the advertising profession has muffed this opportunity.

The old attitude in the public utility business was, "Here is the service, come and get it." This, he said, has changed, and advertising should rank as a major item of utility company activity and of legitimate operating expense, recognizable as such, along with cost of material and labor, by state commission or other regulatory authority.

Even uniformly good service in time ceases to cry out in its own behalf in the opinion of G. C. Maxwell, former secretary of the Ohio Public Service Commission, and it follows that a public utility company should continually remind the people that the service is good and tell them why it is good. Tell the story of the men with faith who invested of their means, he said; tell the story of the men with vision who struggled for the achievement of an ideal; tell of the army of men and women who daily go about tasks to make the giving of service possible; tell of plans for future development and even further perfection of service. If, on the other hand, there are difficulties which make the attainment of the ideal of service impossible, frankly tell the public so. Tell them what the difficulties are. If further patience and co-operation from them are necessary, boldly ask for it.

The best way for a public utility to advertise is to start with a public safety campaign, according to W. H. Boyce, general manager Beaver Valley Traction Company. That will get the public accustomed to seeing the name of the utility in print, and will not excite suspicion. Afterward good-will and public relations copy may be added advising patrons of the cost of the cars, cost of special work, and cause of delays. Wherever an opportunity exists for criticism on account of shortage of power or uneven track conditions, or shabbily appearing cars, the force may be taken out of the blow by self-criticism, at the same time giving an explanation of why such conditions exist.

The great mistake made by a number of companies, he said, is that they do not start to advertise soon enough. They wait until a fight is on in regard to their franchise, an increase in fare, or some other important problem, at which time a large portion of their riders have formed unfavorable conclusions before the company had presented any part of its side of the case.

A public utility company often neglects to adopt publicity methods, thinking it is saving money, said P. H. Gadsden, vice-president of the United Gas Improvement Company. Then some crisis in the company's affairs arises and immediately there is a frenzied resort to newspaper advertising in the futile effort to reach the public ear—in the vain hope that having neglected to cultivate the public all along, they will listen sympathetically at such a late date to the company's case. This kind of publicity under such circumstances is of little benefit. It is almost a waste of money. Publicity to be really effective must be continuous, sustained, day in and day out.

There is much to tell the public about the service of the utility in the opinion of J. C. McQuiston of the Westinghouse Electric & Manufacturing Company. Each message should carry one specific thought, and the messages should be continuous and not spasmodic. If a utility company uses paid space in the newspapers only when agitation is on foot for a new franchise or when rates must be advanced or when for some other reason that which smacks of a favor asked of the public, then, quite naturally, the public becomes suspicious. Carry the message to the public continuously with a definiteness of purpose. Constant pounding wears away any obstacle in time. If we can so educate the people that they will understand us and support us, he said, we need have no fear of unscrupulous politicians who delight in using the public utility as a political football.

Speeches were made at the same meeting by W. S. Vivian, Middle West Utilities Company; F. H. Sisson, Guaranty Trust Company, and W. H. Hodge, Byllesby Engineering & Management Corporation.

Speaking on "What Advertising Has Done and Can Do for the Public Utilities" at the general session of the advertising convention Floyd W. Parsons, the writer, said that:

"During the war, when the government was obliged to classify the nation's businesses in the order of their indispensability, the people in Washington made the remarkable discovery that practically all of our industries believed they were vitally essential, and were able to produce pages of proof to support their claims. The motion-picture people said that recreation was necessary to keep up morale. The cement people insisted we must go on with our road building. Thousands of manufacturers, running all the way from the makers of motor cars to the producers of toys, showed how life would never be the same, and our fighting efficiency would be materially lowered, if they were compelled to curtail their activities.

"But the utilities did not have to prove their case, and, in keeping with what was up to that time their established policy, they did not try. Of course, a few utility men went to Washington and co-operated with Federal officials, but the fact remains that arguments were unnecessary to show the necessity of keeping utility operations normal. However, the average citizen has become so accustomed to the services the utilities render that now he merely takes them for granted, and the gravest mistake that has been made by our public service executives has been their long submission to this state of public indifference."

Program of the Canadian Association

A TENTATIVE program for the Canadian Electric Railway Association convention in Toronto, June 27 to 30, has been announced. The meetings will be held in the Phonograph and Press Buildings at the Toronto exposition grounds. The headquarters of the association will be the King Edward Hotel.

At a luncheon on Wednesday the president of the association will make his address and the report of the secretary, treasurer and committees will be heard in the morning. The afternoon will be devoted to an examination of exhibits.

On Thursday morning a paper entitled "Deciding on the Proper Motor for a Given Cycle of Duty," by W. G. Gordon, railway engineer Canadian General Electric Company, will be presented. Mayor McGuire of Toronto will address the members at luncheon. The afternoon will be devoted to exhibits again, and in the evening there will be a banquet in the King Edward Hotel.

On Friday morning a paper will be presented by Alexander Jackson, Public Service Railway, Newark, N. J., on "Operation of a Scientific Survey of Traffic Movement for Urban Railways." In the afternon attention will be devoted to exhibits, and in the evening there will be a dinner-dance at the Yacht Club. The election of officers will take place Saturday morning.

Missouri Operators Discuss Railway's Future

THE outlook for street railways was considered at the seventeenth annual convention of the Missouri Association of Public Utilities, held on the river boat *Harry G. Drees* May 23 to 25, 1923. A comprehensive paper by F. G. Buffe, general manager, Kansas City Railways, was read in his absence by H. H. Kuhne. After reviewing the past troubles of railway operations, Mr. Buffe listed the favorable elements in the future development of railways, namely, the fact that service-at-cost is here to stay; the improvement in relations among management, employees and the public; the conviction that street railways are necessary for mass transportation; the need of securing relief from indirect taxation; the realization that although speculative returns are gone, a fair interest return on

capital actually invested will be not only permitted but encouraged, and, finally, that operating methods have advanced and will continue to advance.

B. W. Frauenthal, St. Louis, expressed the feeling that the best way to work out the problems of the future is by continually bringing these problems to the public's attention, since the utilities' most serious obstacle is public ignorance of these problems. E. A. Hart, Cape Girardeau, spoke of his troubles in maintaining local service with poor equipment until a refinancing two years ago warranted the purchase of new equipment, and a right to operate with a 7-cent fare insured greater income. He considered such a service as an important part in the economic development of small towns, but felt that unremunerative service could not be furnished indefinitely without becoming a detriment to the entire community. E. J. Walsh, United Railways of St. Louis, said that he considered unjust the requirement that a railway assume the expense of paving between the rails. He also made a strong plea to the executives, urging them to serve as jurymen rather than "pass the buck" to men of lower caliber. He argued that unless the individual citizen gives more thought to his duties as an American, there will be an increasing danger of drifting away from the principles laid down by the authors of the constitution.

California Electric Railway Association Elects Officers

AT THE annual meeting of the California Electric Railway Association, held in San Francisco on June 4, officers elected for the ensuing fiscal year were: President, Charles N. Black, Market Street Railway; vice-president, H. A. Mitchell, San Francisco-Sacramento Railroad; manager, W. V. Hill. The executive board was increased from five to seven members, the new board consisting of C. N. Black, W. A. Alberger, John A. Britton, Paul Shoup, W. E. Dunn, H. A. Mitchell and Claus Spreckels.

Program of New York Meeting

FOR the annual meeting of the New York State Electric Railway Association at Hotel Champlain, Bluff Point, Lake Champlain, New York, June 23, the program has been arranged as follows:

Annual report of President Benjamin E. Tilton.

"Industrial Relations, Unemployment Compensation and Old Age Pensions," by James E. Kavanaugh, vice-president Metropolitan Life Insurance Company.

"What the Outsider Wants to Know," by Edward Hungerford.

"Telling the Electric Railway Story to Bill Jones," by W. Dwight Burroughs, purchasing agent United Railways & Electric Company, Baltimore, and president Advertising Club of Baltimore.

"Co-ordinating Bus and Trackless Trolley Transportation with Electric Railway Service," by W. B. Potter, chief engineer railway and traction department, General Electric Company.

Election of officers.

The speaker for the evening banquet will be J. Herbert Case, deputy governor Federal Reserve Bank of New York.

Public Ownership Conference in Toronto in September

THE proposed program has been announced for the Public Ownership Conference to be held at King Edward Hotel, Toronto, Ont., Sept. 10-13. The addresses to be made will cover practically all phases of public ownership. On the afternoon of Sept. 12 Delos F. Wilcox will discuss the question "Why Cities Should Own Their Own Utilities." He will be followed by representatives of the cities of Toronto, San Francisco and Detroit, who will talk on the question "Municipal Street Car Lines." It is hoped that all of the thirty cities in the United States and Canada which now run their own railways will have representatives present who will engage in the discussion. Edward F. Dunne, former Governor of Illinois, is expected to talk on the subject "Prospects for Public Ownership in Illinois, with Special Reference to Chicago Street Car Lines." Cornelius Sheehan, commissioner of gas, water and electricity in New York City, has been asked to discuss "The Failure of Regulation in New York City." Charles P. Steinmetz of the General Electric Company will talk on "The Possibilities of Hydro-Electric and Superpower Development."

American Association News

Buildings and Structures

THE committee on buildings and structures of the Engineering Association met on June 8 in New York. Consideration was given to replies to a questionnnaire received from 106 companies on prepayment and post payment inclosures. This includes the consideration of various types of passimeters, turnstiles, fare booths and cashier systems.

The report on the design of small bridges, culverts and trestles was considered with a view to presenting good current practice.

The meeting was attended by N. E. Drexler, chairman, Hampton, Va.; and C. W. Burke, Brooklyn, N. Y. R. C. Cram, sponsor of the committee on way matters, was also present.

Special Reports Available

THE following special reports have been prepared by the Bureau of Information and Service, American Electric Railway Association, and are available to member companies in good standing upon request:

Motor Vehicle Legislation Enacted in 1923.—Copies of all legislation affecting the operation of motor vehicle common carriers passed by the various state Legislatures in session in 1923, with an analytical summary of their principal provisions.

Trend of Electric Railway Operations.—A month by month statement of the combined revenues, expenses, net revenue, taxes, car-miles and revenue passengers of eighty-one companies reporting to the American Electric Railway Association, beginning with the month of January, 1922, and giving a comparison of each month's operations with the operations of the same month of the previous year.

Motor Truck Operating Costs.—Operating figures derived from various sources showing the costs of operating different types and sizes of trucks in a number of different lines of business.

Valuation Decisions.—Abstracts from recent commission decisions in cases in which the valuation of an electric railway's property was an important factor, bringing out the principles which the commission followed in determining the valuation.

Revised List of Companies Operating One-Man Cars.—A new edition of the list issued April 1, showing the number of cars operated by each company, checked and revised in the light of later information, together with a complete income statement and detailed statement of operating expenses per car-mile of a group of companies operating one-man cars exclusively.

In addition to the above compilations, supplements to the Wage Bulletin, Fare Bulletin and Cost of Living Studies have been prepared, bringing them up to date.

Valuation Committee

A MEETING of the valuation committee of the American Association was held in New York on June 4. Tentative reports of the sub-committees on price trends and on the relative weight to be given various methods of valuing properties were presented. In the study made by the latter sub-committee of decisions by various commissions and of communications from the commissions discussing their methods it appears that there is a leaning toward giving very substantial weight to reproduction costs on the basis of present prices. The sub-committee on price trends had included in its work since the last meeting a curve showing the trend of prices of the electric railway materials and equipment.

Those present were L. R. Nash, J. A. Emery, W. H. Maltbie, Prof. A. S. Richey, J. F. Hamilton, C. S. Klumpp, Frank Silliman, Jr., H. A. Clarke and C. W. Young, representing W. V. Tuttle.

The News of the Industry

Board Hears Plans

High-Speed Development in Philadelphia Estimated at $200,000,000—Mitten Discusses City's Subway Needs

The second meeting of the Councilmanic Transit Commission of Philadelphia was held in the City Council chamber on June 12. The members of the commission were present, as well as Ralph T. Senter, vice-president of the Philadelphia Rapid Transit Company, and S. M. Swaab, who, with Mr. Twining, are the conferees on the proposed high-speed lines.

The proposals submitted indicated that conferences between Mr. Senter and the city Transit Director were leading toward a solution of the traction difficulties. One new proposal of the transit company's engineers and regarded by the city engineers as practicable was for a surface subway on Locust Street to carry into the business center the three West Philadelphia lines. The adoption of this plan would mean the relief of present surface congestion in the center of the city.

The principal feature of Mr. Twining's proposal was four tracks in Broad Street to Arch Street, instead of a diversion into Ridge Avenue with two tracks. That would do away with the Ridge Avenue loop and promote express service as far as Arch Street, he said.

Near the close of the session there was some talk about costs, and Mr. Senter estimated that the cost of the high-speed development would be from $200,000,000 to $225,000,000, according to the transit company plans. Mr. Twining's estimate for his plan, including the extension to Darby, was $100,000,000.

The Councilmanic meeting came the day following a session before the Public Service Commission, where Thomas E. Mitten, chairman of the board of directors of the Philadelphia Rapid Transit Company, told the commission that Philadelphia needed not less than $100,000,000 as the first move to meet the subway requirements and that the city's borrowing capacity was insufficient to obtain the money without a pledge from the operating company to pay the rental. The commission, sitting as a whole all day, considered the argument on the rate of fare and the value of the company's property.

Samuel Rosenbaum, assistant city solicitor, attempted to show that the company was making excess earnings of $5,400,000, which should be turned back to the car riders in the form of a reduced fare. Mr. Mitten declared that upon the credit engendered by the 7-cent cash fare and four tickets for 25 cents, the Philadelphia Rapid Transit Company had undertaken a $10,000,000 program of improvements, which included new cars, crosstown feeders, trackless trolleys and motor buses, and that the company was planning further improvements which would make the surface system a credit to, as well as a feeder of, the city-built subway to come. Further, he argued that subways were the immediate need of the city and company, since the city could not develop its home-building outskirts without city-built subways, nor could the Philadelphia Rapid Transit accommodate its 50,000 000 added passengers per annum without subways to provide uninterrupted service throughout the delivery district. In his talk to the Commission Mr. Mitten said:

> P. R. T. economies, resulting from cooperation of men and management, approximate $16,000,000 per annum, which is the reason why the cash fare is but 7 cents in Philadelphia, as against 10 cents in Pittsburgh.
>
> P. R. T. has proved to its own satisfaction that the present cost of reproducing its property exceeds $300,000,000, which, at only 7 per cent, would entitle it to $21,000,000 of return per annum. If P. R. T. received in reward but one-fourth of its proved economies, then $4,000,000, thus added, would make P. R. T. entitled to $25,000,000 of annual return, or more than double the amount which it now distributes by way of interest, rentals and dividends on P. R. T. stock.
>
> The city, in its most extreme claim, attempts to show the company is being entitled to but little more than $9,000,000 per annum as a return on original cost. If we add to this unduly shrunken amount but one-fourth of our proved economies, $4,000,000, the total annual return to which P. R. T. is entitled would be $13,000,000, which is more than the company at present receives as a return upon the capital invested, and, in fact, is all that the present 7-cent cash—four tickets for 25 cents—fare can now be made to produce.

Coleman J. Joyce, counsel for the transit company, then gave some facts on the cost of reproducing the company's property and fixed the value of the property at $316,423,557. For the city, Mr. Rosenbaum contended that the value of the property, based on the original cost, should be $130,000,000. Mr. Joyce argued for an 8 per cent return and Mr. Rosenbaum thought 7 per cent sufficient.

Wage Agreement Being Negotiated by Interborough

Preliminary discussions have begun between the officials of the Interborough Rapid Transit Company, New York City, and representatives of the employees with a view to extending or modifying the existing wage agreement which expires June 30. Present wage schedules were accepted by the employees in July, 1921, to be effective for one year. The period of the agreement was extended in July, 1922, for twelve months to June 30, 1923.

Arbitration to Decide

Dispute of Tri-City Railway Demanding Seventy-five Cents an Hour Must Go Before Three Boards

Boards of arbitration will shortly consider the wage demands of the trainmen employed by the Tri-City Railway. Negotiations covering both the Iowa and Illinois lines of the company and the Clinton, Davenport & Muscatine interurban as well have been in progress for the past six weeks and have resulted in an impassé which arbitration has been called on to remove.

The men, now drawing a top scale of 55 cents an hour, have asked for a wage of 75 cents an hour. The company has declared its inability to pay this increase and, following various proposals, among which was the offer of a slight increase to the Iowa trainmen, arbitration has been invoked.

The company recognizes the union locals, but does not recognize the International Association, with which the unions are affiliated. The International has had an official in Davenport for several days advising with the union locals, but this official has not attended any of the conferences between the men and the traction line officials.

For the companies, R. J. Smith, general manager of the Tri-City Railway of Iowa; T. C. Roderick, general manager of the Tri-City Railway of Illinois, and Clarke Anderson, head of the Clinton, Davenport & Muscatine interurban, have been conducting the wage negotiations. These negotiations have now extended longer than the period covered by the old contract, which expired June 1. An agreement has been made between the men and the company, however, by which the finding of the arbitrators will be retroactive to that date.

The wage scale is to be settled by three separate boards, one to fix the wage on the Illinois lines, one to decide the scale for the Davenport city lines and one to determine the rate of pay for the interurban trainmen.

No strings are tied on this arbitration agreement, the finding to be binding on each party and evidence of any pertinent nature to be considered. The men at first asked that 55 cents be established as a minimum wage, below which the board of arbitration would not go in its consideration of the scale. This attitude, however, was later abandoned.

Last year the men voted to accept a company offer and the scale was settled in a short time. Two years ago the wage went to a single board of arbitrators for the three lines.

Pittsburgh Railway Report Expected by Sept. 1

As a result of the termination of the argument on the reorganization of the Pittsburgh Railways on June 11, Special Master Henry G. Wasson will submit his recommendation to the court prior to Sept. 1. This is the final date set by the State Public Service Commission for the completion of the reorganization.

Attorney A. W. Robertson, counsel for and vice-president of the Philadelphia Company; City Counsel C. K. Robinson, and Attorney E. W. Smith presented the arguments in behalf of the proposed organization, to which there was no opposing argument. The attorney for Receivers Fagan, George and Tone said that they had placed all records at the disposal of the investigation.

At the meeting before Special Master Wasson at his office in the Frick Building, Attorney Robertson reviewed the progress of the railway company during the five years it has been in the hands of the receivers. Attorney Smith called attention to the fact that if a reorganization is not effected now, it may be some time before circumstances for such a plan are so favorable. If the master's report is contrary, the agreement with the city will be abrogated and the plan of deferred payment will fail. Attorney Robinson in behalf of the city urged a speedy reorganization.

In connection with the company's reorganization it was brought out by Arthur W. Thompson at a previous meeting that two modifications of the present carfare of 8½ cents now being charged by the railway were being considered by officials of the company. These changes were a slight reduction of fare at times other than rush hours and a reduced fare for school children. He said further that it was the plan of the company to expend $5,000,000 more for better equipment, $3 000,000 for 300 new cars and $2,000,000 for the improvement of lines, carhouses and other parts of the service. He took occasion to praise the work of the receivers and said that they were naturally handicapped by the conditions of the receivership which restricted expenditures for improvements.

Working Agreement Signed—Wages to Be Arbitrated

A new working agreement between the Connecticut Company and the Union was signed on June 7 while the question of an increase in wages on which there was a split was sent to arbitration. President Lucius S. Storrs and General Manager John K. Punderford signed the working agreement on behalf of the company while the state conference committee of the local unions signed on behalf of the men. The action came at the conclusion of a joint conference.

The men rejected by a large vote several days ago the offer of the company for an increase of 4 cents an hour. The company at the conference on June 7 declared that its financial burdens would not permit a greater increase than 4 cents an hour while the union representatives maintained the company was financially able to increase its offer.

When it became evident that agreement was impossible at this time both sides decided to turn the matter over to a board of arbitration to be selected later.

Let the Daily Din Deafen

The louder the noise, the greater the impression. So thinks Special Deputy Police Commissioner Barron Collier, who is not satisfied with the daily din at 3 o'clock. He has asked all factories to blow their sirens for one minute beginning at 2.59 as the pupils start home from school. The observance of "Safety Hour" began on May 25. Since that date automobiles have tooted their horns and large buildings have blown their whistles as a safety reminder to both school children and automobile drivers. The din, however, is not deafening enough. Mr. Collier says there are only a few more school days left and that he wants to finish the school year with the least possible number of accidents.

Last year 477 children were killed in the streets and many more were seriously injured. The greater part of these accidents occurred during what is now termed "Safety Hour." Reference to the "Safety Hour" idea and Miss Aunty Walker's activity has been made previously in the ELECTRIC RAILWAY JOURNAL.

Increased Service in Schenectady —Injunctions Against City Made Permanent

The strike situation on the Schenectady Railway remains unchanged, with both the union and the company deadlocked. The trolley company is gradually increasing its service and has been able on one or two nights to maintain service until 10 o'clock. The police have been successful in preventing much disorder, although one or two cars have been stoned. Partial interurban service is being maintained.

Two temporary injunctions obtained by the railway company against the city were made permanent by Supreme Court Justice Edward M. Angell at Fonda. One forbids interference with the operation of cars, while the other restrains the city from enforcing an ordinance requiring operators to have fifteen days' experience under the guidance of experienced operators. Justice Angell held that the city's order holding all cars in the carhouse during the strike was clearly in violation of state railroad laws.

The Schenectady County Board of Supervisors by resolution have called upon the county judge to revoke the revolver permits of all strike breakers. Judge McMullen, when informed of the Supervisors' action, said he would revoke licenses only after specific complaint had been lodged and it had been shown that there was a reasonable cause for revocation.

Discussions Held on Beeler Recommendations for New Orleans

Conferences have been taking place since June 4 in New Orleans over the Beeler organization plan for the traction lines of the city. At the initial conference on June 4 in the Council chamber there were present members of the Commission Council, property holders interested and Major H. R. Copper, representing the Beeler survey bureau. At this meeting the 125 or more changes in the trolley system recommended by the experts were divided into five groups.

The greater part of the time occupied at the conference was taken up by Major Cooper, who had his subject well in hand and pointed out clearly and distinctly the reasons which had prompted the Beeler people to recommend the changes submitted. He said the survey had disclosed that there were two sections of the city that were rapidly developing and to which sufficient and quick street car service would be imperative in the near future. One was the section in the lower part of the city from Lafayette Street to the Industrial Canal and the other in the upper end of the town from Carrollton Avenue to the water filtration plant.

At a later conference he brought out the fact that the city of New Orleans had a tremendous mileage of track and ample equipment to meet its present transportation needs after the elimination of certain lines, the extension of others and the straightening out of others.

In the opinion of Commissioner Paul Maloney, it may be a week or ten days before the Commission Council will be able to take action on the recommendations following the public hearings.

Dismisses Appeals Against New York Railways

An order was entered by the United States Supreme Court on June 11 dismissing for lack of jurisdiction appeals by the Eighth Avenue Railroad and the Ninth Avenue Railroad in suits against Job E. Hedges as receiver of the New York Railways. No written opinion was given in either case. The suits were parallel in nature and were considered as one.

Both companies leased their lines to the New York Railways. When a receiver for the latter was appointed, they filed bills for return of their properties, and several months after the receivership the two properties were returned. The companies then sued for rental during the period the receiver controlled their lines. The District Court declined to order immediate payment of the rents and the complainants asserted that the decree gave no assurance of ultimate payment. The Court of Appeals affirmed the District Court and the two companies appealed to the Supreme Court. In defense, it was pleaded that as both companies are New York corporations, no Federal question was involved. The Supreme Court upheld this plea.

Los Angeles Voters Approve Subway Terminal

The proposed subway terminal franchise was carried by the voters of Los Angeles by a large majority at the city's general election held on June 5. The proposition, which was reviewed in the ELECTRIC RAILWAY JOURNAL, May 26, page 899, was to grant permission to the Pacific Electric Railway to establish under Pershing Square the central station of its $20,000,000 subway system, the first unit of which will be the tubes to give rapid transit service between Los Angeles and the Hollywood district.

At the same election the voters decided in favor of a $2,000,000 bond issue, representing the city's share of the proposed expenditure of $10,000,000 for constructing six new viaducts over the Los Angeles River at Macy, Aliso, First, Fourth, Seventh and Ninth Streets. In addition to bridging the river these viaducts will also cross the numerous steam railroad tracks on each side of the river, thus eliminating the grade crossing hazards and costly traffic and transportation delays at these important industrial district grade crossings. Street car lines are operated over the river on these streets and the delay to street car traffic has been growing greater year by year. The remaining four-fifths of the cost of the new viaduct is to be borne by the street railway companies, the steam railroads and the county of Los Angeles. The work of constructing these viaducts will be commenced shortly, the plans providing for building one at a time to reduce the necessary traffic detours.

The voters also approved of a bond issue of $15,000,000 for improvements at Los Angeles Harbor, which bond issue just equals the amount already authorized and expended for the development of the city's investment on its waterfront. This means the enlargement and construction of more docks, wharves, more dredging and additional switching and storage tracks. The city now owns more than 21 miles of switching and storage tracks serving its municipally owned docks and wharves. More than two-thirds of this circuit is electrified, the switching being performed by the Pacific Electric Railway for the city by means of electric locomotives.

Wage Decision for Scranton Railway Employees Awaited

The arbitration proceedings between the Scranton Railway and Division 168 closed on June 6. The board is composed of James H. Vahey, chief counsel for the Amalgamated Association; Lawrence F. Hart, business agent of Division 168 of the Amalgamated, for the men, and Joseph O'Brien, of the law firm of O'Brien & Kelly, and Ralph W. Rymer, prominent attorney of Scranton, arbitrators for the company, and the fifth arbitrator, or referee, is the Right Rev. Bishop M. J. Hoban of this diocese.

The only issue between the company and the men is one of wages. The company is paying its platform men 50, 55 and 60 cents an hour, and the men contended for 60, 65 and 70 cents, with a corresponding increase for shopmen and trackmen. There was very little oral testimony submitted by the men or the company, all the evidence by the above parties being explained in exhibits. Arguments were made by P. J. Shea, international representative of the union, and James J. Powell, attorney for the men, while Charles P. O'Malley, of the law firm of Knapp, O'Malley, Hill & Harris, made the argument for the company.

The board adjourned until June 23, when it will reconvene, and it is expected that a verdict will be handed down by Bishop Hoban by June 25.

Fares Increased — Increased Wages Sought in Seattle

By a vote of 7 to 2, the Seattle City Council passed over Mayor E. J. Brown's veto the carfare ordinance increasing fares on the Seattle Municipal Railway lines from 5 to 10 cents, with three fare tokens for 25 cents. The increased carfare ordinance becomes effective July 4. Several plans for further increasing street railway revenues are under consideration by the Councilmen, including consideration of the weekly pass system.

Under the present outlook, it is likely that railway trainmen will be compelled to wait for ten days or two weeks before receiving pay due on June 10, when pay warrants amounting to $125,000 became due, but for which there is no balance to the credit of the railway. The Seattle banks, through the Bank Clearing House Association, have refused to cash the street railway warrants.

To complicate the situation further, a general demand for increase in wages has been made by all shopmen, linemen and laborers of the Municipal Railway, and by the conductors, motormen, one-man car operators and cable car employees. The increased wage is asked to become effective Jan. 1, 1924, and is asked at this time to permit of its being included in the railway budget.

Under the schedule demanded, conductors and motormen would receive a minimum of $180 a month instead of the present scale of $135 for the first year, $145 for the second year, $150 for the third year, and $155 thereafter. One-man car operators are asking for 20 cents an hour over the scale for other platform men, which would bring their wages to $228 for a thirty-day month. They are now receiving $164.60. There are 1,450 platform men employed. Shopmen, numbering about 200 at present, are asking for increases ranging from 50 cents to $1 a day and track workers are asking for an increase of approximately 25 per cent. If such increases and others sought were granted it would mean that $650,000 annually would be added to the street railway payroll.

Large Improvements in Richmond Planned

Elaborate improvements to the service of the Virginia Railway & Power Company in Richmond are planned under the new franchise which now is before the City Council, according to a map which has just been drawn up by the company for the information of the Councilmen. The map shows a number of new street car lines in every section of the city, proposed under the new franchise, a number of extensions of existing lines, and the removal of a great deal of track conflicting with lines now in successful operation.

One of the provisions includes important changes in the heart of the city. They include the construction of a block of track on Grace Street between Seventh and Eighth Streets, and of track on three sides of a block between Marshall and Clay Streets. The first move would allow the company another loop in the downtown district, as it has tracks on Broad, one block north, and on Seventh and Eighth Streets at the present time. The second provision would give the Highland Park line a terminus two blocks away from the present congested district at Seventh and Broad Streets. The cars now must stand at this point until trolleys can be changed and the only cars available are those which can be operated from both ends.

This program would call for a huge expenditure of funds and would eliminate a great deal of trackage not essential, adding a great deal of much needed trackage. Councilmen are much pleased with the proposed improvements, and are believed to be in favor of the proposal.

Double Tracking Arranged Without Any Paving Obligation

The Common Council of Beloit, Wis., has confirmed an agreement with the Beloit Traction Company and the Rockford & Interurban Railway, joint users of the track, calling for the construction of a double track on South State Street. The city will not require either of the companies to pay any part of the repaving of the street, which is to be done simultaneously with the laying of the new tracks.

The Rockford & Interurban Railway holds a franchise giving it the right to maintain a single track in the center of the street, such as is now in use. From the point of view of that company this track is ample for its needs. The city, however, needs the double track. To obtain it the three-cornered agreement was worked out. The interurban company assumes the expense of moving its track to one side in exchange for the city's waiving the cost of paving between the rails as called for in the franchises. The Beloit Traction Company agrees to lay the second track as part of its future loop around Broad and Pleasant Streets. The city bears the expense of paving between the rails of this track.

Strike Averted in Chicago—Arbitration Will Decide Wage Issue

There will be no strike in Chicago. The wage controversy will be settled by arbitration.

The agreement to submit the wage dispute in Chicago to arbitration came on June 12 after a series of conferences between officials of the companies and representatives of the unions held in the office of Mayor Dever in the City Hall. Shortly after 1 o'clock on that day it was unanimously agreed that there should be no strike and that the wage dispute be submitted to a board of arbitration. The wage scale fixed will be for two years, from June 1.

Mayor Dever, who was successful in his negotiations to bring about arbitration without a tie-up of the city's elevated and surface lines, will appoint the umpire, or third member of the arbitration board. The Mayor suggested that he would prefer to name all three members of the arbitration board, but the union representatives refused to consider this proposal. Members of the board will be selected in a few days.

The only question to be considered by the board of arbitration will be that of the 10 cents an hour increase demanded by the men. Officials of the company insisted that the whole question of working conditions should be opened in the event an arbitration board passed upon the merits of the controversy. The union representatives, led by William D. Mahon, international president, who came from Detroit to be present at the negotiations, agreed to leave the question of the wage increase to arbitration, but refused to permit the question of working conditions to be considered.

The union officials will not go back to their locals for approval of the arbitration plan, as the unions in their resolution adopted last week voted authority to the leaders to negotiate "any reasonable settlement."

Farewell Dinner by Englishmen

Messrs. J. C. Mitchell, Ivor Frazer, Albert Rozier and E. Boyes, the four Englishmen connected with the London railway and bus operations, who have been studying transportation conditions and methods in the United States during the past six weeks, on June 11 gave a farewell dinner at the Lotus Club, New York City, for a few of their acquaintances within easy reach. They sailed on the Aquitania June 12. During their stay in this country they visited New York, Albany, Montreal, Toronto, Buffalo, Cleveland, Detroit, Chicago, Pittsburgh, Washington, Philadelphia, Atlantic City and Boston.

The four men were exceedingly enthusiastic over the cordiality and hospitality they had been extended everywhere. They praised our railway people in highest terms, not only for the reception they had been given, but for the manner in which everything in the way of information had been opened up to them. They said that they now saw traction matters in an entirely new light. They were reluctant to express any views of their impressions of American railway work until they had had time to think over all of the things they had seen and heard. As Mr. Frazer, who is responsible for the famous London underground posters, put it, his mind was a "mass of mental pulp," because of all the things he had tried to absorb from American practice.

In other informal talks made at the dinner there were many complimentary references to the work of the English railways and to the success attained by Lord Ashfield. Frank Hedley, who lived in England the first nineteen years of his life, said he had attended the dinner to Albert H. Stanley, now Lord Ashfield, when the latter went to London to manage the railways, and he said that knowing the British people, he knew that the promotion and elevation of Mr. Stanley was because he had "made good."

The guests at the dinner were: N. A. Bolen, E. F. Gaynor, E. C. Faber, R. H. Montgomery, Fred H. Gallagher, H. H. Vreeland, John L. O'Toole, W. C. Burton, Frank Hedley, B. A. Hegeman, H. C. Clarke, F. O. Wood, Fred Sargent, C. E. Morgan, Charles Castle, H. C. Donnecker, C. P. Norcross, M. R. Boylan, H. A. Hegeman and H. L. Brown.

News Notes

Increase in Wages of Five Cents.—Trainmen employed by the Lake Shore Electric Railway Company, Cleveland, will receive an increase in pay of 5 cents an hour. This will bring their wages to a maximum of 55 cents an hour for the fifth year of service. The trainmen on this line now start for 50 cents an hour and get 1 cent an hour increase for each year of service

Line to Be Rehabilitated.—The Arkansas City-Winfield Northern Railway, Wichita Kan., will be rehabilitated and shortly put into first-class shape. The property, formerly known as the Southwestern Interurban Railway, was purchased early in 1923 by a group of Wichita capitalists. The line consists of 15 miles of interurban and 5 miles of city lines in Winfield and Arkansas City, Kan. The president of the company is George Theis, Jr., who is president of the Arkansas Valley Interurban Railway.

City Club Behind Railway Program.—The City Club of Atlanta, Ga., has joined with numerous citizens in expressing the hope that the Georgia Railway & Power Company "will receive every reasonable opportunity and encouragement in the development of its service, which means so much to the present and future of the city." It has adopted resolutions embodying these sentiments. The improvement program of the company was reviewed previously in the ELECTRIC RAILWAY JOURNAL.

Foreign News

Freedom from Accidents

The number of drivers who have entered for the drivers' freedom from accident competition for 1923 of the London Safety First Council is no fewer than 10,908, or about 50 per cent more than last year. The competition is open to drivers of all classes of road vehicles, including tramcars and buses. Each competitor free from accidents during the year receives a prize in money, or a badge, medallion or diploma.

Difficulties of Tramway Extension in London

At a recent meeting of the London County Council, C. W. Matthews, chairman of the highways committee, referred to the proposals for the extension of the London Underground Railways. These railway companies, he pointed out, were in a different position from the Council. They were able to secure without difficulty full consideration by the committees of Parliament of any proposals for extensions which they might bring forward. But the Council could not introduce a bill into Parliament for tramway extensions unless it first obtained the consent of the local road authorities. That was provided by Parliamentary standing orders, and Parliament had consistently refused to relax these orders. The highways committee had for some time been in communication with the local road authorities concerned with regard to the possibility of seeking powers for the construction of certain new tramways. When they knew to what extent the authorities affected would be prepared to give the necessary consent, they might proceed with a Parliamentary bill.

London Tramway Finance

Although the traffic receipts of the London County Council tramways, like those of a good many others in England, continue to show a decrease, it was mentioned at a recent meeting of the Council that the accounts for the past fiscal year would show a surplus. This can only arise from a reduction in expenditure. The cost of materials has, of course, fallen and wages continue to come down. Early in May another 1s. per week came off wages under the sliding scale arrangement, which will mean a saving on the London undertaking of £31,000 a year. The official index figure of the cost of living at May 1 was 70 per cent above that of July, 1914, as compared with 74 per cent on April 1. As the index figure falls, so do wages. It may be recalled that the deficiency on the working of the London County Council tramways for the year 1920-21 was £590,000 and for the year 1921-22 it was £88,000.

Financial and Corporate

$1,917,044 Net in Atlanta

Georgia Railway & Power Company Reports This Amount for 1922 Before Depreciation and Dividends

After payment of operating expenses, taxes, rentals and interest, the balance of the year's operations of the Georgia Railway & Power Company, Atlanta, Ga., for 1922 amounted to $1,917,044, and after the payment of sinking funds to $1,666,253. Reserves for maintenance, damages and contingencies are charged to operating expenses. In 1921 the actual expenditure on these accounts was $9,556 less than the amount charged in operating expenses and credited to reserves. In 1922 the expenditure on these accounts was $364,066 less than the amount charged in operating expenses and credited to reserves. It is thus explained that in order to make a true comparison on the basis of actual expenditures for operations between the "net income" of 1921 and the "net income" of 1922 there should be added to "net income" for the year 1922 the sum of $354,510.

Pursuant to the provisions of the general mortgage of Georgia Railway & Power Company dated Nov. 1, 1921, and to an order of the Railroad Commission of Georgia dated June 7, 1922, the company issued during the year $3,500,000 of twenty-five year 6 per cent general mortgage gold bonds, series of 1922, secured by a general mortgage on the property, subject to the first and refunding mortgage dated April 1, 1914, and the mortgage of the Atlanta Water & Electric Power Company, and also secured by a deposit with the trustee of $3,500,000 par value first and refunding mortgage 5 per cent bonds, which latter, owing to the low interest rate, were unsalable under current market conditions at a price the company could afford to take. Inasmuch as bonds can only be issued under the general mortgage to the extent that first and refunding mortgage bonds are deposited with the trustee of the general mortgage as collateral, the issuance and sale of this $3,500,000 general mortgage gold bonds, series of 1922, did not increase the bonded debt of the company.

Of this issue of $3,500,000 of general mortgage gold bonds $631,700 of the proceeds were used in paying off the balance due on account of the purchase price of the Tugalo power plant equipment and machinery. The balance of proceeds, namely, $2,553,300, was deposited with the trustee to be used exclusively for the purpose of completing the Tugalo Development, increasing the capacity of the Morgan Falls plant, and other items of new construction necessary for the transmission, distribution and delivery of electrical energy, all as authorized by the Public Service Commission of Georgia.

The company issued during the year $2,500,000 first preferred 8 per cent cumulative stock, series of 1922. The sum of $2,000,000 par value of this new stock was used in retiring the $2,000,000 first preferred 6 per cent cumulative stock of the company together with the accrued and unpaid dividends thereon aggregating $30.50 per share. The remainder of $500,000 par value of the new first preferred 8 per cent cumulative stock, series of 1922, was sold for cash at par, and the proceeds placed in the treasury of the company to be used or applied only for the acquisition or construction of new and additional property, or reimbursing the company for expenditures already made for new construction.

GEORGIA RAILWAY & POWER COMPANY AND LEASED AND SUBSIDIARY COMPANIES

Income Statement

	1921		1922	
Operating revenues	$14,080,903		$14,449,497	
Operating expenses	8,476,795		9,130,345	
Net operating revenue		$5,604,108		$5,319,152
Less taxes		916,765		952,188
		$4,687,343		$4,366,964
Other income		350,921		417,190
Gross income		$5,038,264		$4,784,154
Bond interest and rental dividends of leased and subsidiary companies		1,679,228		1,694,311
		$3,359,036		$3,089,843
Other interest of leased and subsidiary companies	$158,126		$185,869	
Extinguishment of discount on securities of leased and subsidiary companies	9,287	$167,413	9,661	195,530
		$3,191,623		$2,894,313
Bond interest Georgia Railway & Power Company		655,017		888,350
		$2,536,606		$2,005,963
Interest on notes Georgia Railway & Power Company	$221,239		$26,744	
Extinguishment of discount on securities Georgia Railway & Power Company	88,903	310,142	62,175	88,919
Net income for the year before depreciation and dividends		$2,226,464		$1,917,044

NOTE: As stated in the text of the report $354,510 must be added to the "Net Income" for 1922, as shown above, to make a true comparison with 1921, resulting in "Net Income" for 1922 on the basis of actual expenditures for operations of $2,271,553 compared to $2,226,464 for 1921.

Under the terms of sinking fund provisions of the respective mortgages, the total sinking fund requirements for the year were $253,042.

On Dec. 31, 1922, the total mileage of railroad tracks (on a single-track basis) owned or leased and controlled and operated by this company, including the mileage in Gainesville, Ga., was 247.303.

During the year 1922 the company placed an order for twenty city-type electric railway double-end pre-payment passenger cars with a seating capacity of forty-eight passengers each at an aggregate cost of $256,000. These cars have all been delivered and are now in service.

During 1922 the company transported 94,208,490 passengers, as against 93,557,131 in 1921.

Alabama Company Revalued at $29,000,000

The valuation of the Alabama Power Company properties was recently fixed by the Public Service Commission for rate-making purposes at $29,000,000. This order supersedes the order issued by a majority of the commission on Dec. 13, 1922, which fixed the valuation at $33,843,252. The order of last December never became effective, having been suspended pending application by the Alabama Mining Institute for a rehearing.

The revaluation places the properties at $4,943,252 less than the original valuation as made by Associate Commissioners Cooper and Gaillard before leaving office. In reaching the new valuation the commission considered the evidence submitted in the original hearing and made new investigations into the various phases of the case.

The new valuation, which covers all property of the company as of June 30, 1920, plus property acquired since that time, including the utilities of Montgomery, is $15,000,000 less than the final valuation placed by Hagenah & Erickson, engineers, who made an inventory and appraisal of the property for the commission after the valuation case was docketed in 1920. Their original report placed the valuation at approximately $47,000,000. Later, conferences between them and I. F. McDonnell, engineer for the commission, caused a reduction of the valuation to approximately $44,000,444. A check was then made by Mr. McDonnell of the valuation recommended by Hagenah & Erickson and of the valuation of Morris Knowles, who was employed by large consumers of power, and his recommendation was the establishment of the $29,000,000 valuation. The order states that the above valuation included the sum of $1,500,000 working capital and $3,750,000 as going concern value.

Before the valuation can become final sixty days must elapse for protest. Upon the expiration of sixty days, unless protest is filed, the valuation fixed becomes final. Governor William W. Brandon stated the valuation arrived at had his full approval and was in line with his own ideas as to the fair value.

Receivership Ends

Brooklyn-Manhattan Transit Corporation Starts Operation—Menden Heads New Company

The receivership of the Brooklyn Rapid Transit Company, with the exception of certain formalities affecting the surface lines, was terminated on June 14, when Judge Mayer of the Federal District Court ordered turning over the properties to the newly organized Brooklyn-Manhattan Transit Corporation. The new company began operation at midnight, but the receiver will operate the surface lines for a few days.

The officers of the new company are: Gerhard M. Dahl, chairman of the executive committee; Albert H. Wiggin, chairman of the finance committee; William S. Menden, president; George D. Yeomans, vice-president and general counsel; Howard Abel, comptroller. The offices of secretary and treasurer have not as yet been filled. J. H. Bennington, who has been in charge of the department of real estate and taxes under the receiver, will be continued in the same capacity with the new company.

The board of directors includes three members named by the Transit Commission to represent the public. This is in accordance with the reorganization plan. These men are: Travis H. Whitney, former Public Service Commissioner; Alfred E. Marling, former president Chamber of Commerce, New York, and Robert A. Shaw, formerly chairman transit committee, Brooklyn Chamber of Commerce. The other directors are: Arthur S. Somers, president Brooklyn Chamber of Commerce; Charles A. Boody, president People's Trust Company; J. Sherlock Davis, president Cross, Austin & Ireland and former president Brooklyn Chamber of Commerce; James H. Post of B. H. Howell Sons & Company; William H. Johns, president George Batten Company and former president of Queens Chamber of Commerce; William H. English, director Brooklyn Trust Company; William S. Menden, president Brooklyn-Manhattan Transit Corporation; Albert H. Wiggin, president Chase National Bank; Frederick Strauss of J. & W. Seligman & Company; Matthew C. Brush, president American International Corporation; Charles S. Sargent, Jr., of Kidder, Peabody & Company; Gerhard M. Dahl, of Hayden, Stone & Company and George S. Franklin of Cotton & Franklin.

Prior to Judge Mayer's action dissolving the receivership, Lindley M. Garrison, receiver of the Brooklyn Rapid Transit Company, presented his final report on the transactions of the receivership. Mr. Garrison took occasion to thank the court for its splendid co-operation, which was reflected in the comparatively short time within which the intricate matter was brought to a conclusion. Further, that only those matters which absolutely necessitated it were brought before a master and so the seven receiverships involved had only incurred a relatively small expense for master's fees. He also thanked the able counsel and then acknowledged the help which General Manager William S. Menden and heads of the different departments gave to the work.

The salient facts brought out in the report included the following:

Approximately $26,000,000 has been spent on the rapid transit lines for new construction and the purchase of equipment.

Approximately $1,600,000 has been expended on the surface lines for track reconstruction, car reconstruction and new cars.

The Brooklyn Rapid Transit receiver has spent out of earnings upward of $3,700,000 on the construction of the Williamsburg power plant.

Power bills in arrears owing by the surface companies in receivership in the total amount of $1,710,799 have been paid.

Taxes in arrears in the amount of upward of $3,000 000, as of Nov. 30, 1920, have been paid and all current taxes levied have been paid, except for contested items.

4.40 miles of company owned rapid transit lines under construction at the beginning of the receivership have been completed and placed in operation. 30.095 miles of city owned trackage has been completed during the receivership and the company has equipped and placed the same in operation. Arrangement has also recently been made for joint operation over 12.20 miles of track on the Corona and Astoria elevated extensions in Queens, and this operation has been commenced.

The total number of revenue passengers carried by the rapid transit lines has shown a constant and substantial increase as shown by the following yearly totals: 1918, 280,295,281; 1919, 330,256,192; 1920, 393,778,883; 1921, 431,108,837; 1922, 459,049,609.

The total number of revenue passengers carried on the surface lines (including the Brooklyn City Railroad) has likewise shown a substantial increase as shown by the following yearly totals: 1918, 320,370,317; 1919, 398,199,316; 1920, 402,647,343; 1921, 449,795,980; 1922, 465,865,137.

The receivership surface lines purchased ninety-two new safety cars and forty-six new trail cars during the receivership.

150 old type surface cars have been reconstructed into cars of the safety type so they can be operated by one man.

During the year 1922 approximately 17 miles of surface trackage of the receivership lines was reconstructed at a cost of $650,000, and approximately an equal amount of reconstruction work is under way during the present year.

400 new cars for the rapid transit lines have been purchased and placed in operation during the receivership at an approximate cost of $10,000,000.

Increase in Service. In 1919, 140,000 car-miles were operated on the rapid transit lines daily. At the present time approximately 200,000 car-miles are operated daily, an increased service of approximately 43 per cent during receivership. If seat-miles are taken, it shows a still greater increase of service. The total number of seat-miles for 1918 was 2,945,480,124, as compared in 1922 with 4,528,515,520, approximately a 50 per cent increase in the number of seats furnished for passengers to ride 1 mile.

The increased service furnished by the system has been made possible largely through improved operating methods and labor-saving economies and without any marked increase in the number of employees.

At the outset of the receivership, there were 4,532 suits and claims against the companies for tort damage, with respect to which 3,106 claims were filed with the receiver for an aggregate amount claimed of $21,013,328. Of these claims 2,950 have been liquidated either by trial or by agreement for a total liability of $2,030,775. Only 124 remain undisposed of, for an estimated liability of $65,295.

A total of 1,034 claims for money due upon contract, prior to receivership, were filed with the receiver for an aggregate amount claimed of $6,184,822. With the exception of fifty-nine claims, all of these have been satisfactorily disposed of by litigation or by agreement.

Net Income $451,000

The Springfield, Mass., Street Railway's annual report shows operating revenue of $3,409,436 in 1922, as against $3,428,334 in 1921; operating expenses of $2,685,586 in 1922, as against $2,957,404 in 1921. The decrease in the first instance was $18,898, and the decrease in the second instance was $271,818. After payment of taxes and interest on funded and unfunded debt, the net income was $451,000, out of which a 5 per cent dividend was paid, against a net income of $264,766 in 1921.

During 1922, the report shows $169,000 was spent on additions and renewals in the roadway, tracks, structures and car equipment. The amount spent for track and maintenance is shown to be $26,000 more in 1922 than in 1921. The number of passengers carried in 1922 was 49,544,902, an increase of 208,980 over 1921. Car-miles operated in 1922 totaled 6,939,524, a decrease of 88,168 from 1921.

The fact that operating revenue was less, although the number of passengers was greater in 1922 than in 1921, is explained on the ground that a greater number rode on special rate tickets in 1922.

$2,261,340 Increase in Toledo Tax Protested

The State Tax Commission has raised the valuation of the properties of the Community Traction Company, Toledo, to $7,252,940, or $2,261,340 more than last year. This is an increase of 45.8 per cent in one year and brings the total up to 94.25 per cent of the valuation as fixed under the franchise ordinance.

The car riders are now paying a tax equivalent to 0.36 cent per fare. If the increase stands it will boost it to approximately a half cent per fare.

The sinking fund presents another tax problem. Money in the fund is really the property of the city as it goes to retire bonds, after which equivalent common stock is issued in the name of the city. The company has no control over the funds. However, they are taxed as company funds. The cash in the fund is taxed in Ohio as an operating fund, then the bonds to be retired are taxed, and under the New York laws the money actually in the hands of the trustee is taxed by that state. Cash in the fund is taxed three times and bonds retired and property owned by the city are taxed once. There are now $364,000 of the bonds retired and equal amount of common stock issued to the city and $120,761 in cash in the fund on May 1. The state tax commission has refused to make any concession on this item.

The boost in valuation is believed to be a discrimination against utilities. All property in the state is by law supposed to be taxed "according to its true value in money and at a uniform rate." However, real estate in Toledo is assessed at about 60 per cent of its full value. Other counties vary from this ratio. To tax a public utility on an assessed valuation of 95 per cent and other property only 60 or 75 per cent is discrimination in the view of the street railway board and commissioner.

Commissioner Cann and Assistant City Law Director Dodd appeared before the State Tax Commission recently to protest the valuation.

Report on Traction Fund

Chicago Fund Totaled $28,438,295 on Jan. 1—May Accept the Payments Refused by Mayor Thompson

The status of the city of Chicago's traction fund, accumulated by the collection of 55 per cent of the net earnings of the Chicago Surface Lines by the municipality under the terms of the 1907 ordinance, is outlined in a recent report by City Comptroller Martin J. O'Brien. This fund was created to be used ultimately for subway construction.

The report shows that the traction fund totaled $28,438,295 on Jan. 1, 1923, and that payments aggregating $8,189,128 had been offered to the city by the companies during the last four years of Mayor Thompson's administration, but were refused by Former Mayor Thompson on the theory that these would impair his efforts to have the companies' franchises declared void by the courts. By this refusal it is estimated that the city sacrificed $640,000 in interest.

Comptroller O'Brien's report shows that the Chicago City Railway paid $8,745,716 into the traction fund, while the Chicago Railways paid $13,665,812. The total deposits are $22,411,528, while $6,772,163 in interest has been earned on the fund. Expenses of investigations of the local transportation problem, reports on subway plans and litigation over fares used up $745,396 of the fund. Of this amount $600,683 was spent by the Thompson administration, chiefly in connection with litigation.

Mayor Dever now has under consideration the question of acceptance of the payments refused by former Mayor Thompson. If these are accepted, the city's fund will total $36,627,424.

The traction fund is now a part of the city's consolidated investment fund. Interest earnings last year totaled $1,000,000. The report shows that the fund is distributed as follows at present:

Cash	$11,788,779
Invested in anticipation tax warrants	34,155,000
Invested in city of Chicago bonds	3,063,000
Invested in U. S. Liberty bonds	8,860,800

Detailed information regarding the fund will be found in the accompanying table.

STATUS OF CHICAGO'S TRACTION FUND

Year	Deposits of Chicago City Railway Paid on April 10	Deposits of Chicago Railways ot each year	Total Deposits	Interest Earnings	Expenses Paid
1908	$675,702	$881,106	$1,556,809	$30,054	.....
1909	521,666	862,782	1,384,449	53,361	.....
1910	473,942	811,320	1,285,262	79,747	.....
1911	960,075	744,110	1,704,185	99,542	24,462
1912	1,048,361	821,376	1,869,738	133,415	66,201
1913	1,116,163	1,412,870	2,529,033	292,103	51,418
1914	842,587	1,855,205	2,697,792	293,866	2,450
1915	872,845	1,684,197	2,557,042	479,809	.....
1916	547,680	1,116,744	1,664,424	397,234	203,882
1917	976,995	1,768,659	2,745,654	434,220	76,820
1918	704,411	1,330,940	2,035,352	765,681	14,764
1919	5,284	376,498	381,782	837,444	22,331
1920	.....	.....	.....	891,827	181,221
1921	.....	.....	.....	983,847	43,872
1922	.....	.....	.....	1,000,005	57,790
	$8,745,716	$13,665,812	$22,411,528	$6,772,162	$745,396
Total fund balance as of Jan. 1, 1923					$28,438,295
These amounts tendered and not accepted:					
1920	$442,990	$1,004,362	$1,447,352	.....	.....
1921	737,989	1,406,626	2,144,616	.....	.....
1922	1,075,744	1,858,367	2,934,112	.....	.....
1923	552,654	1,110,392	1,663,046	.....	.....
Total unaccepted			8,189,12		

Dividends Declared.—The directors of the Twin City Rapid Transit Company, Minneapolis, Minn., have declared a semi-annual dividend of 3 per cent on the common stock, payable July 2, to holders of record on June 15. Semi-annual dividends of 2 per cent were paid on the common stock on July 1 and Dec. 30, 1922.

Issue Authorized.—The Board of Public Utility Commissioners of New Jersey has authorized the Cumberland Traction Company, Bridgeton, N. J., to issue $24,800 in preferred stock and $17,200 in common stock. The proceeds of these issues will be used for the acquisition of certain property formerly owned by the Bridgeton & Millville Traction Company.

Auction Sales in New York.—At the public auction rooms in New York on June 13 the following electric railway securities were sold: $4,000 Second Avenue Railroad first consolidated 5 per cent bonds, due 1948, certificates of deposit, $36 lot; $84,000 Washington-Virginia Railway 6 per cent secured gold notes, series A, due Jan. 1, 1922, January, 1922, coupon attached, $85 lot.

Sale Date Announced. — Albert Swartz, Harry A. Dunn and Joseph A. Yager, special masters, will sell at public auction to the highest bidder on June 19, 1923, the property of the Toledo & Western Railroad. The sale will take place at the railroad station of the property in the village of Sylvania, Ohio. The sale will be carried out in pursuance of the provisions of a decree entered in the District Court of the United States for the Northern District of Ohio, in Toledo, on May 7, 1923.

Gold Bonds Being Offered.—Baker, Young & Company, Blodget & Company and Arthur Perry & Company are offering at 98½ and interest to net about 6.15 per cent $3,000,000 of first mortgage 6 per cent gold bonds of the Dubuque Electric Company. The bonds are dated April 2, 1923, and are due April 1, 1942. The purpose of the issue will be to discharge all present funded debt and for other corporate purposes. The company has at present outstanding $2,445,000 first mortgage 5 per cent bonds due June 1, 1925, and $111,000 8 per cent notes due Sept. 1, 1923.

Taylor, Engineer, on Norfolk Valuation. — In the issue of the ELECTRIC RAILWAY JOURNAL for May 28, page 902, Edwin Wortham was credited as being author of a valuation report of the Norfolk Street Railway property of the Virginia Railway & Power Company. This information was received from a correspondent whose work is dependable. In this instance the information given him seems to have been incorrect. Credit for preparation of the report should have been given to Walter H. Taylor, 3d, City Engineer of Norfolk, while Mr. Wortham acted as assistant.

Sale Decreed by Court.—All the tangible assets, charters, leases and rights of the Portsmouth, Dover & York Street Railway, Portsmouth, N. H., which ceased operation several weeks ago, will be sold at Alfred on June 30. The sale was decreed by Judge Clarence Hale in the United States District Court. Philip G. Clifford has been appointed special master. For the past six years the property has been operated by Willis G. Meloon, as receiver. Recent efforts to reorganize and rehabilitate the road failed and nothing was left but to petition the court to terminate the affairs of the company.

Enters Order for Sale.—Judge Evan Evans of the United States Circuit Court, sitting in Chicago, has entered an order for the sale of the Aurora, Elgin & Chicago Railroad properties, consisting of the Aurora and Elgin city lines and interurban lines operating in the Fox River valley. The order was issued on application of holders of $1,546,000 bonds of the Elgin, Aurora & Southern Traction Company, from which the Aurora, Elgin & Chicago company developed. Holders of the bonds are three Cleveland banks. The sale, it is expected, will result in a refinancing of the lines, which have just been voted new twenty-year franchises in Aurora and Elgin.

Must Pay to Manhattan Stockholders.—Frank Hedley, president Interborough Rapid Transit Company, recently announced that the Interborough board had determined that the net earnings applicable to the Manhattan rental for the quarter ending June 30, 1923, amounted to 60 cents a share and the rental was ordered paid to Manhattan stockholders at that rate on July 1, 1923. The Interborough failed to earn the full 3 per cent for Manhattan rental as reduced from 7 per cent by approximately $90,000 for the year, hence the payment of 60 cents a share instead of 75 cents which would be the amount payable at 3 per cent if earned. The deficit, however, Mr. Hedley said was cumulative and would have to be paid in the future if and when earned.

Traffic and Transportation

Eight-Cent Fare in Jersey

Judge Haight Reports on Controversy Between the Railway and Commissioners—Will Appeal

Another chapter in a fight lasting almost five years was terminated on June 9 when former Judge Thomas G. Haight, as special master, affirmed the 8-cent fare with 1 cent for transfers on the lines of the Public Service Railway, Newark, N. J. Judge Haight also recommended that the fare be authoritatively declared effective. Since the fall of 1921 this has been the rate charged by the company in various parts of the state, although it has been opposed by the Board of Public Utility Commissioners. The fight of the Jersey City Commission will be carried to the Supreme Court of the United States following a resolution offered by Frank Hague, Mayor, and adopted by the commission on June 12.

First Application for Increase in 1918

The controversy between the Public Service Railway and its subsidiary traction companies on the one side and the Board of Public Utility Commissioners with several New Jersey cities on the other side dates back to 1918, when the company, owing to the increased costs of operation, brought about by war conditions, applied to the commission for permission to charge 1 cent for transfers in addition to the 5-cent fare then in effect. This was approved, as was a second application, a year later, for further increases to a 7-cent fare and a 2-cent transfer charge.

On July 15, 1921, the commission denied a third request for an increase by the company to a 10-cent fare without charge for transfers. The commission held that the increase was not justified by the costs of operation and decreed that the "seven-two" rate be continued.

The company appealed to the Federal Court, alleging that the continuance of the 7-cent fare with a 2-cent transfer rate was confiscatory and invaded its property rights, and sought to obtain an injunction to restrain the commission from preventing it from putting its proposed 10-cent fare into effect. The commission was restrained temporarily by the court, on condition that the company would charge a fare not exceeding 8 cents and 1 cent for initial transfers. The appointment of Judge Haight as special master followed.

Differences Over Valuation

The chief point of difference in the testimony before Judge Haight was on the question of the valuation of the company's properties. The commission had fixed it at approximately $82,000,000, while the company contended that the true value was in the neighborhood of $200,000,000.

Experts testifying for both sides estimated the value of the property at from $65,000,000 to $135,000,000. In his report Judge Haight fixed about $110,000,000 as a fair valuation of the company's holding. He based this upon an estimate of the cost of reproduction, new, at present prices, less depreciation of $98,291,563 for the company's physical property, $8,000,000 for the power lease or contract and $5,500,000 for going value, or a total of $111,791,563.

In his report Judge Haight said:

> As I have found that the rate of fare fixed by the Board of Public Utility Commissioners is confiscatory, I am constrained, of course, to recommend that a decree be entered restraining the board from putting it into effect or from enforcing or attempting to enforce the orders or the rate. If the effect of such a decree will be, as suggested in Judge Woolley's opinion, to re-establish a prior and lower rate of fare, then, of course, the decree should also prevent the putting into effect or enforcement of any such lower rate.
>
> The plaintiff has also prayed in its bill of complaint for an injunction restraining the board from preventing the plaintiff from putting into effect and collecting a rate of fare of 10 cents for adult passengers, without charge for transfers. I do not think that the court should attempt to pass on that question, or attempt to decide what rate of fare in excess of that prescribed by the before-mentioned orders of the board would produce the necessary fair return, for to do so would be in effect to indulge in rate-making.
>
> If it is eventually determined by this court or the Supreme Court, on appeal, that the rate fixed by the Board of Public Utility Commissioners is confiscatory, it will be necessary for the board to prescribe a new rate of fare. It is, of course, not to be doubted that the board will fix a proper rate of fare based upon the valuation and rate of return which this court or the Supreme Court, on appeal, may eventually determine is proper in order to avoid confiscation.

Copies of the report were forwarded to Trenton to the three Federal judges comprising the special tribunal selected to adjudicate the fight and who appointed Judge Haight to take testimony.

New Employees in Dallas Will Have Trained Instructors

According to new plans being worked out by the employment and training department of the Dallas Railway, instructors in that department will take a standardized course in methods of teaching new employees. Supervision over this department has been given to C. J. Crampton, superintendent of the efficiency department. Mr. Crampton will be assisted by Inspector A. E. Harris, who has been loop inspector. Mr. Harris will retain his rank and title as inspector and assume the duties of chief instructor for the present.

Several students are now taking the course and it is likely that no new men will be employed by the railway for some time to come. Just at present there is a large number of applicants for employment, and due to this condition the employment department advises that men be not encouraged to seek employment.

Seven Cents in Norfolk

Corporation Commission Fixes Higher Fare Temporarily—Jitney Competition Figures Largely in Order

Without deciding the value of the property of the Virginia Railway & Power Company in the city of Norfolk, South Norfolk and Norfolk County, the Virginia State Corporation Commission has issued an order increasing the fare on the company's Norfolk division from 6 to 7 cents, four tokens for a quarter. Major Alexander Forward, the commissioner in charge of public utility work, increased the fare on noting that under either the valuation claimed by the city of Norfolk, or that claimed by the company, a higher fare was justifiable.

The valuation claimed by the company is about $10,500,000, while the city's approximate value is $6,150,000. In Norfolk it is generally believed that the decision of the Corporation Commission may mean an even higher fare, as the token fare would be only about 6¼ cents a passenger.

In the 7-cent fare order the testimony of the Virginia Railway & Power Company is cited that jitneys handled 25 per cent of the traffic in Norfolk and at Richmond only 10 per cent. Attention was also called to the admission of Walter H. Taylor, director of public works, chief witness for the city at the hearings, that there were some jitney lines in Norfolk in unfair competition with the cars of the traction company. Further, that jitney owners were not required to contribute to street paving, that the buses operated only in well settled sections and that they were permitted to charge a fare higher than on the street cars.

An important part of the order concerned the 3 per cent depreciation reserve set aside by the company from its earnings. However, the commission purposely withheld opinion as to the methods used in calculating depreciation, but said "it is certain that any adjustment thereof that might be made would not involve a sufficient amount in the Norfolk street railway system to result in bringing the return up to a fair amount even on the basis of valuation presented by the city.

The matter of the Norfolk fare has been under discussion for some time. Some facts about the situation were recently brought out in a letter to the editor of the *Ledger-Dispatch* entitled "Street Car Fares," by T. Norman Jones, Jr., general manager of the Norfolk division. His letter takes the form of a reply to some comment in the paper on the comparative cost of bus and electric car operation, which said, among other things: "Gradually the street railway fares have been increasing and now the Virginia Railway & Power Company wants in Norfolk a fare that is equal to that of the motor-bus lines."

Mr. Jones referred to the jitney competition which the city had permitted to grow and said that financial results would be very different if jitneys were taken out of territory which for the

most part had been developed by his company and were confined to territory which the company did not serve. His analysis of the situation brought out the following:

The longest haul on a motor bus line in Norfolk for one fare (no transfer privilege) is approximately 4.3 miles.

The longest haul on street cars in Norfolk for one fare without transfers is approximately 5.5 miles. The longest haul, including the use of a free transfer, is approximately 9.5 miles.

The average of the one-way distances traversed by jitney routes in Norfolk, exclusive of the second zone on the Naval Base jitney line, is approximately 3.3 miles.

The average of one-zone fare routes on street cars in Norfolk, exclusive of second and third zones, which do not transfer to each other, and exclusive of the shuttle line in Berkley, carrying with it second transfer privilege, is 4.05 miles, without transfers. With transfer privilege a person can travel varying distances up to a maximum of 9.48 miles for one fare.

The average fare collected on the street cars, exclusive of free transportation for company employees and policemen and firemen in the city service, but including free transfer passengers for three months, Jan. 1 to March 31, 1923, is .0513 cent.

The Corporation Commission of Virginia, under the new statutes and recently compiled Code of Virginia, is placed in charge of all electric street railway systems in the state whose franchises have been granted since the code was compiled. Realizing that the Corporation Commission has become the rate-making body of the state, Norfolk has twice petitioned that body to set the fare in Norfolk.

The city attorney has been asked to render the Council an opinion on the power of the Council as a rate-making body should a blanket franchise be granted and no action will be taken on the company's petition until this opinion is in hand.

Eastern Massachusetts Wants to Operate Buses in and Out of Woburn

The Eastern Massachusetts Street Railway, Boston, Mass., is negotiating with the Woburn-Reading Bus Company, Inc., for the purchase of its good will and equipment in Woburn, Stoneham, Reading, Wakefield, Burlington and Billerica. The bus company was started some years ago when the Eastern Massachusetts abandoned the tracks in these cities and towns, and is operating bus lines out of Woburn to Reading, to Billerica and Burlington, and from Reading to Wakefield. Now the Eastern Massachusetts is willing to reclaim the territory, to continue the bus lines already established and perhaps operate others as feeders of its trolley system.

John F. Lovell, who organized and owns the Woburn-Reading Bus Company, has recently taken over the territory which the Concord, Maynard & Hudson Street Railway, a bankrupt road, abandoned, and he intends to give more personal attention to that field if he can reach an agreement with the Eastern Massachusetts Street Railway, relieving him of the jitney service in and out of Woburn.

State authority has been granted to the Eastern Massachusetts to operate bus lines in any part of Massachusetts within the reach of its system, provided it secures permits from the local authorities. It has already secured a permit from Stoneham and has filed applications for permits in Woburn, Wakefield, Reading and Burlington.

Jitney Regulatory Ordinance Introduced in Terre Haute

The first regulatory jitney ordinance including many stringent provisions for the operation of jitneys was introduced to the City Council of Terre Haute, Ind., on June 7. If the ordinance is passed jitneys will be barred from streets on which electric railway cars operate. This will put an end to the accumulation of jitneys in parking spaces on Wabash Avenue.

According to the ordinance as drafted, when the jitney operator applies to the city comptroller for a license he must state, besides his own name and address, the names of all persons outside of himself who will be liable to operate the car.

No person under eighteen years of age will be allowed to drive a jitney nor one who is not physically fit. No person who has been convicted more than twice for violating the speed law nor one who has been convicted of transporting liquor or any other offense in connection with an automobile will be licensed.

With the application must be stated the route which the applicant expects to drive, and the hours which he intends driving. The time limit for one day is nine hours of continuous driving. The yearly fees for cars used as jitneys will be $15 for cars carrying five passengers including the driver, $25 for cars carrying more than five and less than eight including the driver, and $35 for cars carrying more than seven, including the driver.

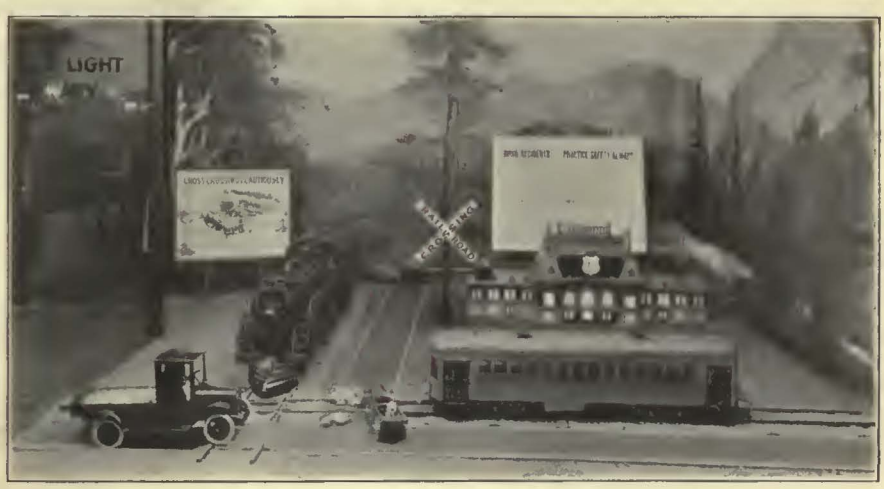
A bond of $20,000 will be required of the driver if his car carries more than seven passengers. For failing to comply with the ordinance and its provisions the driver is liable to have his license revoked and upon conviction is liable to any punishment not to exceed $300 and costs and 180 days imprisonment.

The ordinance was referred to the committee on ordinance. The ordinance refers only to vehicles carrying passengers over fixed routes inside of the city. The regulations have nothing to do with hotel buses, cabs or taxis charging fares of not less than 25 cents.

New Fare Plan in Bellingham

The Puget Sound Power & Light Company, operating the railway system in Bellingham, Wash., on May 31 announced that the experimental tariff of twenty tickets for $1 was discontinued and a new experimental plan of selling four tickets for 25 cents or sixteen tickets for $1 placed in effect for ninety days. The company announced that the reason for discontinuing the lower tariff was that the increase in return was not sufficient and that the company was losing steadily on the fare. The City Council permitted the company to introduce the new tariff, but Mayor E. T. Mathes sent a letter to the Public Service Commission at Olympia protesting the higher car fare and suggesting that "to the minds of a great number of citizens the evidence is not conclusive that the cost of maintenance (under the 5-cent fare) has been readjusted to meet the new conditions, and the opinion is held that other phases of the question might well be considered before a permanent advance in rates is ordered." The Mayor also asks that the commission order an extension of the Meridian Street car line to the entrance of Cornwall Park, and if this could not be profitably made, he suggests that auto bus service might meet the need.

Utah Power & Light Safety First Window Display



A very effective "Safety First" window display was exhibited by the Utah Power & Light Company at Salt Lake City during National Safety Week, from June 4 to 9 inclusive.

A miniature locomotive, electric street car and two automobiles were shown approaching a railroad crossing. Considerable interest and attention were attracted by the display, which offered a very impressive visualization of the disastrous results of such situations.

Eight Cents in Youngstown

Fares on the lines of the Youngstown Municipal Railway were advanced on June 11 to 8 cents or seven tickets for 50 cents. The fare increase was announced on June 9, when Commissioner Engle received official word from the company. In making the announcement G. T. Seely, president and general manager of the company, stated that if jitneys were eliminated it would be possible to reduce fares as well as supply ample additional bus and car service. However, on June 11 the ordinance giving the safety director power to bar jitneys from the congested district was again tabled for one week.

The weekly pass in Youngstown was discontinued on April 1. The new rate of fare adopted for a trial period was 7 cents cash, three tickets for 20 cents, and 1 cent for a transfer. The rate previously in effect was 9 cents cash, six tickets for 50 cents, 1 cent for a transfer and an unlimited ride weekly pass for $1.25. Youngstown's fare troubles have been followed in the ELECTRIC RAILWAY JOURNAL.

Know Your Buses—New York's Conception of Education

If concentration on something desired spells attainment, then inhabitants of New York will be transported by buses and buses only in the near future. In the twenty-fifth anniversary of the consolidation of Greater New York the city finds another opportunity to extol this method of transportation as a contribution to the present welfare and future development of the city. At the Municipal Education Exposition now going on at the Grand Central Palace the Department of Plant and Structures is enjoying a respite from the labors of bridge and highway construction and is reveling in the statistical feats which are placarded on the wall for the consolation and edification of the city traction magnates and the small town bus promoters who are celebrating the quarter century mark of Greater New York.

Here are some things the department says about the motor bus: Under municipal ownership and operation they would be profitable to the city. On the basis of 100 buses on a 5-cent fare there is an estimated daily profit of $376.80, or an annual profit of $137,532. There are many reasons why the motor bus will aid in solving serious street congestion and one of these is that the bus would eliminate the safety zones, thus leaving in the roadway additional space for traffic. In addition is is said that the bus is more economical than the street cars, the only capital charges being the bus and garage. Further, the bus renders better service because it meets with no delay because of traffic blocks and is not put out of service by the closing of streets and numerous other causes.

Though the department is partial to the bus, it can't be said that it doesn't recognize electric railway transportation, trackless trolleys, etc., for it shows at the exhibit pictures of trackless trolleys being operated under its own supervision. Then, too, there is quite some display of street car appliances and appurtenances. There are models of the various types of motors on the elevated, surface and subway cars, including safety car motors, a model standard trolley base, and lightining protection equipment for street railway cars and for trackless trolleys.

The booth in charge of the Department of Plant and Structures has one of the most interesting displays at the exposition, which includes the activities and aims of every New York City department.

Last Minute Ruling by Commission Prevents Fare Rise in Buffalo

Eleventh hour notice was served on the International Railway, Buffalo, by the Public Service Commission that it could not put into effect the proposed 8-cent fare on the local lines of the company in Buffalo. The International had planned to make the 8-cent fare effective at midnight June 8 or thirty days after formal notice of the proposed increase had been filed with the Public Service Commission. The commission has suspended the proposed fare increase for 120 days. In its order suspending the fare increase, the commission held that it would be unjust to the public to allow a fare increase at this time, inasmuch as the rate proceeding is now pending before the commission. This proceeding was brought by the city to force the return of the 5-cent fare. The fare is now 7 cents on local lines or four tokens for 25 cents. The company proposed to charge 8 cents or four tokens for 30 cents.

In announcing its plan to charge an 8-cent fare, the International is charged by the municipal authorities with ignoring the new law just signed by Governor Smith which prevents public utility corporations from raising its rates until after a hearing has been held by the Public Service Commission and a decision has been handed down by that board. This law was referred to in the ELECTRIC RAILWAY JOURNAL, issue of June 9. The International acted under a former law which allows public utility companies to file notice of the proposed advance and put it into effect after thirty days upon one-day notice to the public, providing the increase is not suspended by the Public Service Commission.

The city law department stood ready to apply to the courts for an injunction restraining the railway from putting into effect the 8-cent fare, if the Public Service Commission had not acted within a few hours.

The decision of the commission in suspending the proposed increase was received from Albany twelve hours before the increase was to have gone into effect. The patrons of the lines were prepared for the increase and were making large purchases of fare tokens at the rate of four for 25 cents. The company had planned to use similar tokens which would be sold four for 30 cents. It is estimated thousands of dollars were invested by the car riders in tokens on the day before the proposed increase was to have become effective.

Twenty One-Man Cars in Operation.—The Oklahoma railway has been using twenty one-man cars in regular schedule all day service in Oklahoma City. They are used on five routes, supplemented with tripper service with large cars during the busy hours. The results of the one-man car operation have not been thoroughly tried out.

Pamphlet Issued as Traffic Guide.—The Atlanta Motor Club has prepared a pocket size pamphlet "for the guidance of motorists, pedestrians and people who ride the street car." The booklet explains the law's requirements on traffic problems. *Two Bells*, the official publication of the Georgia Railway & Power Company, suggests a ten-minute study of the booklet.

Favor Jitneys.—At an election held on June 9 the citizens of Houston voted to retain the jitneys by a vote of 7,261 to 5,083. The Houston Electric Company has made no announcement as to what course it will follow in order to obtain financial relief made necessary by jitney competition.

Clinton Fare Cut.—The Terre Haute, Indianapolis & Eastern Traction Company is experimenting with another lower fare plan. A little more than a year ago the company introduced the $1 weekly pass on the lines in Terre Haute. The present reduction will affect interurban patrons and will be introduced on the Clinton line. A 100-mile mileage ticket will be sold for 1¼ cents per mile. If the idea appeals to the Clinton interurban riders these fare strips will be introduced on all of the other interurban lines entering Terre Haute. The announcement of the fare cut was made by E. M. Walker, general manager of the Terre Haute division.

Amsterdam Seeks Return to Five-Cent Fare.—Testimony was taken on May 29 before Executive Clerk Harry M. Ingram of the Public Service Commission by the Fonda, Johnstown & Gloversville Railroad to show that during the last four months the company had not paid in running expenses. The company is seeking authority to continue its present fare of 8 cents in the city of Amsterdam. The city authorities had served notice on the company that it must reduce its fare to 5 cents. Amsterdam was represented by Ambrose P. Fitz James, corporation counsel; John Boyd, chairman of the committee on public works of the Common Council, and Jacob Labischner, city engineer. The railroad company was represented by Wesley Maider and C. S. Nisbett, attorneys, and J. Ledlie Hees, president; William H. Collins, general manager, and Frank Burton, secretary.

Personal Items

11,000 Trainmen Under Him

New Superintendent of Transportation at Chicago Has One of Biggest Jobs of Its Kind

C. H. Evenson, who has been appointed superintendent of transportation of the Chicago Surface Lines, has been connected with the transportation companies in Chicago for fifteen years. Mr. Evenson was only twenty-three years old when in 1908 he entered the service of the Chicago City Railway as a clerk. Then for three years he was secretary to the president of the Calumet & South Chicago Railway.

In a semi-official post of this kind transportation affairs passed before him daily in cinema review, and being of the type that he is, Mr. Evenson saw the picture as a whole and profited accordingly. All phases of the business had their appeal for Mr. Evenson, but he became interested especially in the problems of management and men. Under given circumstances all similar machines will act alike, but under given circumstances not all human beings will act alike. Here enters the fascination of the study of human reactions. And here was where Mr. Evenson quickly showed himself to be most competent.

C. H. Evenson

At first Mr. Evenson's work brought him in touch with the matter only on its academic side, but he was building steadily for the future and in 1920, after more than ten years' service in a secretarial capacity, came real opportunity with Mr. Evenson's appointment to the position of assistant superintendent of transportation. And now in less than three years he is advanced to the very responsible post of superintendent in charge of 11,000 trainmen and the operation of 3,100 cars. There are few jobs bigger than this anywhere in the transportation world.

Four years after he entered the service of the Chicago City Railway in 1908 Mr. Evenson was promoted to the position of secretary to President Leonard A. Busby. When Mr. Busby was elected president of the Chicago Surface Lines in 1914 Mr. Evenson was retained as his secretary. When Henry A. Blair became president in 1920, he was made assistant superintendent of transportation. As superintendent of transportation he succeeds F. P. Edinger, resigned.

One of Mr. Evenson's accomplishments is that he has a great faculty of winning first prize at the annual golf tournaments of the Surface Lines.

William A. Whitney, general manager of the Utah-Idaho Central and the Utah Rapid Transit Railroads for the past six years, has been made active head of the Mount Hood and Sumpter Valley Railroads in Oregon, as well as manager in charge of operations of the Oregon Lumber Company mills in Oregon and Washington. Mr. Whitney will remain with the two Utah electric roads as vice-president and director. He will be the active head of the Eccles lumber and railroad interests in Oregon and Washington. Mr. Whitney came to Ogden as head of the electric roads in 1917 from the position of superintendent of transportation for the Union Pacific. Prior to that time he was superintendent of several different divisions of the Union Pacific and from 1911 to 1914 was superintendent of the Sacramento and Oakland divisions of the road. In railroad circles Mr. Whitney is regarded as one of the ablest operating officials in the West. P. H. Mulcahy, who has been auditor and assistant manager of the above electric roads, will be general manager of the two lines.

Albert H. Sisson, better known to his many friends as "Pop," has, as assistant to the president, joined forces with the Columbia Machine Works & Malleable Iron Company of 3303 Atlantic Avenue, Brooklyn, N. Y. Mr. Sisson first appeared on the railroad horizon when he founded the Jewett Car Company in 1897. In 1905 the Jewett company was purchased by the St. Louis Car Company and "Pop" went with it, acting as general manager of the latter organization until 1908. He then became general manager of Forsythe Brothers Company and remained there for five years, until, in 1913, he was appointed president of the Southern Car Company. In 1917 he joined the National Pneumatic Company as a special representative and continued to occupy this position until making his present connection with the Columbia Machine Works.

John W. Hulme Resigns at Buffalo

Superintendent of Equipment of International Railway Resigns After Serving Company Ten Years

John W. Hulme has resigned as superintendent of equipment of the International Railway, Buffalo, N. Y., to be associated with the maintenance department of the Interborough Rapid Transit Company as master car builder. It is understood that Mr. Hulme was anxious to give up his work in Buffalo six months ago, but at that time the company was engaged in a strike, so Mr. Hulme did not press the matter. The strike is now over, and Mr. Hulme has asked definitely to be released, so that his resignation has been accepted. He will remain with the company in a consulting capacity for a month or more.

Mr. Hulme has made an enviable record in Buffalo as superintendent of equipment, a position for which his previous experience had well qualified him, as he has been engaged in the mechanical side of electric railway service since 1904. At that time he entered the employ of the Chicago Elevated System, after an experience of about five years with the Western Electric Company, for which he installed its exhibit at the St. Louis fair. He remained with the Chicago Elevated System for five years, and in 1909 he resigned his position of inspection barn foreman with that property to accept that of general inspection foreman of construction for the Hudson & Manhattan Railroad. Subsequently he was made general foreman of inspection of that company. He remained with this property until 1913, when he accepted a position in the car equipment department of the Interborough Rapid Transit Company. He was appointed superintendent of equipment of the International Railway in January, 1918.

J. W. Hulme

Mr. Hulme has taken an active part in the work of the American Electric Railway Engineering Association and has served on several of its committees. He also has contributed articles on technical topics to this paper.

Heavy Traction Expert with Virginian

Engineer in Charge of Southern Electrification Has Had Wide Experience in Similar Undertakings

Hugh Pattison, whose appointment as engineer of electric traction of the Virginian Railway was noted in the ELECTRIC RAILWAY JOURNAL for May 19, was formerly with the Illinois Central Railroad, with which for the last two years he has been engaged on preparation work for the coming electrification of the Chicago terminal. In his new post Mr. Pattison will have charge of directing the extensive electrification program of the Virginian Railway.

Mr. Pattison was born in Maryland on Aug. 3, 1872. He was graduated from the Johns Hopkins University, electrical engineering course, in 1892. His first position was that of foreman electrician of the Norfolk, Va., Navy Yard, wiring and installing electric apparatus on naval vessels.

In 1893 he became assistant engineer with Sprague, Duncan & Hutchinson, consulting engineers of Baltimore. From 1894 to 1903 he was associated as engineering assistant to Frank J. Sprague, vice-president and technical director of the Sprague Electric Company in New York, and assisted in equipping and operating Sprague multiple-unit control on the Boston Elevated Railroad, and also in Brooklyn. During this period he was also resident engineer representing Cary T. Hutchinson, consulting engineer, New York, in charge of design and erection of a new power plant for the Pennsylvania Steel Company at Steelton, Pa., including substations, high tension transmission line, and lighting and power equipment for the shop.

In 1905 Mr. Pattison joined Westinghouse, Church, Kerr & Company as an engineer, having charge of the work on foundation for the Long Island City power house of the Pennsylvania Railroad, the design and installation of the multiple unit cars for the Long Island electrification; also the design and construction of the brick and concrete inspection shops and carhouses. All types of control since that period have been more or less patterned after the Long Island equipment. That installation is recognized as the first real achievement in multiple-unit operation for suburban service.

From 1905 to 1911 Mr. Pattison was assistant engineer of electric traction for George Gibbs, consulting engineer. During this period, when the Pennsylvania tunnel electrification was carried out, Mr. Pattison was superintendent of construction in charge of the Pennsylvania Tunnel & Terminal Railroad. Here again was a very marked achievement in the working out of all engineering details for the free movement of locomotives and multiple-unit trains through this tunnel and terminal.

Later, Mr. Pattison had charge of the electrification of the West Jersey & Seashore Railroad from Camden to Atlantic City. He also built an experimental single-phase electric railway on Long Island and had charge of the conduct of locomotive test on the West Jersey & Seashore Railroad to determine the effect on track. As superintendent of construction work in connection with the electrification of the Pennsylvania Railroad at New York, he was responsible for the foundation and erection of a steel tower transmission line across the New Jersey Meadows, all substation equipment, third-rail and bonding, and all lighting, air and water equipment in tunnels and yards.

The work performed by Mr. Pattison on these undertakings was recognized in 1911 when he was appointed engineer in charge of the Chicago Association of Commerce Committees in the study of smoke abatement and the electrification of terminal railways in Chicago. This undertaking covered a period of approximately four years, and it is admitted that the most comprehensive study of electrification of yards was made by this committee and, as previously mentioned, Mr. Pattison was in charge of practically all of the electric engineering studies and reports.

When the war broke out Mr. Pattison was placed in charge of inspection and was finally made assistant to the general manager of the Remington Arms Company, later the Eddystone Rifle Plant of the Midvale Steel & Ordnance Company, at Eddystone, Pa. At the close of the war this factory discontinued operations and Mr. Pattison joined the heavy traction staff of the Westinghouse Electric & Manufacturing Company under F. H. Shepard, director of heavy traction.

Twenty-five Years a Secretary

Mrs. Roberts of Los Angeles Railway Remembered with Presents from Company Executives

Not all the honors nor all the worries of the electric railway business go to the sterner sex. Witness Mrs. Mabel Knight Roberts, secretary to G. J. Kuhrts, general manager of the Los Angeles Railway, who recently completed twenty-five years of service with the company. Her silver service anniversary, celebrated recently, was remembered with presents from executives of the company.

Mrs. Mabel K. Roberts

Mrs. Roberts has been secretary to every general manager the company has had. Starting in 1898, Mrs. Roberts was secretary to F. W. Wood, then general manager. The property was owned by Eastern capital, and a small two-story frame building at Sixth and Central Streets served as headquarters for the railway, which Mrs. Roberts has seen develop into an extensive system serving nearly 1,000,000 passengers a day.

In 1898 the company had two car dispatchers, one for day and one for relief and night service. The cars were of various types.

The latter months of 1898 were busy ones which Mrs. Roberts well remembers. It was then that Henry E. Huntington acquired the property and proceeded to reconstruct the entire railway system.

In 1904 Mrs. Roberts and others of the general manager's office moved from the small frame building on Central Avenue to the Pacific Electric Building at Sixth and Main, which was completed that year.

H. G. Bonner, general manager of the Meridian Light & Railway Company, Meridian, Miss., will resign on July 1 to take charge of the Ohio Public Service Company, Alliance, Ohio. He will be succeeded at Meridian by W. R. Phipps. Mr. Bonner first became connected with the Doherty organization in 1913.

Obituary

Dr. Louis Bell

Dr. Louis Bell of Boston, well known consulting electrical engineer, died in West Newton, Mass., on June 14 at the age of fifty-nine years. One of his outstanding achievements was the design and installation of what is said to have been the first polyphase power plant in this country. This was at Taftville, Conn., about 1894. He organized the course of electrical engineering at Purdue University. Dr. Bell was editor of the *Electrical World* for two years from 1890 to 1892 and after he gave up active editorial work was a frequent contributor on technical subjects to the electrical press, including the ELECTRIC RAILWAY JOURNAL. For three years he was chief engineer of the electric power transmission department of the General Electric Company. He was a former president of the Illuminating Engineering Society, lectured at Harvard University and the Massachusetts Institute of Technology and was a member of the advisory committee of the Council of National Defense. He was the author of numerous books on electric lighting and power distribution.

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

Linseed Oil Combination Dissolved

Competition Is Restrained by Subscription Agreement, According to Supreme Court Decision

"Open price" associations are unlawful when they restrain competition, according to a decision of the United States Supreme Court handed down June 4 in the case of the American Linseed Oil Company, et al., comprising twelve corporations, in six different States, which manufacture and distribute linseed oil cake and meal, and Julian Armstrong, who operates at Chicago under the name of Armstrong Bureau of Related Industries. The opinion said:

> This bureau conducts a so-called "exchange," through which one subscribing manufacturer may obtain detailed information concerning the affairs of others doing a like business. The defendant "crushers" constitute one of the groups who contract for this service. They manufacture and distribute throughout the Union a very large part of the linseed products consumed therein, and prior to the challenged combination were active, unrestrained competitors. Sometime in September or October, 1918, each of them entered into an identical written "subscription agreement" with the Armstrong bureau, and a year thereafter signed another, not essentially different.

The crushers secure from this bureau information relating to markets and other data and report to it all sales, quotations, offerings and other statistics. The obvious policy of this arrangement, according to the decision, was "to submerge the competition theretofore existing among the subscribers." Continuing, the decision said:

> The Sherman act was intended to secure equality of opportunity and to protect the public against evils commonly incident to monopolies and those abnormal contracts and combinations which tend directly to suppress the conflict for advantage called competition—the play of the contending forces ordinarily engendered by honest desire for gain.
>
> Certain it is that the defendants are associated in a new form of combination and are resorting to methods which are not normal. If, looking at the entire contract by which they are bound together, in the light of what has been done under it, the court can see that its necessary tendency is to suppress competition in trade between the States the combination must be declared unlawful. That such is its tendency, we think, must be affirmed."

Permanent Foreign Outlets Should Be Maintained

An old abuse, so costly in the past to American prestige abroad, according to the Department of Commerce, is again creeping into our export trade. Under the allurements of domestic boom conditions many manufacturers are showing increasing apathy to foreign contacts. The sound policy of definite allotments for export is being ignored in far too many cases. Unless this disloyalty to firmly established foreign contacts is promptly overcome, American commercial prestige and good will abroad are likely to suffer serious damage.

If the United States is to level out the valleys of periodic depression in the curve of its business cycles and is to keep its factories and farms steadily and fully occupied, the maintenance of permanent foreign outlets must be assured regardless of fluctuations in domestic market conditions. It does not improve .the standing of America's business abroad to have the first sign of better domestic trade bring about the immediate abandonment of all interest in those foreign contacts which had been hailed with such joy and solicitous regard during the dark days of 1921.

Steady Trend Toward Electric Heating

Two important factors, characteristic of general conditions since the war, have strongly influenced the development of car heating. In the first place anthracite coal suitable for use in the ordinary coal stove has more than doubled in price. The cost of electric power, on the other hand, has increased very little, because greater efficiency in production has largely balanced higher fuel cost. For this reason the differential between the cost of heating by coal and heating by electricity is not so great at the present time as it used to be.

In the second place the wages of common labor have doubled or trebled in recent years, and this has greatly increased the cost of handling fuel and ashes at the car houses. Coal stoves require a good deal of attention, not only for operation, but also for upkeep, because grates, etc., at times have to be replaced, and at present wages such attention is a serious item of expense. With electric heat a very considerable saving can be made in labor costs.

The average length of time that a car is in operation each day has some bearing on the question. Where the period of daily service is short, electricity has the advantage because it produces adequate results with a minimum amount of manual labor, but where the period of daily service is long, this advantage is less because the labor cost becomes secondary to fuel cost.

Railway cars are particularly well adapted for the use of electric heat because many people are seated in a comparatively small space with a low roof overhead and the volume of air to be heated per passenger is smaller than in an ordinary room.

Manufacturers of electric heaters report a rapidly increasing demand for equipment of this type during the past year. This is the natural reflection of the changed conditions. Some very interesting development work in this field is also under way and with its completion the use of the "fireless heaters" is likely to be given further impetus. One manufacturer estimates that from 50 to 60 per cent of the electric railways in the country are now using electric car heating.

Railway Will Receive Energy from Electric Company

The Eastern Massachusetts Street Railway has entered into a contract with the Lynn Gas & Electric Company by which the railway will be supplied with all of the electrical energy required for the operation of its electric cars in its Lynn division, consisting of about 60 miles of track in Lynn, Saugus and Swampscott.

The light company expects to begin to supply electric power under the contract not later than Feb. 15, 1924. The power will be in the form of 13,200-volt a.c. current, transmitted through about 1 mile of duplicate underground cables to the new $125,000 substation of the railway company to be erected at the center of the d.c. distribution near the corner of Union and Washington Streets, in Lynn. The substation is to house three 1,500-kw. standard rotary convertible units and control equipment, with room for an additional 1,500-kw. unit.

A good deal of consideration was given to an automatic substation, but due to the fact that there was to be only one station in the division, consisting of about 24 square miles and a population of 118,000, it was deemed advisable to make the substation a manually operated one.

The automatic substation building will be a concrete brick and steel fireproof structure about 32 x 68 ft. long and 32 ft. in height, including the basement. The old power plant to be abandoned was built about thirty-two years ago.

Metal, Coal and Material Prices

Metals—New York	June 13
Copper, electrolytic, cents per lb.	15.125
Copper wire base, cents per lb.	18.00
Lead, cents per lb.	7.25
Zinc, cents per lb.	6.45
Tin, Straits, cents per lb.	42.00
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$6.125
Somerset mine run, Boston, net tons	2.875
Pittsburgh mine run, Pittsburgh, net tons	2.20
Franklin, Ill., screenings, Chicago, net tons	1.80
Central, Ill., screenings, Chicago, net tons	1.875
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$7.75
Weatherproof wire base, N. Y., cents per lb.	19.00
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal.	$1.13
White lead, in oil (100-lb. keg), N. Y., cents per lb.	13.125
Turpentine, (bbl. lots), N.Y., per gal.	$1.06

Rolling Stock

New Orleans Public Service, Inc., will shortly ask for bids for forty new cars, according to an announcement made by H. B. Flowers, president.

Montreal & Southern Counties Railway, Montreal, Que., expects to purchase one motor baggage car and two suburban passenger trailer cars.

Oklahoma Railway has purchased twenty one-man cars, which have been installed and placed in operation since Jan. 1 down to the present time.

Louisville Railway has ordered ten motor cars with a seating capacity of fifty passengers and thirty trailers. The new equipment, which will replace the rolling stock depleted as a result of serious carhouse fires, will cost $330,000. The cars have been purchased from the Kuhlman Car Company of Cleveland for Nov. 1.

Connecticut Company has purchased fifty cars from the Osgood-Bradley Car Company. The specifications of these cars are as follows:

Date order was placed	May 16, 1923
Date of delivery	Commencing August, 1923
Type of car	D.T. steel motor passenger; one-man, two-man type
Seating capacity	47
Total weight, approximately	30,000 lb.
Bolster centers	21 ft. 4½ in.
Length over all	44 ft.
Truck wheelbase	5 ft. 4 in.
Width over eaves	8 ft. 4½ in.
Height, rail to trolley base	10 ft. 8 in.
Body	Semi-steel
Interior trim	Cherry or natural birch
Headlining	Agasote or Nevaspilt
Roof	Arch
Air brakes	Westinghouse
Axles	A. E. R. A. Standard
Armature bearings	Friction
Bumpers	Channel
Car signal system	Consolidated
Car trimmings	Bronze statuary finish
Center and side bearings	Bradley
Conduits and junction boxes	General Electric and Westinghouse
Control	General Electric and Westinghouse Type K
Couplers	Connecticut Company standard
Curtain fixtures	Curtain Supply Company
Curtain material	Pantasote
Destination signs	Hunter
Door operating mechanism	National Pneumatic
Fare boxes	Johnson
Wheelguards	H. B.
Gears and pinions	General Electric and Westinghouse
Hand brakes	Bradley
Heater equipment	Gold panel heaters
Headlights	Golden Glow
Journal bearings	Friction
Journal boxes	Symington
Lightning arresters	General Electric and Westinghouse
Motors:	
25 cars	4 General Electric 264
25 cars	4 Westinghouse 508
Inside hung.	
Paint and varnish:	
Exterior	Sherwin Williams
Interior	Castillian System
Registers	International
Sanders	Bradley
Sash fixtures	J. L. Howard Company
Seats	Bradley
Seating material	Rattan
Step treads	Mason safety
Trolley catchers	Ohio Brass
Trolley base	U. S. No. 13
Trolley wheels	5½ in.
Trucks	Osgood-Bradley—OBC 30-64
Ventilators	Bradley exhaust
Wheels	26 in. steel
Safety equipment	Safety Devices Company

Paris-Orleans Railway, Paris, has just placed an order for two electric locomotives with Brown-Boveri & Company, Ltd., of Baden, Switzerland. These two locomotives, which are for express passenger trains, will be run on the Paris-Vierzon section. Each locomotive is equipped with four motors and a type of drive after the new system of the Baden firm. The capacity of each locomotive is 4,000 hp., the maximum speed 130 km. per hour. The weight, only 116 tons, is relatively small. The length of the engines is nearly 18 meters. All the mechanical parts are supplied by the Winterthur Locomotive Works.

Track and Roadway

Hamilton (Ont.) Street Railway proposes to lay new tracks on Main Street from Ottawa Street. This project is estimated at $40,000.

Tri-City Railway, Davenport, Iowa, has begun relaying tracks on Brady Street, in Davenport. The estimated cost is $58,000.

Des Moines City Railway will spend approximately $460,000 in improvements this year. Of this amount $326,000 will be for track construction, $30,000 for construction equipment and $50,000 for substation equipment.

Portland Railway, Light & Power Company, Portland, Ore., has recently completed trolley line construction, including the laying of 122-lb. rails, on Hawthorne Avenue, at a cost of $40,000. Other improvements recently completed represent an expenditure of $10,000.

Los Angeles Railway has started the double-tracking of the "C" Line on Douglas Streets from Bellevue to the end of the line. This is one of the track construction jobs to be carried out in the extensive program for the improvement of service. Eight tracks in the new carhouse which is under construction at South Park will soon be available for the storage of cars.

Power Houses, Shops and Buildings

Milwaukee Electric Railway & Light Company will erect in Racine a modern steel and brick car house building, 80 ft. x 160 ft., to cost between $75,000 and $100,000.

Arkansas City - Winfield Northern Railway, Wichita, Kan., will discontinue its power plant now in use and will install an up-to-date substation. Power will be purchased from the Kansas Gas & Electric Company.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont., will spend $300,000 for improvements on the building of a modern terminal, passenger station and freight building at St. Catharines.

Fort Dodge, Des Moines & Southern Railroad, Boone, Iowa, has ordered a new 10,000-kw. turbine and condenser. Improvements will be effected necessary to their installation for the generating station at Fraser, Iowa. The new equipment, which will cost $400,000, will be delivered about Jan. 1.

Trade Notes

General Electric Company, Schenectady, N. Y., has announced a number of important improvements in its P. C. multiple-unit control for train operation. The main air engine has been redesigned to include a spring which eliminates delay in passing from the "off" to the first position. After fitness tests, phosphor bronze stems and monel metal seats have been adopted to lengthen the life of magnet valve parts. Other improvements include a new type of control finger which cannot stub even if worn through at the line of contact. A new accelerating relay has also been designed with features including brush contact, a better and more accurate means of adjusting drop out point of series armature and a guard to prevent chance of affecting adjustment by careless handling.

Surplus Steel Exchange, Inc., New York, N. Y., has been formed for the purpose of presenting an outlet for surplus stock material. Surplus stocks of steel will be listed free of charge and stock lists mailed to users of similar material at frequent intervals. A commission will be charged only on sales actually made as the exchange does not propose to purchase material, but to act solely in the capacity of agent. It is known that very large quantities of steel at all times lie idle in the store rooms of manufacturers who for lack of organization or knowledge of possible buyers do not make any effort to reduce inventory, or make way for new material from the steel mills, and it is the expectation that this valuable service can be rendered at a moderate cost. The officers of the new company are Robert D. McCarter, president; George E. Dix, vice-president; William L. Cooper, treasurer, and Edward Michaud, secretary and general manager. The offices are at 7 Dey Street, New York City.

New Advertising Literature

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 47,672, describing Type PB-53 and Type PB-54 control relays.

Pennsylvania Crusher Company, Philadelphia, Pa., has issued Bulletin 1005 illustrating and describing the complete line of heavy duty "Pennsylvania" Steelbuilt Hammer mills for cement rock and limestone. The pamphlet contains sixteen pages.

Combustion Engineering Corporation, New York, has published a pamphlet on Quinn pure oil burning equipment, with a list of some representative installations among industrial plants. Particulars are also given of the Quinn oil burner, a comparison on the operating and equipment costs of oil versus coal and articles on the design of furnaces for oil burning and the economy of oil as a fuel.

— *for safety cars* —

PEACOCK

Staffless Brakes

The Peecock Staffless

The Solution of a Braking Problem—Not Just a Guesswork Expedient

Safety car brakes—both air and hand—because of the varying nature of the operation require the best and most reliable products obtainable. The idea that a hand brake, because it might be required for only infrequent and emergency use, need not embody best principles of construction and operation is being rapidly discarded.

Air Brake designers have used every means to make the air brake fully adaptable to operating requirements. There are no less requirements for the hand brake since from the very nature of operation, it is essential that when the *hand brake is used* it must be *thoroughly reliable.*

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The Peacock Staffles brake is the result of diligent research, correct calculations and practical experience. It is based on complete figures, not on a make-shift anything-will-do policy. Besides this, it weighs only 72 pounds, and occupies less platform space than any other hand brake made.

Let us submit figures on the braking forces involved in safety car work, have your own engineers check them up and then you'll see why we call the Peacock Staffless brake a solution—not an expedient.

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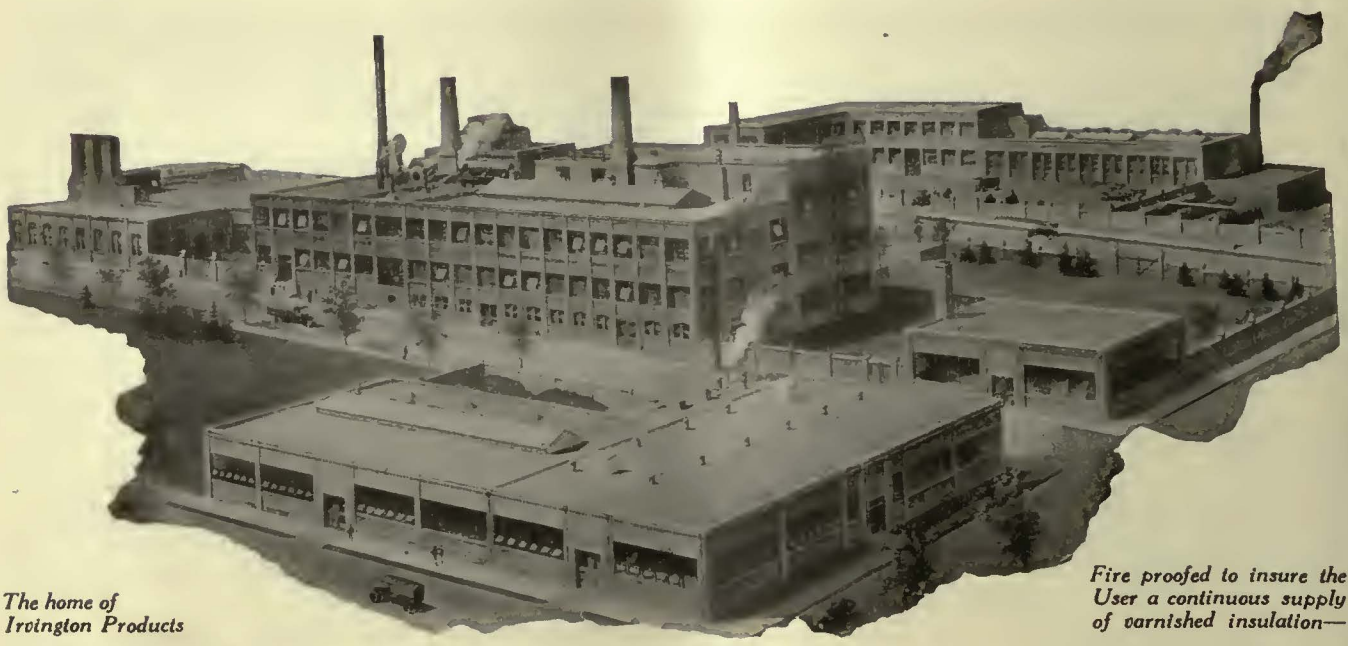

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by FESTUS J. WADE
President, MERCANTILE TRUST COMPANY *of St. Louis*

WHEN we strike at advertising, meaning, of course, efficiently applied advertising, we strike at salesmanship, and the heart of business. For the banker to do anything to retard business right now is suicide.

When the merchant pulls down his shingle and waits for business to come to him in a buyers' market, we laugh at him, and call him a poor business man.

When he is forced to cut down one of his best methods of selling because his banker considers advertising an unnecessary item of expense and refuses an otherwise deserved loan purely on that principle, it is my humble opinion that we should laugh at the banker, and feel sorry for the merchant.

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[Published by the ELECTRIC RAILWAY JOURNAL in co-operation with The American Association of Advertising Agencies]

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Present Status of Electrical Industry
Advantage of Grouping Small Plants into Large Systems
Problems of the Power Industry
Suggested Regional Electric Power Districts. Outline of Suggested Regional Power Districts
Constant-Potential Electric Transmission System
Outline of Proposed Constant-Potential Transmission System
Residence, Commercial and Industrial Customers
Summary of Mechanical and Electrical Power in Utilities and Industries
Water Power Developments
Generator Capacity and Output of Central Stations
General Power Service for Industries
Mechanical and Electrical Power and Wage Earners in Manufactures
Mechanical and Electrical Power in Mines and Quarries
Railway Data and Discussion
Effect of Diversity on Load Factor
Economic Proportion of Hydro-Electric and Steam Power

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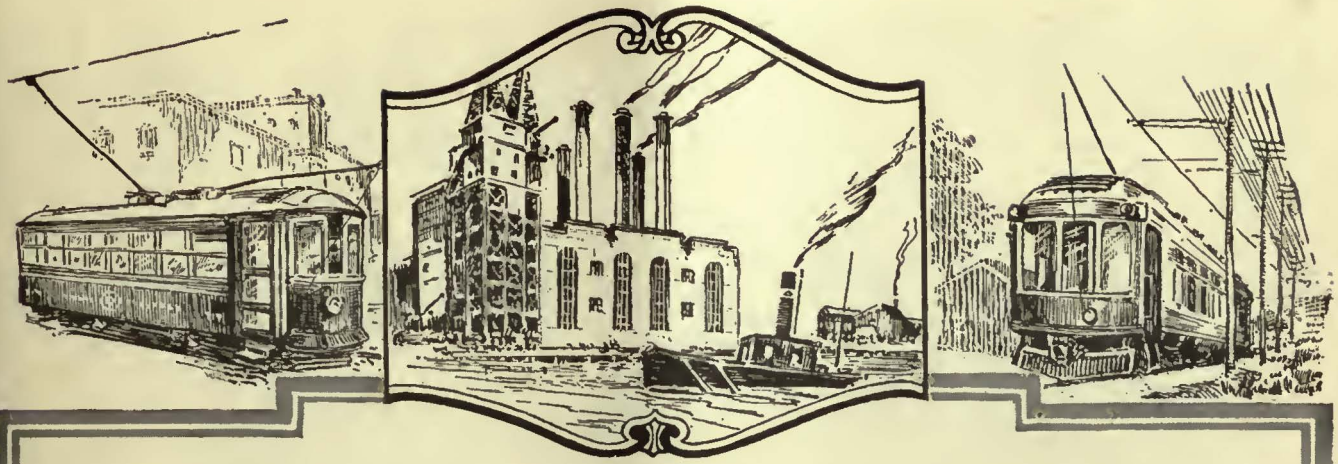

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Traffic stops or parts to right and left to let the emergency truck come through. Everyone knows that on it depends the quick restoration of traffic and, sometimes, even life and limb.

And so you, who are in charge, want it to come along at top speed.

And it will come along at top speed, if you are using

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the Volatile Gas

Then, when the driver steps on the accelerator, a lively stream of vaporized Texaco Gasoline shoots into the cylinders and the truck's away.

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We will gladly ship you a No. 5B Knutson Trolley Retriever for extended trial, and guarantee to refund the price if you are not convinced that it is the most efficient retriever you have ever had on your cars.

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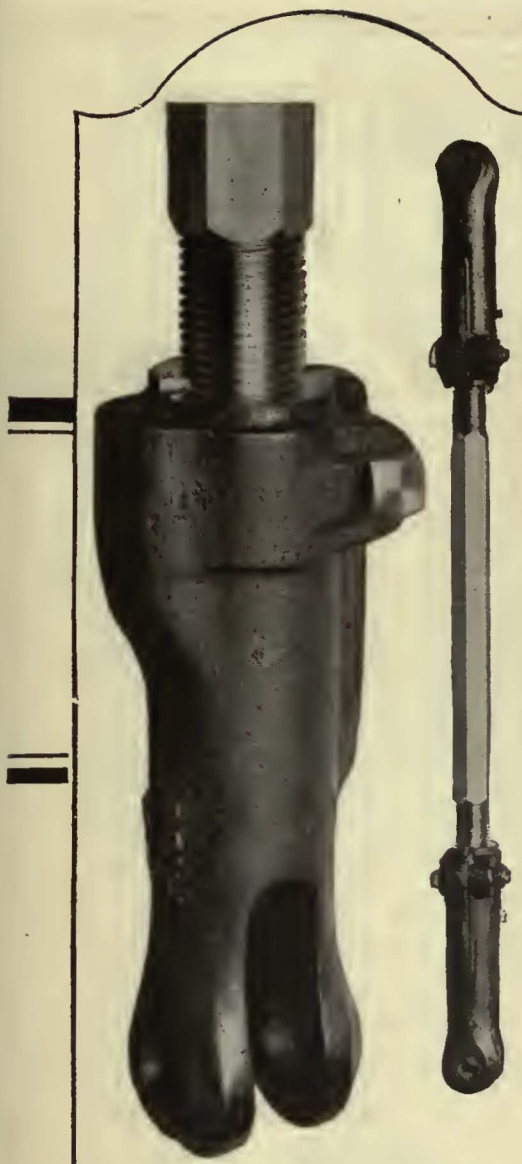

Better Because It's Boyerized

The McArthur Turnbuckle

You won't have to re-fit the brake rigging with new turnbuckles, if you specify McArthur Turnbuckles in the first place. They will last as long as the truck itself.

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Relaying Rails with Angle Bars

Immediate Shipment

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Rails and Track Material

FOR SALE

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San Diego, Calif.

FOR SALE

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Practically New.

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The No-Staff Brake for any size and type of car

Apply the advantages of the staffless brake with its space-saving features, to all your cars. Ackley No-Staff Brakes are adaptable to any kind of service. The eccentric chain-winding drum insures quickest applications and maximum power.

Price only $32.00

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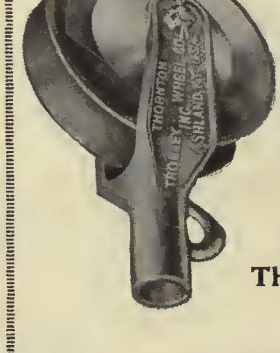

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Incorporated
Ashland, Kentucky

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One-Piece Gear Cases

Seamless—Rivetless—Light Weight

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Chillingworth Mfg. Co.
Jersey City, N. J.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.
Air Circuit Breakers
Roller-Smith Co.
Air Receivers & Aftercoolers
Ingersoll-Rand Co.
Ammeters
Roller-Smith Co.
Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Drew Elec. & Mfg. Co.
Western Electric Co.
Westinghouse E. & M. Co.
Armature Shop Tools
Armature Coil Equip. Co.
Elec. Service Supplies Co.
Automatic Return Switch Stands
Ramapo Ajax Corp.
Automatic Safety Switch Stands
Ramapo Ajax Corp.
Axles
Bemis Car Truck Co.
St. Louis Car Co.
Axle Straighteners
Columbia M. W. & M. I. Co.
Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Carnegie Steel Co.
Westinghouse E. & M. Co.
Babbitt Metal
More-Jones B. & M. Co.
Babbitting Devices
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Beads Insulating
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Bemis Car Truck Co.
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Drew Elec. & Mfg. Co.
General Electric Co.
Gilbert & Sons B. F. Co., A.
St. Louis Car Co.
Westinghouse E. & M. Co.
Bearings, Center and Roller Side
Burry Railway Supply Co.
Stucki Co., A.
Bearings, Roller
Stafford Roller Bearing Car Truck Corp.
Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Heatl'g Co.
Elec. Service Sup. Co.
St. Louis Car Co.
Western Electric Co.
Blowers, Portable, Motor Driven
Martindale Elect. Co.
Boilers
Babcock & Wilcox Co.
Bond Testers
Amer. Steel & Wire Co.
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Elec. Service Sup. Co.
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Morganite Brush Co.
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Elliott-Thompson Elec. Co.
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Railway Track-Work Co.
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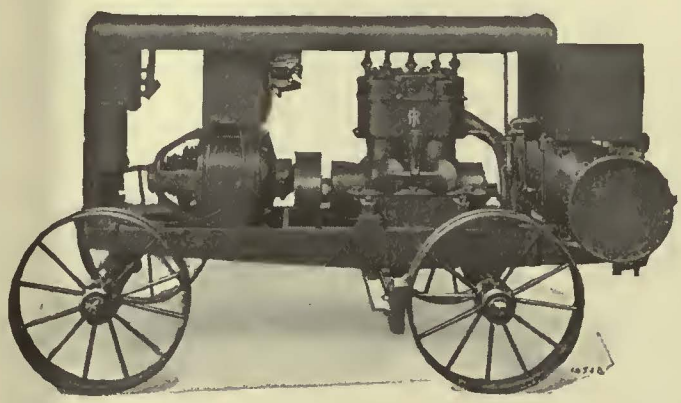

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Stafford Roller Bearing Car Truck Corp.
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Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.
Sash Balances
Edwards Co., Inc., The O. M.
Sash Fixtures, Car
Brill Co., The J. G.
Edwards Co., Inc., The O. M.
St. Louis Car Co.
Sash, Metal, Car Window
Edwards Co., Inc., The O. M.
Hale & Kilburn Corp.
Scrapers, Track (See Cleaners and Scrapers, Track)
Screw Drivers, Rubber Insulated
Elec. Service Sup. Co.
Seats, Bus
St. Louis Car Co.
Seats, Car (See also Rattan)
Amer. Rattan & Reed Mfg. Co.
Brill Co., The J. G.
Hale & Kilburn Corp.
Heywood-Wakefield Co.
St. Louis Car Co.
Seating Materials
Brill Co., J. G.
Heywood-Wakefield Co.
Pantasote Co., The
St. Louis Car Co.
Shades, Vestibule
Brill Co., The J. G.
Shovels
Allis-Chalmers Mfg. Co.
Brill Co., The J. G.
Hubbard & Co.
Side Bearings (See Bearings, Center and Side)
Signals, Car Starting
Consolidated Car Heat. Co.
Elec. Service Sup. Co.
Nat'l Pneumatic Co., Inc.
Signals, Indicating
Nichols-Lintern Co.
Signal Systems, Block
Elec. Service Sup. Co.
Nachod Signal Co., Inc.
U. S. Elec. Signal Co.
Wood Co., Chas. N.
Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
U. S. Elec. Signal Co.
Slack Adjusters (See Brake Adjusters)
Sling
Carnegie Steel Co.
Sleet Wheels and Cutters
Anderson Mfg. Co., A. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Electric Ry. Equipmt. Co.
Elec. Service Sup. Co.
Nuttall Co., R. D.
Smokestacks, Car
Nichols-Lintern Co.
Snow-Plows, Sweepers and Brooms
Amer. Rattan & Reed Mfg. Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Consolidated Car Fender Co.
St. Louis Car Co.
Soldering and Brazing Apparatus (See Welding Processes and Apparatus)
Irvington Varnish & Ins. Co.
Special Trackwork
Lorain Steel Co.
Spikes
Amer. Steel & Wire Co.
Splicing Compounds
Westinghouse E. & M. Co.
Splicing Sleeves (See Clamps and Connectors)
Spray Nozzles
Drew Elec. & Mfg. Co.
Springs, Car and Truck
Amer. Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G
St. Louis Car Co.
Sprinklers, Track and Road
Brill Co., The J. G.
St. Louis Car Co.
Steel Castings
Wharton, Jr., & Co., Wm.
Steel and Steel Products
Morton Mfg. Co.
Steps, Car
Morton Mfg. Co.
Universal Safety Tread Co.
Steps, Ladder & Stair, Non-Slipping
Irving Iron Works
Steps, Safety
Irving Iron Works
Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.
Storage Batteries (See Batteries, Storage)
Strain, Insulators
Ohio Brass Co.
Strand
Roebling's Sons Co., J. A.
Subway Grating
Irving Iron Works
Subway Boxes
Johns-Pratt Co.
Superheaters
Babcock & Wilcox Co.
Sweepers, Snow (See Snow Plows, Sweepers and Brooms)
Switches, Safety
Johns-Pratt Co.
Switch Stands & Fixtures
Ramapo Ajax Corp.
Switches, Selector
Nichols-Lintern Co.
Switches, Tee Rail
Ramapo Ajax Corp.
Switches, Track (See Track Special Work)
Switches and Switchboards
Allis-Chalmers Mfg. Co
Anderson Mfg. Co., A. J. & J. M.
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Synchroscopes
Roller-Smith Co.
Tamper Tie
Ingersoll-Rand Co.
Railway Track-Work Co.
Tapes and Cloths (See Insulating Cloth, Paper and Tape)
Tee Rail Special Track Work
Ramapo Ajax Corp.
Telephones and Parts
Elec. Service Supplies Co.
Western Electric Co.
Terminals, Cable
Std. Underground Cable Co.
Testing Devices, Meter
Johns-Pratt Co.
Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)
Thermostats
Consolidated Car Heat. Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter
Ticket Choppers & Destroyers
Elec. Service Supplies Co.
Ties and Tie Rods, Steel
American Bridge Co.
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.
Ties, Wood Cross (See Poles, Ties, Posts, etc.)
Tongue Switches
Wharton, Jr., & Co., Wm.
Tool Steel
Carnegie Steel Co.
Tools, Track & Miscellaneous
Amer. Steel & Wire Co.
Columbia M. W. & M. I. Co.
Elec. Service Supplies Co.
Hubbard & Co.
Railway Track-work Co.
Torches, Acetylene (See Cutting Apparatus)
Tower Wagons and Auto Trucks
McCardell & Co., J. R.
Towers and Transmission Structures
American Bridge Co.
Archbold-Brady Co.
Bates Exp. Steel Truss Co.
Westinghouse E. & M. Co.
Track Expansion Joints
Wharton, Jr., & Co., Inc., Wm.
Track Grinders
Metal & Thermit Corp.
Railway Track-Work Co.
Seymour Rail Grinder Co.
Trackless Trolley Cars
St. Louis Car Co.
Track, Special Work
Barbour-Stockwell Co.
N. Y. Switch & Crossing Co.
Ramapo Ajax Corp.
Wharton, Jr. & Co., Inc., W.
Transfer (See Tickets)
Transfer Tables
American Bridge Co.
Transformers
Allis-Chalmers Mfg. Co.
General Electric Co.
Western Electric Co.
Westinghouse E. & M. Co.
Treads, Safety, Stair, Car Step
Morton Mfg. Co.
Universal Safety Tread Co.
Trolley Bases
Anderson Mfg. Co., A. J. & J. M.
Elec. Service Supplies Co.
General Electric Co.
Nuttall Co., R. D.
Ohio Brass Co.
Trolley Supply Co.
Trolley Bases, Retrieving
Ackley Brake & Supply Corp.
Anderson Mfg. Co., A. & J. M.
Elec. Service Supplies Co.
Nuttall Co., R. D.
Ohio Brass Co.
Western Electric Co.

Trolley Bases
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Trolley Material
Drew Elec. & Mfg. Co.
Ohio Brass Co.
Elec. Service Supply Co.

Trolley Shoes
Economy Elect. Devices Co.
Miller Trolley Shoe Co.

Trolley Wheels and Harps
Thornton Trolley Wheel Co.

Trolleys and Trolley Systems
Ford Chain Block Co.

Trolley Wheels (See Wheels, Trolley)

Trolley Wire
Amer. Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
Bridgeport Brass Co.
Page Steel & Wire Co.
Roebling's Sons Co., J. A.
Rome Wire Co.
Western Electric Co.

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.

Tubing Yellow & Black Flexible Varnish
Irvington Varnish & Ins. Co.

Turbines, Steam
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Turnstiles
Elec. Service Sup. Co.
Perey Mfg. Co., Inc.

Upholstery Materials
Amer. Rattan & Reed Mfg. Co.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Varnished Papers
Irvington Varnish & Ins. Co.

Varnished Silk
Irvington Varnish & Ins. Co.

Varnishes
Beckwith-Chandler Co.

Ventilators, Car
Brill Co., The J. G.
Nat'l Ly. Appliance Co.
Nichols-Lintern Co.
Railway Utility Co.
St. Louis Car Co.

Voltmeters
Roller-Smith Co.

Waste Saving Machines
Oil & Waste Saving Mch. Co.

Weather Strippings, Top, Bottom & Sides
Edwards Co., Inc., The O. M.

Welded Rail Joints
Alumino-Thermic Corp.
Metal & Thermit Corp.
Ohio Brass Co.
Railway Track-Work Co.

Welders, Portable Electric
Elec. Ry. Improvement Co.
Ohio Brass Co.
Railway Track-Work Co.

Welding & Cutting Tools
International Oxygen Co.

Welding Processes and Apparatus
Alumino-Thermic Corp.
Electric Railway Imp. Co.
General Electric Co.
Green Equip. Co.
Metal & Thermit Corp.
Ohio Brass Co.
Railway Track-Work Co.
Westinghouse E. & M. Co.

Welding Steel
Railway Track Work Co.

Welding Wire & Rods
Page Steel & Wire Co.

Whael Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Cast Iron
Bemis Car Truck Co.
Griffin Wheel Co.

Wheels Car Steel & Steel Tire
Carnegie Steel Co.

Wheels, Trolley
Anderson Mfg. Co., A. J. & J. M.
Bayonet Trolley Harp Co.
Columbia M. W. & M. I. Co.
Gilbert & Sons B. F. A.
Electric Ry. Equip. Co.
Elec. Service Supplies Co.
Flood City Mfg. Co.
General Electric Co.
Nuttall Co., R. D

Whistles, Air
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Wire Rope
Amer. Steel & Wire Co.
Roebling's Sons Co., J. A.

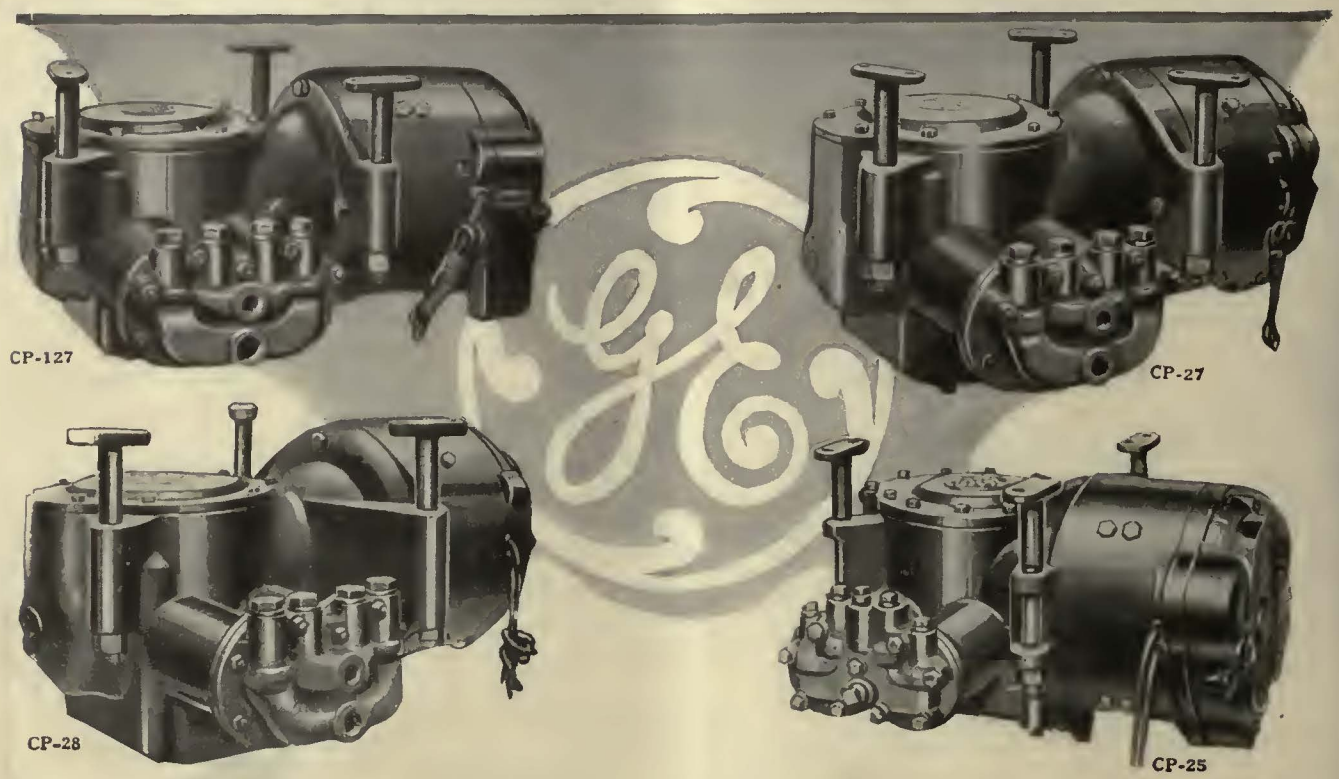
Wire, Copper Covered Steel
Page Steel & Wire Co.

Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
Bridgeport Brass Co.
General Electric Co.
Kerite Ins. Wire & Cable Co.
Okonite Co.
Page Steel & Wire Co.
Roebling's Sons Co., J. A.
Rome Wire Co.
Std. Underground Cable Co.
Western Electric Co.
Westinghouse Tr. Br. Co.

Wood Preservatives
Baker Wood Preservative

ALPHABETICAL INDEX TO ADVERTISEMENTS

Type CP—the Low-Maintenance Compressor



These 19 Companies Wanted 1100 More

The best recommendation for any equipment is continued repeat orders. Low operating costs of CP center-gear type Air Compressors have resulted in recent repeat orders for 1133 equipments from the following companies:

	No. of cars	Type
Buffalo & Lake Erie Traction Co., Erie, Pa.	25	CP-25
Chicago Surface Lines, Chicago, Ill.	45	CP-27
Chicago Surface Lines, Chicago, Ill.	169	CP-127
City of Detroit, Detroit, Mich.	100	CP-27
City of Seattle, Seattle, Wash.	9	CP-27
Cleveland Railways, Cleveland, Ohio	100	CP-127
Conestoga Traction Co., Lancaster, Pa.	12	CP-27
Indiana Service Corp., Ft. Wayne	15	CP-27
Kentucky Traction & Terminal Co., Lexington	27	CP-25
Knoxville Power & Light Co., Knoxville, Tenn.	14	CP-25
Nashville Railway & Light Co., Nashville, Tenn.	12	CP-27
New Orleans Railway & Light Co., New Orleans, La.	100	CP-27
Oakwood Street Railway Co., Dayton, O.	12	CP-27
Philadelphia Rapid Transit Co., Philadelphia, Pa.	201	CP-27
Public Service Railway, Newark, N. J.	110	CP-27
Pennsylvania-Ohio Electric Co., Youngstown, O.	12	CP-27
San Francisco-Oakland Terminal Ry., Oakland, Cal.	55	CP-27
Terre Haute Traction & Light Co., Terre Haute, Ind.	10	CP-25
United Traction Company, Albany, N. Y.	55	CP-27
Virginia Railway & Power Company, Richmond.	50	CP-27

General Electric Company
Schenectady, N. Y.

GENERAL ELECTRIC