

ELECTRIC RAILWAY JOURNAL

8 miles in 8 weeks!

And twenty-three more to go!

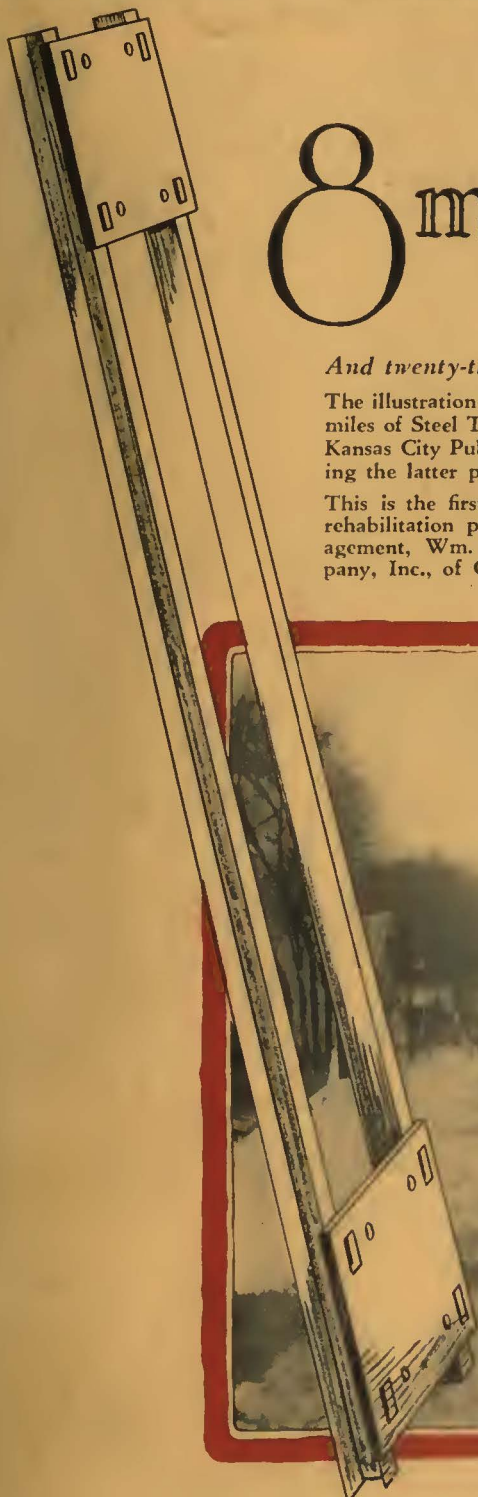
The illustration below shows part of eight miles of Steel Twin Tie track built by the Kansas City Public Service Company during the latter part of 1926.

This is the first part of a very extensive rehabilitation program by the new management, Wm. G. Woolfolk and Company, Inc., of Chicago, directed by their

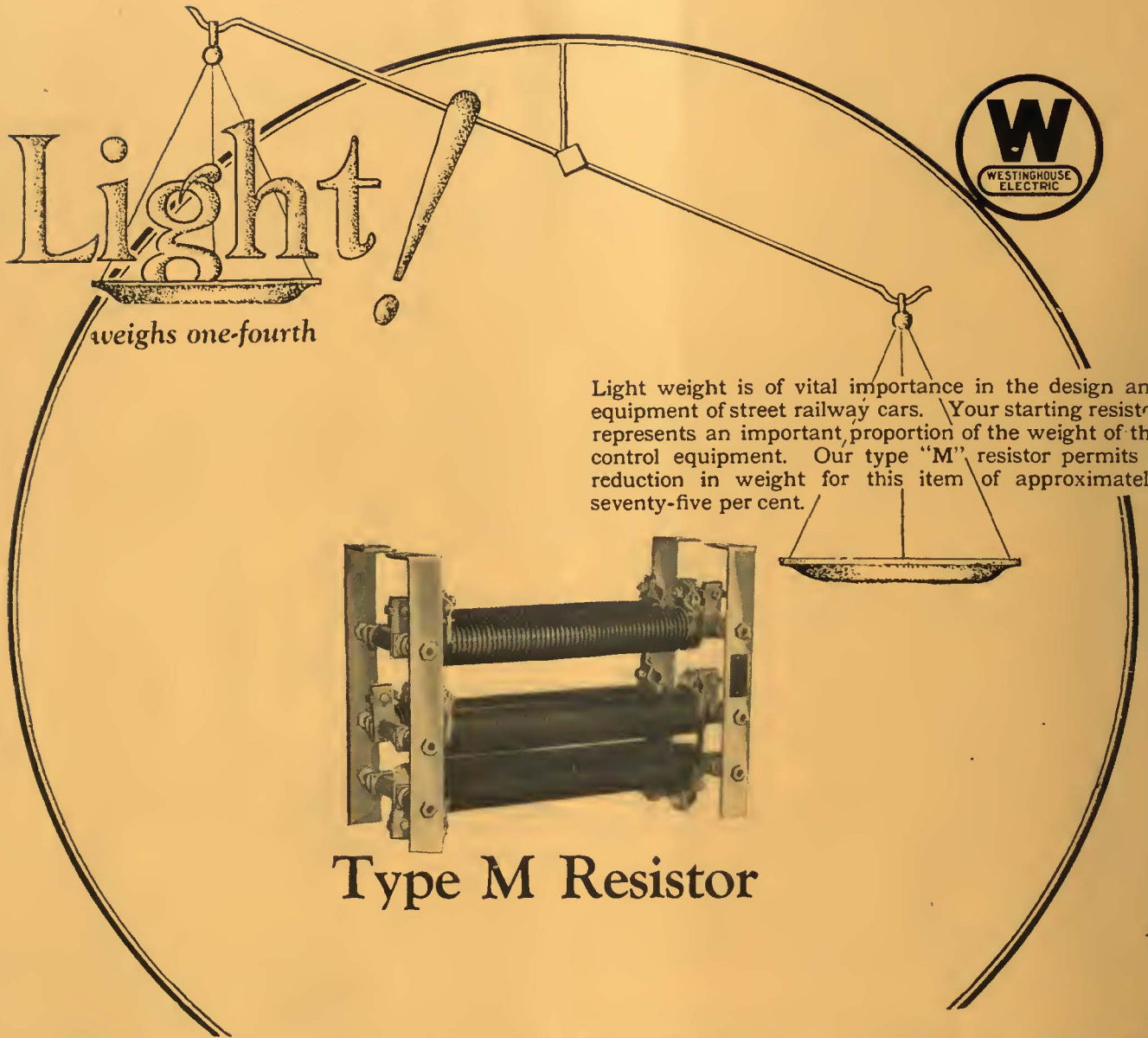
Engineer of Construction, Mr. A. E. Harvey.

Steel Twin Ties are now being fabricated for 23 additional miles for early spring delivery for Kansas City.

Further details in the "Paved Track Notebook," write the International Steel Tie Co., of Cleveland, O.



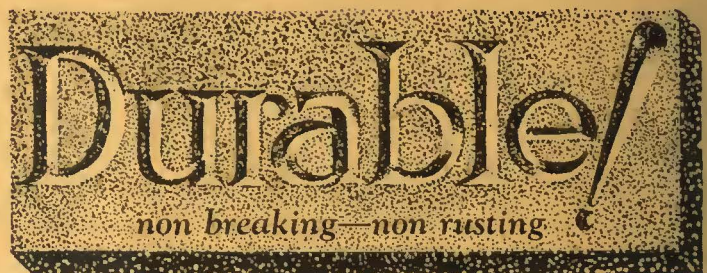
20% more bearing surface
 steel **Twin Tie** track



Light weight is of vital importance in the design and equipment of street railway cars. Your starting resistor represents an important proportion of the weight of the control equipment. Our type "M" resistor permits a reduction in weight for this item of approximately seventy-five per cent.

Type M Resistor

Strength is of equal importance with weight. The resistance element of our Type "M" Resistor is a drawn ribbon alloy wound spirally around porcelain insulators. This construction eliminates localized heating and evenly distributes any strain. The flexibility of the alloy prevents breakage in even the most extreme cases.



Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania

Sales Offices in All Principal Cities of
the United States and Foreign Countries



1927

Westinghouse

ELECTRIC RAILWAY JOURNAL

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Vol. 69
No. 3

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Making Neighbors

ELECTRIC railway men in the more populous districts are fortunate in their opportunity of frequent contact with others in similar lines of work. They can look over one another's systems, and find such contact stimulating and instructive. But many railways are so located that frequent visits to other properties are impracticable. Distances are too great.

Though remote these railways are not isolated, however, for once a week **ELECTRIC RAILWAY JOURNAL** carries to them the news of the industry, stories of the doings of electric railway men, and technical articles dealing with the latest developments.

"We devour every word of it," remarked the superintendent of a remote company when in the **JOURNAL** office recently. "Every issue is read from cover to cover."

Thus do the railway officials in distant towns keep in touch with the progress of the industry. For those more centrally located it is of equal value as a guide to what is most worthy of attention when on a trip to other cities, and from week to week as a source of prompt and accurate information.

McGRAW-HILL PUBLISHING COMPANY, INC.

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Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place.
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SAVING THE RAIL SAVES THE RAILWAY

Actions, not words, sell rides

You can sell rides only by doing something to make them attractive. Words sell nothing until they proclaim something achieved.

Advertise your service by all means, but first do something worth talking about.

For example—rejuvenate your track. Grind out the corrugations, weld and grind the joints. Only then can you talk about good service. Whether your cars be old or new, you can give combined speed, safety, silence and comfort only on well-maintained track.

The cost of keeping track ever fit is cut to the limit by the modern equipment shown here.

Quotations now?

Railway Trackwork Co.

3132-48 East Thompson Street, Philadelphia

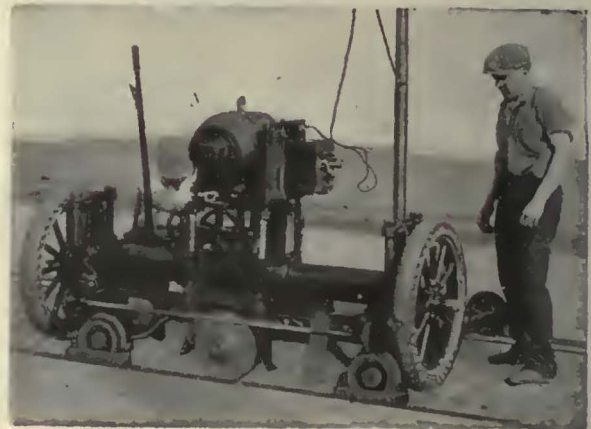
AGENTS:

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 Electric Engineering & Mfg. Co., Pittsburgh
 H. F. McDermott, 208 S. La Salle St., Chicago
 Equipment & Engineering Co., London
 P. W. Wood Railway Supply Co., New Orleans, La.
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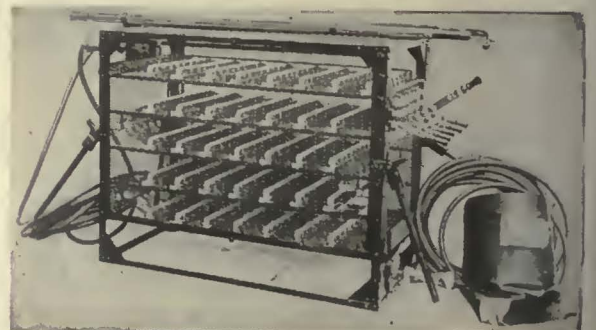
"Improved Atlas" Rail Grinder



"Imperial" Track Grinder

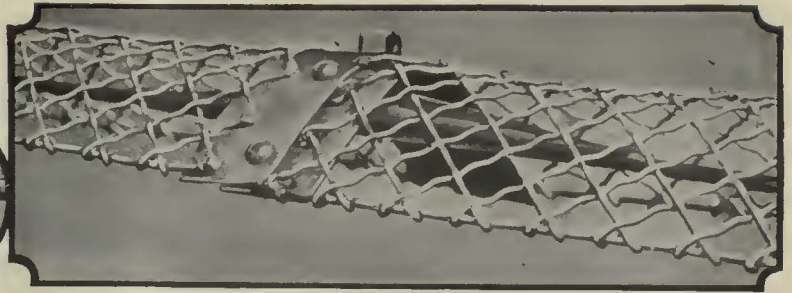
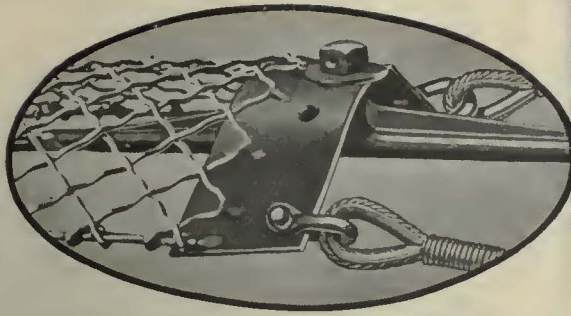


Reciprocating Track Grinder



"Ajax" Electric Arc Welder

SAVING THE RAIL SAVES THE RAILWAY

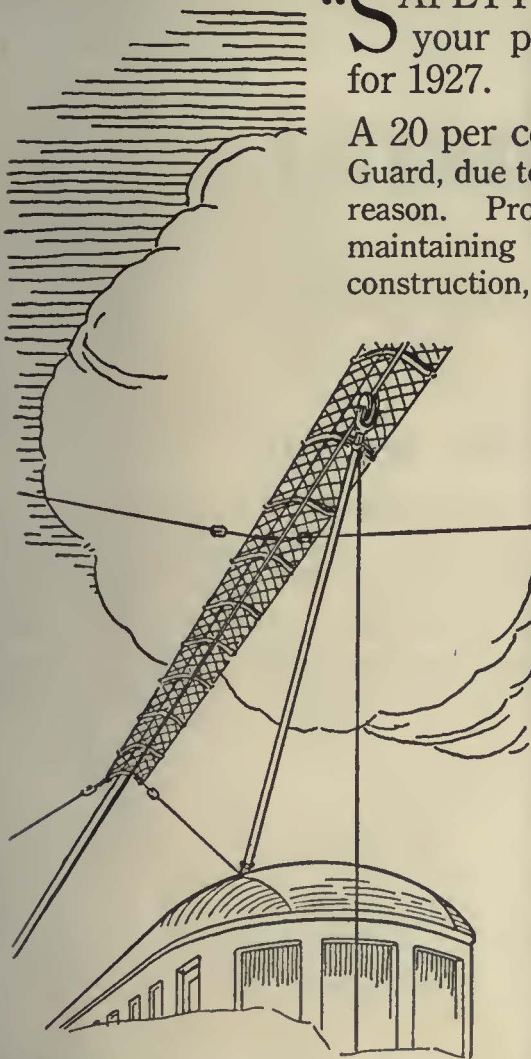


At Left; End of Guard Installed. Above: Method of Splicing Sectional Guard.

Have "Safety Crossings" Now—At A Lower Cost

"SAFETY CROSSINGS" may well be included in your patronage-winning revenue-increasing plans for 1927.

A 20 per cent reduction in the price of O-B Trolley Guard, due to manufacturing and selling economies, is one good reason. Proportionate savings in the cost of installing and maintaining Trolley Guard, due to its improved sectionalized construction, is another important consideration.



Makes Safe Cars Safer

There are still better reasons: "Safety Crossings" make safe cars safer by preventing the stalling of cars at the most dangerous points on your system; they prevent traffic delays at such points; and they build good will by advertising the fact that car riders are protected with every needed safety device.

Trolley guard has been used for years by scores of the most progressive properties. It has proved the only effective means of preventing loss of power due to dewirements at dangerous railroad crossings.

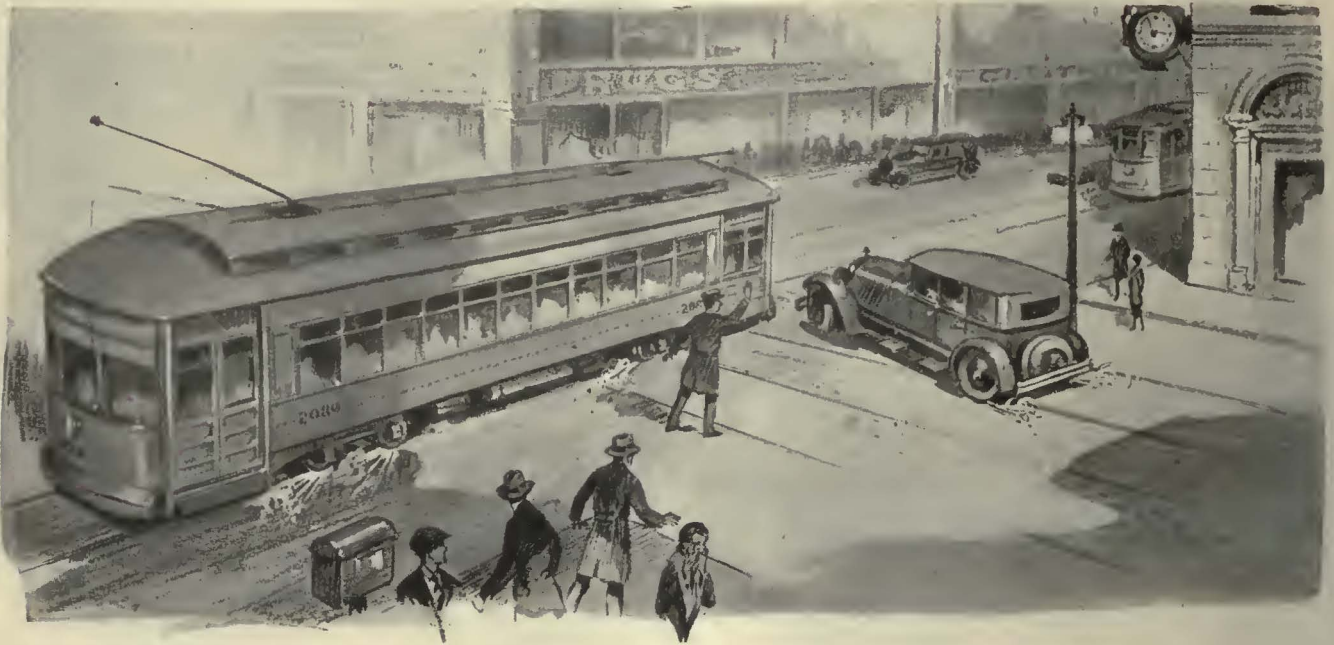
May we send you complete and detailed information, now? Address

Ohio Brass Company, Mansfield, Ohio
 Dominion Insulator & Mfg. Co., Limited
 Niagara Falls, Canada
 2888

Ohio Brass Co.



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Brake'em-hard!

QUICK starts—and even quicker stops!

Acceleration—2 m.p.h. per second!
Braking as high as 3 m.p.h. per second!

This is necessary to keep ahead of the other street traffic—the modern idea in trolley car operation. Such operation soon brings ordinary steel wheels to the shop.

Flats and shell-outs are more frequent.

Roads using Davis "One-Wear" Steel Wheels avoid this maintenance expense. Throughout their longer life, Davis Wheels needs no contour reconditioning. Their greater strength resists the greater stresses of modern operation.

AMERICAN STEEL FOUNDRIES

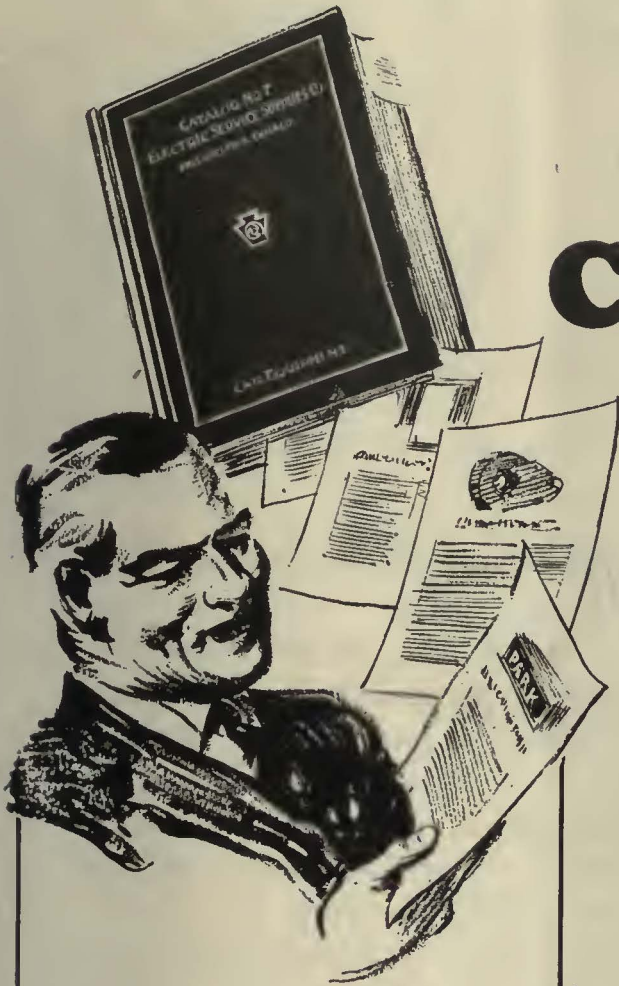
NEW YORK

CHICAGO

ST. LOUIS

Have you this complete buying guide of car equipment?

ESSCO Catalog No. 7



Here you will find listed, illustrated and described, thousands of devices, parts and supplies. The tiniest screw in a Faraday Buzzer can be identified and ordered by its Catalog number. The lens or reflector for a Golden Glow Headlight is likewise cataloged. Whether it's a gear case or a match box holder you're looking for—ESSCO Catalog No. 7 should be your first reference.

Some items selected from
ESSCO Catalog No. 7

- | | |
|------------------------------|-----------------------------|
| Golden Glow Headlights | Trailer Connectors |
| Faraday Signal Systems | Automatic Door Signals |
| Hunter-Keystone Signs | Standard Trolley Harps |
| Steel Gear Cases | Standard Trolley Wheels |
| Motorman's Seats | Peerless Coil Winding Tools |
| Lighting Fixtures | Peerless Armature Machines |
| Headlight Resistances | Insulating Materials |
| Air Sanders | Cass Commutator Stones |
| Trolley Catchers | Sand Driers |
| Shelby Trolley Poles | Peerless Pinion Pullers |
| Rotary Gongs | Employees' Badges |
| International Fare Registers | Line Material |
| Fare Register Fittings | Portable Lamp Guards |
| Samson Cordage | |
| Air Valves | |
| Cord Connectors | |

Write today for your copy!

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PITTSBURGH 1123 Bessemer Bldg.	BOSTON 88 Broad St.	SCRANTON 316 N. Washington Ave.
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Interlocking brakes and doors by means of the M-28 Brake Valve with selective control, increases safety and convenience.



How to make cars SAFE and make them SAVE



MORE than 14,000 cars are now active demonstrations that operating safety is increased and operating expense is decreased when operating responsibility is centralized in one man whose duties are safeguarded and simplified by complete protective and labor-saving devices which interlock car-control, door-opening, and brake-manipulation functions.

Make *your*' new cars safe, and make them save with the Safety Car Control Equipment.

We make the Safety Car Control Devices which make the Safety Car.



SAFETY CAR DEVICES CO.

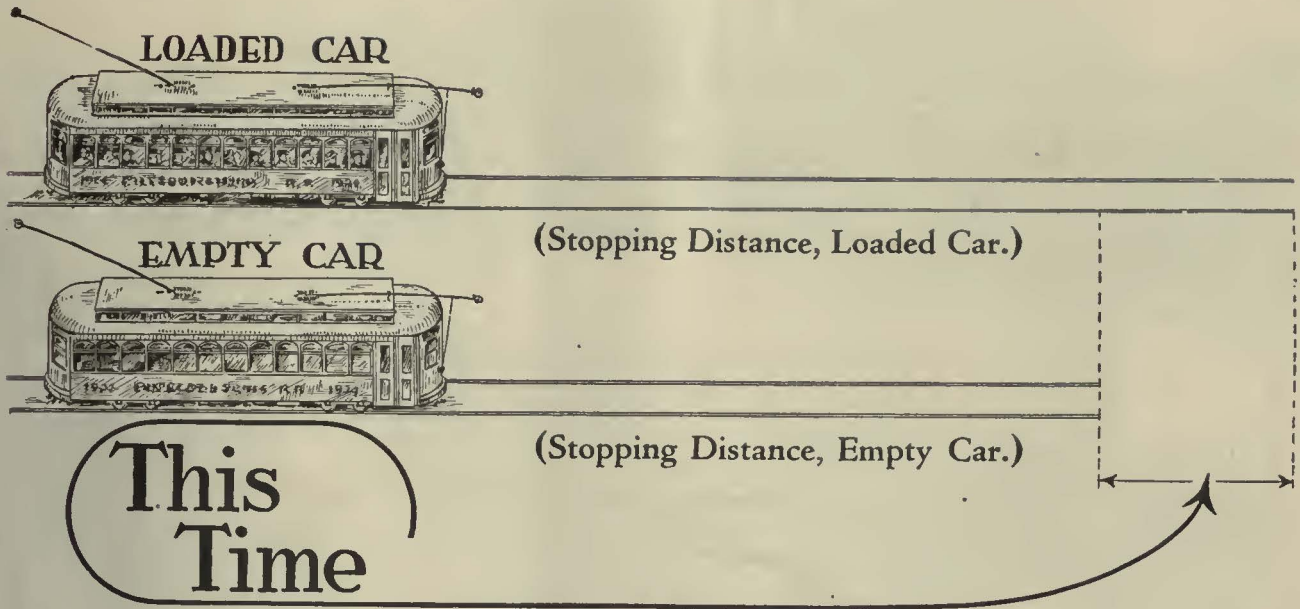
OF ST. LOUIS, MO.

Postal and Telegraphic Address:

WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

Interlocking the power and brakes by means of special controller handle provides safeguard against operator's inattention or disability.



Can be Saved



Information regarding Westinghouse Variable Load Brakes may be obtained upon application to our nearest district office — Ask for Descriptive Catalogue T-2045.

WITH the ordinary form of air brake equipment the maximum retarding force is limited to that which is ample and permissible for an empty car, but which is inadequate to effect the proper degree of control on a loaded car—particularly if it has a high ratio of loaded to empty weight—with the result that the stop is lengthened and more time is consumed.

But this time can be saved!

The Westinghouse Variable Load Brake, adapted specifically for modern light weight surface cars, eliminates the difference in retarding effect on empty and loaded cars—by an automatic adjustment of brake cylinder pressure with the changing load—and insures that stops will be as short under all conditions as would normally be possible only with an empty car.

The saving in time, effected by the uniformly shorter stops, is translated into faster schedule speeds just when time is most valuable—during those periods when there is a demand for quick transportation of large volumes of revenue-producing traffic.

Mass transportation can be accelerated to increase the profit and popularity of your service by the use of this modern brake on your modern cars.

WESTINGHOUSE TRACTION BRAKE CO.
General Office and Works, WILMERDING, PA.

WESTINGHOUSE TRACTION BRAKES



Seats for every service

Whether the service is urban, suburban or interurban—whether it is electric cars or motor buses—you will find a Hale-Kilburn Seat to meet your most exacting requirements. Write for our catalogs to get complete particulars.



**No. 901
Bus Seat**

DeLuxe type seat—designed especially for buses — has divided back, spring cushion and air cushion pads. Upholstered in leather, imitation leather or plush as specified.



**No. 199-F
Car Seat**

Inexpensive, comfortable seat, made for suburban and light-weight interurban cars, has plush upholstered spring edge cushion and detachable back.



**No. 392-EE
Car Seat**

DeLuxe type seat — built for the finest interurban cars — has extra high three-part headroll, mahogany capped armrest and metal parts of pressed steel for light weight. Upholstered in plush or other materials as specified.

HALE-KILBURN COMPANY

General Offices and Works: 1800 Lehigh Avenue, Philadelphia

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Building a copper highway for power

EACH year sees thousands of new miles added to America's vast network of electrical generating systems. Each year sees an increasing amount of Rome Bare Transmission Cables being strung to build these systems.

If you follow span after span of copper cables on into the distribution circuits, to home and factory, you will find other Rome wires—Rome Weatherproof Wire—Rome Cutting-in and Lead Encased

Cables—RomeX, the original non-metallic sheathed cable, and Rome Code Wire.

All these are but a part of the broad line of wires and cables that are manufactured in Rome Mills to fill the countless wiring needs of industry.

Rome Service, ample stocks, and competitive prices, are at your disposal—while an opportunity to quote on any of your wire requirements will always be welcome.

*Stranded
Copper Wire*

ROME WIRE COMPANY, ROME, N.Y.

ROME WIRE

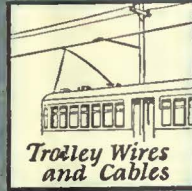
FROM WIRE BAR TO FINISHED COPPER WIRE



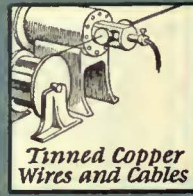
Antenna Wire



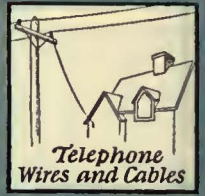
Weatherproof Wires and Cables



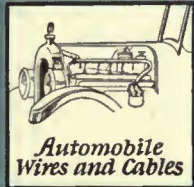
Trolley Wires and Cables



Tinned Copper Wires and Cables



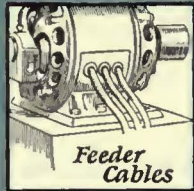
Telephone Wires and Cables



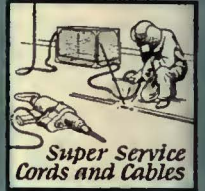
Automobile Wires and Cables



Slow Burning Wires



Feeder Cables



Super Service Cords and Cables



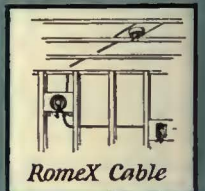
Extra Flexible Wires and Cables



Rubber Covered Wires - Code 30% Intermediate



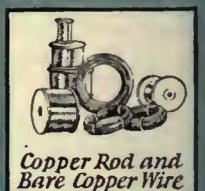
Heater Cords



RomeX Cable



Lamp Cords



Copper Rod and Bare Copper Wire

TWENTY acres of manufacturing floor space—over twenty years of manufacturing experience—both are back of every one of the wires you see pictured on this page.

And, functioning as one part of the Rome organization, is an engineering department composed of men whose duty is the study and development of copper wires and cables that will help to lower the cost of power.

If you will let us know what types of wires and cables you are interested in, we will be glad to send you samples, catalogs, and other information that will be of help to you.



ROME WIRE COMPANY

Mills and Executive Offices: ROME, N.Y.

Diamond Branch: Buffalo, N.Y.

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Boston—1011 Little Building

Chicago—14 E. Jackson Blvd.

Detroit—25 Parsons Street

Cleveland—1200 W. 9th Street

Los Angeles—J. G. Pomeroy, Inc., 336 Azusa Street

San Francisco—J. G. Pomeroy, Inc., 960 Folsom Street



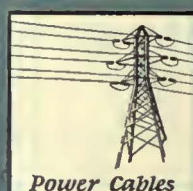
Lead Sheathed Cables



Magnet Wire



Mining Machine Cables



Power Cables



Radio Wires and Cables



THROUGH THE FLOOD

When the Florida hurricane flooded 78 cars of the Florida Power & Light Company to a level higher than the seat backs, there were 50 of these cars equipped with National Pneumatic floor-type sliding door engines. These floor engines were completely submerged in the turbulent flood waters for days.

All other flooded items of equipment had to be taken

down, washed out, baked and placed back in the cars. The National Pneumatic Door Engines, however, were simply drained and were ready to operate without missing a stroke as soon as the air pumps started.

To withstand conditions such as these, the National Pneumatic Door Engine has to be and *is* "a nice piece of mechanism."



National Pneumatic Company

Executive Office, 50 Church Street, New York

General Works, Rahway, New Jersey

CHICAGO
518 McCormick Building

PHILADELPHIA
1010 Colonial Trust Building

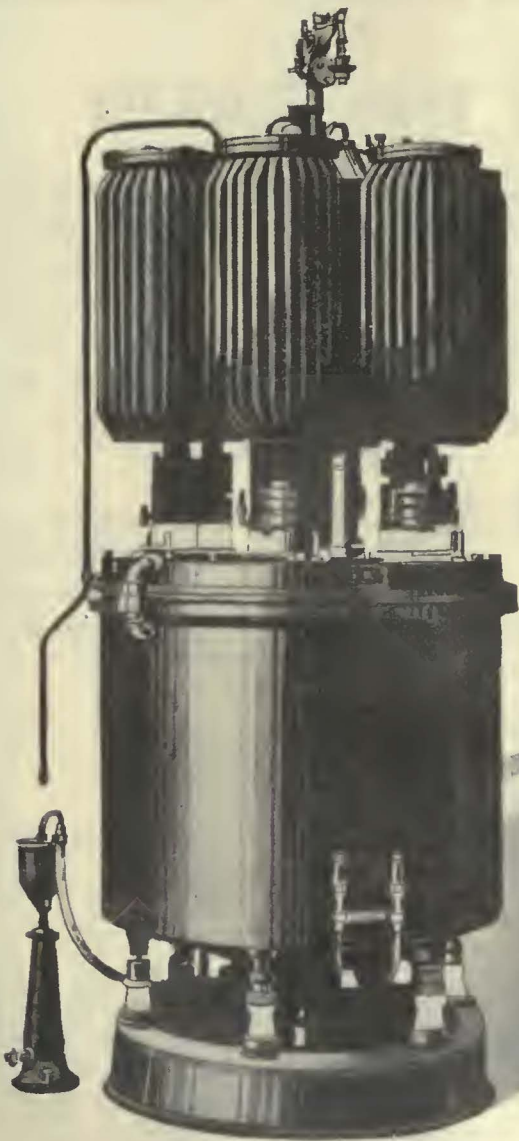
MANUFACTURED IN TORONTO, CANADA, BY

Railway & Power Engineering Corp., Ltd.



American BROWN BOVER

They ar



Principal Products

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| <i>Mercury-Arc Power Rectifiers (steel enclosed)</i> | <i>Mining Locomotives</i> | <i>Relays</i> |
| <i>Electric Locomotives—for any system of current, high or low tensions</i> | <i>Switches, Controllers and all Auxiliary Equipment</i> | <i>Turbo Compressors</i> |
| <i>Complete equipment for railway electrification</i> | <i>Automatic Regulators</i> | <i>Blowers</i> |
| <i>Rotary Converters</i> | <i>Steam Turbo Generators for normal or high pressures and superheats</i> | <i>Electric Furnaces</i> |
| <i>Motor Generators</i> | <i>Oil Switches</i> | <i>Induction Regulators</i> |
| <i>Diesel-Electric Locomotives</i> | <i>Condensers and Auxiliaries</i> | <i>Ships</i> |
| | | <i>Diesel Driven</i> |
| | | <i>Turbine Driven</i> |
| | | <i>Electrical Driven</i> |
| | | <i>Structural Steel Fabrication</i> |



Mercury-Arc Power Rectifiers

ilent!

THUS one source of complaints is stopped by removing the cause. Freedom from moving parts, except small auxiliaries, insures absolutely quiet operation. Even when placed in the heart of the most congested districts no complaint of noise can possibly reach you.

As a matter of fact you can install Mercury-Arc Power Rectifiers anywhere. Place them in sub-stations of light construction, set them up in an old house, bury them under the street. They are low in weight. They require no special foundations. Maintenance is negligible.

Other chief advantages are these—
Efficiency high over the whole working range.
Simple operation.
No synchronizing.

Very high momentary overload capacity and insensibility to short circuits.

Were the only advantage, however, this freedom from noise, the throttling of complaints would alone be sufficient reason to install Mercury-Arc Power Rectifiers in preference to rotary converters.

Descriptive Circular No. 301 describes Mercury-Arc Power Rectifiers. Would you like a copy?

American Brown Boveri Electric Corporation

165 Broadway, New York, N. Y.

Camden, New Jersey

922 Witherspoon Bldg., Philadelphia. 842 Summer St., Boston. 230 South Clark St., Chicago



1927

AMERICAN BROWN BOVERI

PHONO-ELECTRIC OVERHEAD IS A MEASURABLE ECONOMY



You may never need to do this with trolley wire—

but such toughness will stand the buffeting of millions of car passes.

Imagine the mechanical strain on this piece of Phono Electric Trolley wire, tied into a knot while cold.

Yet it shows not the slightest crack or flaw. And the same test has been made many hundreds of times with equally convincing and satisfactory results.

Such toughness is one sound reason why Phono Electric consistently outwears hard

drawn copper trolley wire two to three times.

It has enabled individual installations to chalk up "wire mileage" records of 2,000,000 and more car passes. Certainly a factor well worth consideration in planning a modern overhead for modern service.

We will gladly send you a copy of the Phono Book covering this and other features of Phono Electric Wires in detail.

Phono-Electric The triple-wear Trolley Wire

Phono Hi-Con Conductivity up to 80%

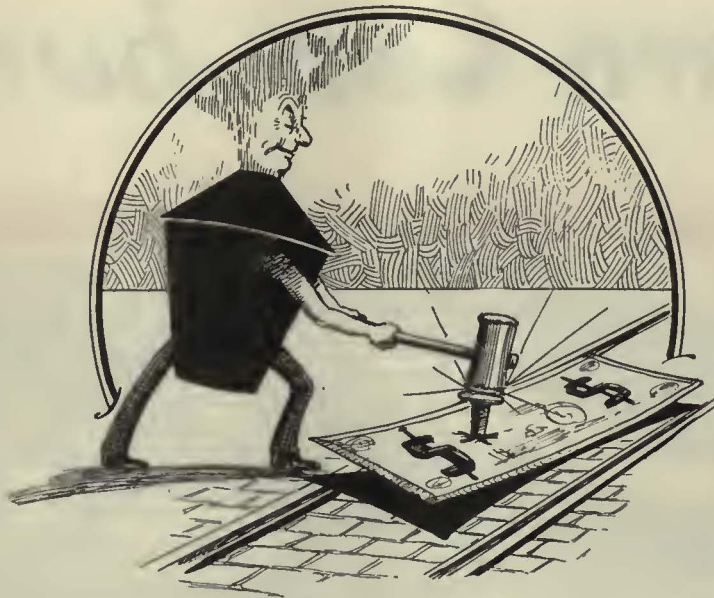
Phono Hi-Strength the corrosion proof messenger

Bridgeport Brass Co

BRIDGEPORT TRADE MARK CO.

Bridgeport Connecticut

A COMPLETE WIRE SERVICE FOR ELECTRIC RAILWAYS



“The first cost is the last cost”

We want to hammer home this *big idea!*

A Thermit weld once made and paid for is no longer a source of expense. The rail joint is eliminated and a solid homogeneous piece of continuous rail takes its place.

Any other joint, no matter how carefully designed, is still a joint, and may ultimately work loose under pounding wheels. Then the pavement must be dug up and the joint repaired.

With Thermit Welds—“the first cost is the last cost,” and the cost today is strictly competitive with other processes.

Why not put this big idea up to the men who control the policies of your company?

THERMIT WELDS

- Permit use of lighter rail sections.
- Eliminate the need for bonds.
- Make smooth quiet-riding track.
- Last as long as the rail itself.
- Are easy to install.



METAL & THERMIT CORPORATION
120 BROADWAY, NEW YORK, N.Y.

Modern Car-building



THE above photograph illustrates our point. It shows the side of a car being completely assembled and riveted on a jig. This method not only assures uniformly good workmanship in minimum time, but also makes the sides of the cars interchangeable. The inset photograph shows another type of jig used for assembling end underframes.

as essential as modern cars

How **BALANCED DESIGN**
and **UNIT CONSTRUCTION**
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This has been clearly demonstrated in working out the modern principle of **BALANCED DESIGN**. Only by boldly breaking with precedent in bringing design and construction under one competent control could the idea of an accurately "balanced" transporta-

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Thus when you buy Cincinnati New Cars of **BALANCED DESIGN** you make no experiments in adaptability—and you pay a minimum price for complete, uniformly efficient units.

This we believe is *modern car-building*.

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CINCINNATI CAR COMPANY
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CINCINNATI
New
CARS

A step ahead of the modern trend



What is your practice?



The cost of coils is only a part of the cost of armature rewinding. The winder's time and other labor must be considered. A small saving in first cost of the coils inevitably is more than offset by frequent rewinding with inferior coils.

The rewinding of G-E Motors to make them as good as new is an ideal achieved only by using coils of "original-equipment quality"—the kind furnished by the builder of the motor—the kind with slot portions moulded to exact dimensions and with insulation not only adequate but sized for a perfect fit to minimize rubbing and wear.

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, Editor

Volume 69

New York, Saturday, January 15, 1927

Number 3

In Helping One's Neighbor One Will Help Himself

SOME master mechanics appear to have a tendency to withhold from visiting master mechanics vital information pertaining to maintenance methods and practices being followed daily within the shop. This is a state of mind that never should exist. These same indifferent master mechanics when visiting the shops of other properties expect an open and frank outpouring of information with respect to the practices being followed—and if this is not forthcoming they feel very much offended.

At varying intervals throughout the year the managements of various companies expect their master mechanics to visit the shops of other properties to discuss maintenance problems and to obtain first-hand information regarding the maintenance practices being followed. Usually these visits prove beneficial, not only to the visitors but to the visited master mechanic as well. The discussion and exchange of ideas give birth to new ideas, resulting in a betterment of maintenance practices with lowered costs. Sometimes, however, little or no benefit is derived from these visits. This is the case when the master mechanic of the visited property will not show his goods in an open, frank manner and the information received by the visitors is obtained only by constant questioning and sifting out the short, curt or evasive answers.

What is the cause of this attitude? Perhaps the offender does not care to impart knowledge to other properties relative to his practices or he does not consider his methods as good as those being followed on other properties. Whatever the reason for this attitude, it should be changed. The sooner this is done the better it will be for the entire industry. It is only through the free and constant exchange of ideas on maintenance methods and practices that progress can be made.

So the Newspapers and the Public May Know

CERTAINLY reassuring is the statement to the press of Managing Director Storrs in review of the electric railway situation for 1926, released for publication on Jan. 10. There appears to be no need here to refer to all that he said, since some of the statistics have heretofore been matters of industry record, but it does seem well to reiterate that the gradual increase in traffic in the industry as a whole stood out in marked contrast to every other year since the war.

Particularly significant is his reference to the extent to which co-ordination is being carried out, the best

part of which is the implication the statement carries of the readiness of the railways to do their share. It may even have escaped railway men that more than 7,000 buses now are being operated by approximately 275 electric railways over more than 15,000 miles of route. A doubter here and there may be inclined to scoff, but it remains significant, however, that, due to the joint effect of an increase in traffic and an increase in the average fare, the gross receipts of the industry have risen during 1926, an advance not offset by the increase in expenses. Mr. Storrs says quite frankly that the future of the small city railway is still a problem and that some interurbans, which never should have been built, are not doing so well.

It was very much to the point for Mr. Storrs to indicate that outstanding problems of the industry are traffic congestion, which slows up cars; taxes, which are the highest imposed on any industry in the world, and the increase in the use of the private automobile in daily business. He is correct when he says that managements generally are approaching these problems progressively. They are effecting operating economies, using paid advertising and other proved forms of salesmanship, and on the whole are confident of the future.

Nothing but good can ever come from the reiteration of the facts of the industry as Mr. Storrs has made them available to the newspaper reading public of the country.

Many Special Machine Tools Being Built

INCLUDED in the equipment of the department of electrical repairs of the new Coney Island shops of the Brooklyn-Manhattan Transit Corporation's lines, as discussed in this and the Dec. 18, 1926, issue of *ELECTRIC RAILWAY JOURNAL*, are a number of new universal machine tools. These permit the performance on an armature, without removing it from the machine, of several operations, such as banding, turning, slotting and finishing of commutators and truing up of shafts. The turning of new armature shafts is done in a multiple carriage lathe with several tool posts on each carriage.

This tendency toward the production of special machine tools was commented upon by the machine-shop practice division of the American Society of Mechanical Engineers in a report presented at the annual meeting in December, 1926. Builders of standard equipment are fitting their machines with attachments particularly needed to do some special job, and in addition a great many purely special machine tools are being built. Some examples given were the multiple-spindle drillers and multi-head millers. In some cases machines are

This is the issue in January that is devoted essentially to maintenance and construction subjects

supplied which employ standard heads and parts, but in other respects the construction is special. Hydraulic feeds have been included in new machinery by several designers. In some types the power is supplied to the hydraulic cylinders in the machine by oil under pressure from an accurately controlled pump.

In the review of machine-shop practice there appeared a direct tendency toward increased use of individual motor drive. Practically every machine-shop tool now built is provided with motor drive, or at least has it as optional equipment. This applies to small machines such as drillers, tappers, etc., as well as to the larger units. Motors are being designed as a part of the machine tool rather than being added as an afterthought, and in some types motors are built directly on the spindles or are geared directly to them.

Another tendency in machine-tool manufacture is toward better bearings. Ball and roller bearings are being employed more than previously. They were used first successfully on intermediate shafts, but now their application is extending to main spindles. Improved lubrication is another feature. Flood lubrication by pump or splash is the rule in the latest type lathes, drillers, milling machines, etc.

In new models of machine tools considerable attention has been given to their control and to facilities for chucking and feeding. These include fast table movements on milling machines, treadle control of work-heads on grinders, push-button control and the bringing together of all control handles within easy reach of the operator.

Knowledge of Improved Methods Needed by Electric Railway Shopmen

QUITE generally it has been considered that the work of car inspection does not require highly skilled mechanics. To a certain extent this is true; a considerable part of it can be done by semi-skilled labor. But experienced mechanics and electricians with previous knowledge and actual training enabling them to determine when work is done properly will prevent many failures of equipment, thus forestalling annoying delays and expense. If a check be made of the average force employed in the inspection of cars few men will be found who have served an apprenticeship at a regular trade. Usually a man has drifted into a railway shop and been put to work as a helper. By sticking to the job, principally because it was a job, he progressed to the position of repairman or gang leader. Having learned the work from the men he helped, if this was done wrong the errors have continued.

To those who have investigated the matter it is apparent that more attention should be given to instruction and training of electric railway shopmen. Employees in subordinate positions must be given an opportunity to secure all possible information about the work they are doing and foremen must be made familiar with the best practices of other shops. Executives and men in the more important positions should be made to understand the necessity of supplying to the men who are actually doing the work information regarding desirable practices. They should also be led to think for themselves and to devise improved methods for doing the work better.

Training of apprentices is another phase of the improvement work that should receive attention. Some of the larger railroad companies have established apprenticeship courses. On the New Haven railroad helper apprentices are recruited from the force of helpers who have already served two years with the company in that capacity. Simple but thorough examinations are given regularly to show the amount of advancement that is being made.

Shop methods, processes and the tools used for the repair of car equipment become obsolete in time. There is a wide field for modernization in electric railway shops. Much of the need has come from the attitude toward the shop employees that has been discussed. So, on the other hand, a plan that will give a modern frame of mind to the workman is an essential factor that must go along with or even precede the physical modernization.

Increased Maintenance Expense May Come from Unexpected Sources

LACK of business intimacy between heads of departments and their subordinates, as well as between heads of departments in general, invariably is a fundamental cause of unpleasant working conditions, undesirable friction, and finally a tremendous financial loss to the operating organization. This is often caused by petty arguments, jealousies or the unwillingness of foremen or department heads to assume responsibility for faulty workmanship or failures.

All this has a far-reaching effect. It not only hampers production but results in the production of materials of a quality inferior to that required and at a greater expense. Increased road failures result, with corresponding delays, loss of public confidence and reduction in revenue. This condition cannot be corrected until every employee of the railway recognizes that he has a personal interest in the success of every other member of the organization. Without this mutual understanding the industry cannot grow. When some member stands back and refuses to co-operate with his fellow worker in the performance of his duties, or the advancement of modernization of ideas or methods, then this individual acts as a retarding force and tends to slow up the progress of the entire organization.

As an illustration, consider one specific instance. The machine shop and the controller shop of a certain property are each headed by a foreman reporting to the superintendent of equipment, so that the two departments are independent of each other. To effect a saving in material, the controller shop foreman decided to cut down certain burnt controller segments in order to permit of their use in positions where shorter segments were needed. This work was being performed in the machine shop. Due to the tactics used by the controller shop foreman, the machine shop foreman was offended and as a result he refused to perform the work. Not wishing to intensify the existing hatred, the controller shop foreman for the time being abandoned the use of reclaimed segments and set about to manufacture a machine capable of cutting off and rebuilding the segments as was done in the machine shop.

What was the result? He had shown a material reduction in cost due to this reclaiming process and naturally did not want to go back to the use of new

material, on account of the expense it would entail. Since he did not have any other way to keep the cost down while he was experimenting with the new machine, he was tempted to stop removing the burnt segments for the time being as had been done previously. As a result there was a far greater expense on account of a large increase in road failures.

When the machine finally was constructed he was able to recondition the segments in his own shop. But the device developed by him was extremely crude and the cost of manufacture was exorbitant, as compared with what it should have been had he used a new machine readily procurable in the open market.

This one instance of lack of understanding certainly bred a great deal of trouble and tremendous expense. All this could have been avoided had the proper means of reconciliation been provided.

Public Utility Success Needs Good Faith of the Public as Well as of the Utility

LOCAL transportation service in Newark, Ohio, was shut down a number of months ago after the City Council repudiated its own grant of a new franchise to the railway by giving paralleling rights to an independent bus concern. This last move came after the Southern Ohio Public Service Company in good faith had purchased the old set of competing bus lines as a part of the unification and modernization plan for the improvement of the property.

The outcome as it stands to-day is far from representing the will of the people. When the company announced that it would suspend service as of midnight, Aug. 10, 1926, following the granting of the competing bus franchise, mass meetings were held, and since then the business men of the city have tried in many ways to undo the damage. It has been found, however, that the bus franchise is as valid as that which was granted to the electric railway, and the Southern Ohio Public Service Company has quite properly refused to sustain the further losses resulting from operation on a competitive basis.

Just 60 miles to the east lies Zanesville, only slightly larger in population than Newark, and heretofore served by the same company that also operates interurban and coach service between these cities and Columbus. Even before the fiasco in Newark, Zanesville had passed a modernized ordinance extending the franchise to the Southern Ohio Public Service and that company had proceeded with the rehabilitation of track and had purchased and placed in operation 20 modern and finely appointed cars and several high-grade buses to serve newly developed territory. The same general plans were offered to Newark, so that there were no grounds for doubt as to the integrity of the company. Zanesville had solved its problem months before Newark upset hers.

The Newark situation was discussed in this paper last August. It is brought up to date elsewhere in this issue. Later developments indicate but little change and it appears that *finis* is to be written to the street railway history of Newark. Through hasty and unwarranted action, upward of a million dollars has been sacrificed to the political selfishness of the clique in power. The clique will soon be forgotten, but the black mark against industrial integrity on the city will be a heritage that will long remain.

Off-Street Parking Facilities Must Not Be a Subsidy

STUDIES by Dr. Miller McClintock, director of the Erskine bureau, reveal the woeful inadequacy of curb space for parking purposes. In Chicago, on the basis of a 100 per cent turnover every 30 minutes, only 15 per cent of the automobiles that daily enter the loop can be accommodated in the Loop district even for so short a time. What is true of Chicago, as shown by the survey of the Chicago Association of Commerce presented in the Jan. 8 issue of the JOURNAL, is likewise true of other great cities as well.

On the other hand every railway man knows the tremendous hindrance that this parking evil creates to all manner of moving vehicles. It is the direct cause of slowing up moving traffic not only of automobiles but, more important, the mass transportation vehicles as well. Merchants, due to erroneous assumptions, have long felt that parking facilities in front of their respective business establishments have been a drawing card to prospective patrons. This recent finding on the part of the Erskine bureau in the light of studies recently made in Chicago, Cleveland and other cities attaches less weight to this mistaken theory.

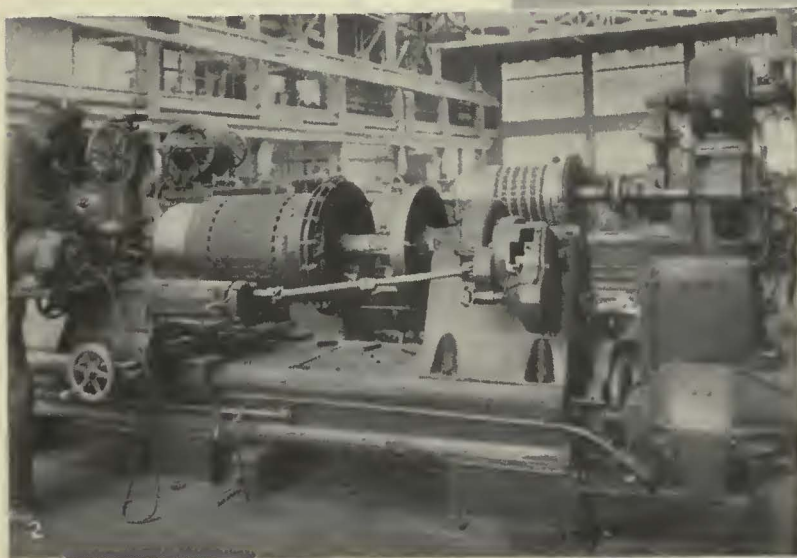
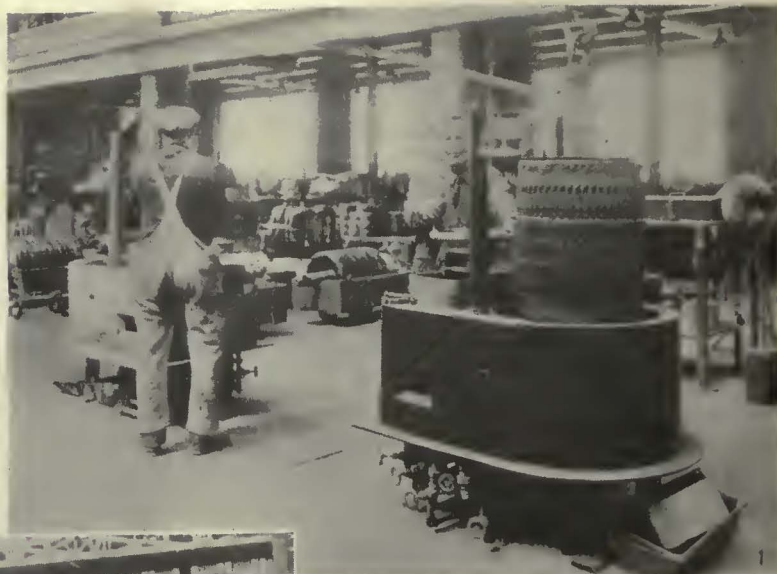
When it is realized more fully that this accommodation of the few is of such disproportionate value to the service of the many, still less value will be attached to street parking facilities. With the full width of busy streets available for moving vehicles, mass transportation could be improved in speed and in this way perform a service to a far greater number of people than is possible at present.

To this end the suggestion of Dr. McClintock, detailed elsewhere in this issue, to provide convenient off-street storage areas is of great value. An element of possible danger, however, arises from the suggestion that such storage facilities be constructed from public capital and charged for at reasonable rates. The possible idea must not be tolerated that such rates can be anything less than the full cost of providing such accommodations. The free use of the streets for parking purposes existing for so many years may well lead to the thought that the storage of private cars in garages erected out of public funds should be a partial gift to the public. Such a condition would be only a subsidy to the private automobile owner and would be directly unfair to the riders on electric railways. In most cities the car riders not only do not enjoy a subsidy, but actually subsidize the city in providing street paving and other forms of taxation that are of no direct benefit to the car rider. In Chicago, for example, the public improvements paid for by the Surface Lines riders have amounted to \$100,000,000 in 20 years.

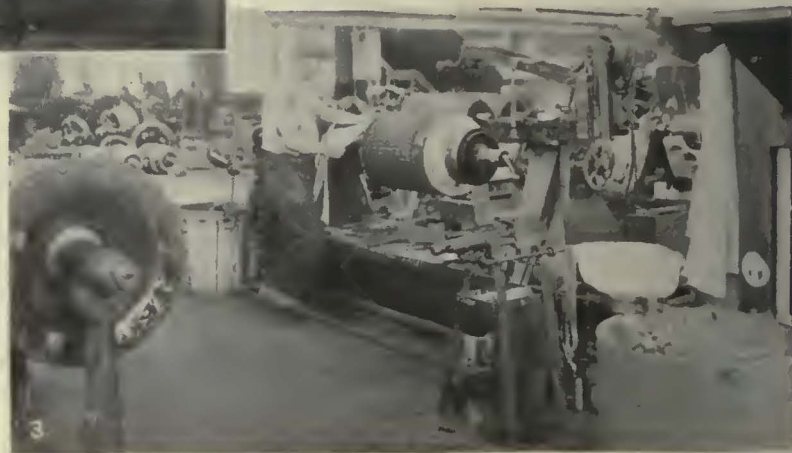
Depending on its value the land used for car storage buildings will be worth from \$1 to \$5 per square foot annually. Assuming that a car will require at least 100 sq.ft. for storage, aisle and ramp space, this will entail a charge of \$100 to \$500 per car annually.

All that the electric railway may expect is fairness. The industry today is competitive, although all too few realize this condition. The operations of the companies in city streets are hampered to an ever-increasing extent by the pitiful few who are benefited by curbstone parking. A ban on parking will allow a distinct improvement in service, but the railways must resist, as taxpayers, any attempt to provide this relief at public expense.

**Modern Machines
Facilitate
Maintenance Work in
New Shop
for
Brooklyn-Manhattan
Transit Lines**



No. 1. Dipping armatures in soldering pots to solder connections at commutator neck.
 No. 2. Banding, slotting and turning operations can all be done in these universal lathes.
 No. 3. Applying canvas hood to the pinion end of armature windings.
 No. 4. Slotting a commutator by means of an individual slotting machine.
 No. 5. Commutators are trued up by taking a slight cut and are then sandpapered and polished.



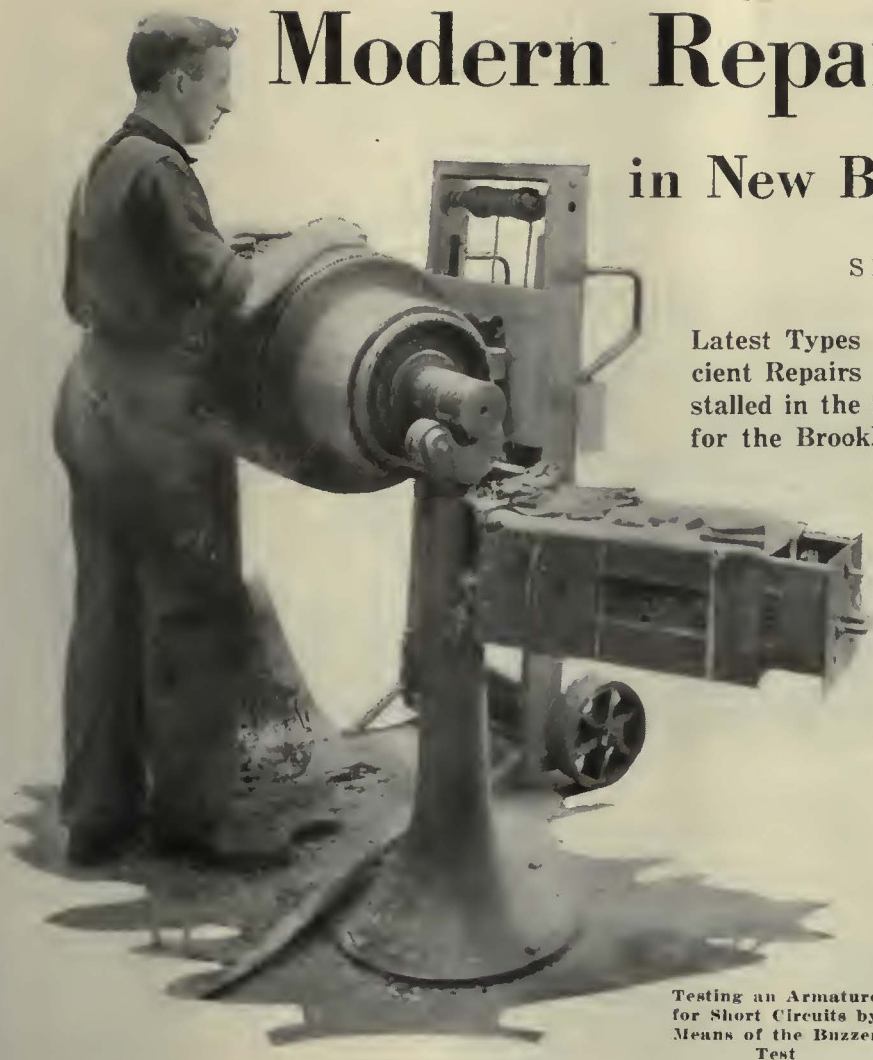
Modern Repair Methods

in New B.-M.T. Shop

SECOND ARTICLE

Latest Types of Tools to Insure Rapid and Efficient Repairs to Electric Car Equipment Are Installed in the Shop Devoted to Electrical Repairs for the Brooklyn-Manhattan Transit Corporation

standard equipment in a number of large shops. There are two compartments side by side, one in which the soldering is done and the other a reservoir in which the solder is kept molten by gas flames. The soldering compartment has a hollow center in which the commutator is placed, so that it projects below the solder and does not come in contact with it. A sheet metal ring laid on the opening in the center has a hole of such diameter that it just lets the commutator pass through. A collar of asbestos tape placed around the commutator about 1 in. from the neck makes a solder-tight connection. The space between the asbestos collar and the neck is painted with a mixture of whiting and alcohol to prevent the solder from adhering.



Testing an Armature for Short Circuits by Means of the Buzzer Test

The armature is handled by means of a crane, a hook fastened to the pinion end holding it vertical with the commutator end down. It is placed in position in the pot and then the solder is forced around the neck by depressing a plunger in the reservoir. While the solder is around the commutator the neck is raked with a wire brush to insure good contact and union of the solder and copper. After several minutes the hot solder is drained from the central portion by raising the plunger in the reservoir and the armature is removed. With the pot method of soldering the leads of an entire armature can be soldered in one operation, without danger that any excess solder will work back of the commutator neck.

The frequency with which an armature is tested was detailed in the previous outline of armature work. Three types of testing apparatus are used, the bar-to-bar test equipment, the high-voltage test and the buzzer test.

Two types of bar-to-bar test equipment are used. One has a variable resistance and the other a lamp circuit. In either case an ammeter is connected in series.

SELECTION of the best available practices for repairing electrical equipment of cars has made the new shop of the Brooklyn-Manhattan Transit Corporation outstanding. Devices have been installed to do the work quickly and with a minimum of physical effort. While many of the pieces of apparatus are fairly common in large railway shops, the combination of them in one carefully planned layout is unique. For this reason considerable attention has been given in this article to a discussion of the individual tools and devices.

Armature leads are connected to the commutator bars by the pot-soldering method.

All oil, dirt, insulating material and paint are removed when the commutator is repaired and the slots in its neck are cleaned and carefully tinned before the coils are inserted in them. The soldering is done in two General Electric soldering pots installed in section 6 of the shop, which has a concrete floor. Provision is made for two additional pots.

The soldering pots, two of which are shown in the illustration on page 108, are

THE first article on the new electrical repair shop for the Brooklyn-Manhattan Transit Corporation's lines was published in *ELECTRIC RAILWAY JOURNAL* for Dec. 18, 1926. It contained information on building, construction, size, lighting, heating, arrangement of departments, plan for routing work, equipment cleaning methods, ovens for drying and baking and vacuum impregnating methods. In this, the second and final article on the electrical repair shop, various departmental operations are discussed, such as testing, soldering, banding, turning, slotting and polishing of commutators, general machine work, locker and washroom conveniences for employees. Articles relating to the other shops which will compose the Coney Island group will be published as soon as the remaining buildings are placed in service.—EDITOR.

Leads placed on two adjacent commutator bars are used to explore the coils and locate trouble, a millivoltmeter giving the indication. The 600-volt shop system is used as the source of supply. High-tension tests are made by the portable transformer box already referred to.

The buzzer test to detect short circuits and grounds is made with standard Westinghouse Electric & Manufacturing Company equipment. This consists of a laminated iron core in which an alternating magnetic flux is set up. The exciting coil is energized from the shop a.c. circuit. The core is mounted on a wheeled stand which readily can be moved up to an armature undergoing repair and on which the tests are to be made. A windlass permits of raising or lowering the cross head which supports the laminated core so that it can be shoved against the armature as it rests on the usual type of winding stand. In this position, with the laminated core energized an alternating flux passes through the arm-

caused by a short circuit or reversed connection will attract the piece of iron when it bridges across the slot containing the defective coil. As the sheet iron is thus caused to vibrate the test has been termed the "buzzer." If no local flux is detected the fault disclosed by the sparking test is due to an open circuit. This testing equipment is suitable only for use with wave-wound (two-circuit) armatures, as the equalizing connectors on lap or multiple-wound armatures would make the en-



Above—Removing Insulation and Straightening Armature Coils

At Left—Strap-Wound Armature Coils Are Tied in Bundles Convenient for Handling and Are Placed in a Lye Tank for Removal of the Insulation. The Solution Is Heated by Steam from a Flash Boiler



tire winding appear short circuited.

For testing equipment the shop is wired for 110 volts alternating current, with outlets in the pedestals of the armature winding section and at other convenient intervals. The alternating current is supplied by a General Electric synchronous converter, installed together with the necessary switchboard equipment at one side of the shop adjacent to the office.

ature. If the condition of the armature winding is correct the electromotive forces generated counterbalance each other and no current passes through the winding. A short-circuited or reversed coil will cause a local current and a flux around the slot in which the coil lies. A piece of metal or a knife blade passed around the commutator will then short-circuit in succession each of the coils that have one side under the testing pole. If there are no faults in the winding a decided spark occurs as the knife blade leaves each bar. Absence of spark between two bars indicates a short circuit, an open circuit or a reversed coil in the winding.

A short-circuited or reversed coil due to the local current induced in it will generate a flux, which can be detected by moving a piece of sheet iron held lightly over the surface of the armature core so as to bridge from one tooth to the next successively. The local flux

and slotting of commutators are done in section 7, which is equipped with four special lathes. One of these is a Peerless universal slotting, banding and commutator turning lathe. There are also two Le Courtenay combination banding and turning lathes, one of which is equipped with a commutator slotting attachment. The fourth lathe of this group is a small Peerless slotting and banding lathe, which is used for small armatures such as are used for air compressors. The banding equipment also includes a separate band tension machine made from General Electric Company's design by the railway, which provides for accurately weighing the tension used for banding. With the large size subway motor armatures such as are used by this company, a banding tension of 400 lb. is required. These machine tools are designed particularly for electric railway work and the economy of being able to do banding, commu-

tator turning, commutator slotting and, in fact, all machine work on an armature in one set-up will be appreciated by railway repairmen.

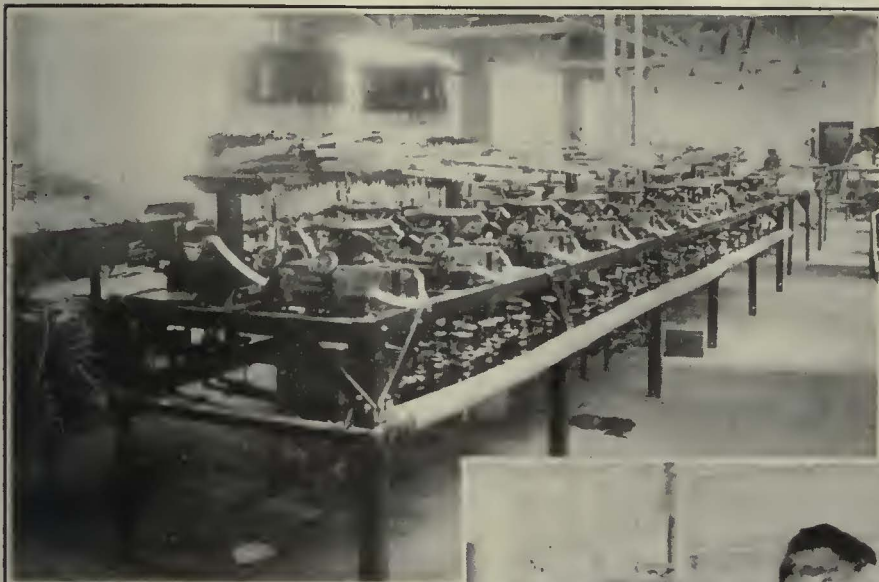
For turning shafts already installed in armatures and for cutting threads on the end of the shaft for the pinion nuts a 26-in. lathe made by the Monarch Machine Tool Company is used. This size is needed in order that the lathe carriage may pass underneath the commutators of the large armatures. This lathe can also be

not to separate the three coils which go together in winding.

The potash tank is made of sheet steel with a frame and supporting legs of angles. It is 6 ft. long, 30 in. wide and 18 in. deep. Steam pipes are run around the inside of the potash tank. The solution that is used in this tank when put in fresh is made with 6 lb. of potash to 50 gal. of water. The solution is continued in use by adding 1 lb. of potash each day. A small washing

tank, 28 in. x 18 in. x 10 in. deep, is provided at one end of the potash tank. The lye solution is kept hot by steam from an 8-hp. flash boiler, manufactured by the P. M. Lattner Manufacturing Company. Steam from this boiler is also used for the hot coil presses installed on the balcony in section 14 immediately above the boiler. This boiler burns gas at a low pressure, regulated automatically to keep the steam pressure at 60 lb.

There are several operations in the straightening of the armature coils. The leads and sides of the coil are



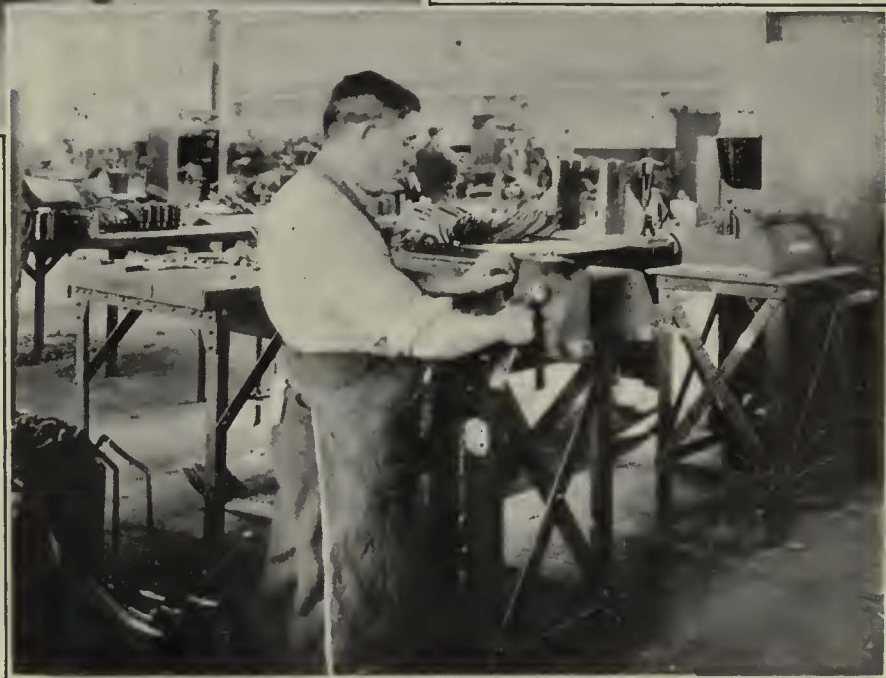
Above—A Large Number of Hot Presses Are Used for Armature Coil Work

At Right—Shaping Coils for Reinsulation

used for turning commutators if the volume of work makes it necessary.

An 8-in. Lo-Swing lathe is used for turning new armature shafts and also for turning the tapers on armature shafts. This lathe has two carriages and two tool posts per carriage. All work on an armature shaft can be done in this lathe except the cutting of threads and keyways. Two machines are provided for keyway work, one a No. 3 Little Giant horizontal key seater and the other a No. 5 vertical key seater. The vertical key seater is used for cutting keyways inside armature spiders and in other places where the keyway is inside an opening. In the table of machine tools now installed in this shop will be found listed several other machines necessary for various repair operations and for keeping the cutting tools in proper condition.

All of the armatures used in rapid transit service for the New York Municipal Railway Corporation have strap-wound coils. After removal from the armatures the coils are taken to section 8 for reclamation. The first operation is removal of the insulation. The coils are bundled up in lots convenient to handle and are put into the potash tank. After immersion for two or three hours, the coils are taken out and one edge of the softened insulation is cut off. They are then returned to the potash tank and left overnight. The insulation can then be scraped off with a knife. After washing, the coils go to a bench for shaping, care being taken



straightened in a vise and they are brought back to their original shape by placing them on forms and hammering with a wooden mallet. It is also necessary to remove carefully any rough spots and sharp edges, after which the coils are retaped and are then dipped and baked for reuse.

FIELD COIL TEST METHODS

Section 14 of the shop is also used for all field coil repairs, which consist mostly of putting on new insulation and new leads, which are placed on all coils which come in for repairs. After repair, each field coil is given a short-circuit test. In this the field under test acts as a secondary of a transformer, the primary coil of which has a circuit breaker, ammeter and a double-pole, single-throw switch. In making the test, a reading is taken on the ammeter and the switch is closed with-



Section Devoted to Controller, Switch Group, Brush-Holder and Other Detailed Equipment Repairs

out a field coil in position for testing. This reading gives the primary current of the transformer when the secondary is open circuited, which will be unchanged if the field coil under test is in good condition. A reading higher than normal indicates that the field coil has a short circuit, the reading varying with the number of turns that are short-circuited. If the test is continued for a sufficient length of time the location of the short circuit will be indicated by heating. Coils are tested for open circuits by grounding one terminal and applying a lamp circuit to the other.

All field coils are impregnated. The coils are dipped twice and baked. They are also subjected to a 2,000-volt test before being returned to service.

All coil winding and taping is done on the mezzanine,

which contains the latest type equipment needed for this repair work. This department also contains a large number of hot coil presses. These are mounted on an angle framework, with the various valves and piping for steam heating carried underneath. Parts are transported to and from the mezzanine through a hatchway.

Most of the employees in the coil-winding and taping department are women. A restroom is conveniently located in the center section of the mezzanine which is fitted up with space for lockers, etc. The east end of the mezzanine is used for the repair of fare registers and parimeters used in subway service.

On the main floor of the shop, in addition to the department already described, a space 32 ft. x 40 ft. in the southwest corner is partitioned off as a foreman's



At Left—All Field Coils Received for Repairs Have New Leads Installed. At Right—Winding New Armature Coils



Circular Wash Fountains Are Provided for Workmen

office. Near the east end under the balcony a large room has been reserved for equipment and later will be used as a testing laboratory. Provision will be made for tests on all kinds of materials used in electric railway construction and operation. The east end of the shop, supplied with an abundance of light, is used for the repair of controller equipment, contactors, switch groups, line switches, magnets, door-operating equipment, brush-holders and other small parts.

A feature of this shop is the provision of storerooms for supplies located conveniently to the point at which they are used. Section 2 is a small storeroom for controller parts, and at the other end of the room is a storeroom for other parts used in the department of electrical repairs. This has two floors and the material used in the coil winding and taping section is carried on the second floor.

A men's locker and wash room is provided in the center of the shop underneath the mezzanine. This is equipped with four Bradley wash fountains of latest design and two shower baths. The lockers are of all-steel construction, made to the company's specifications. Water for washing purposes is heated by a Ruud auto-

matic multi-coil storage heater, regulated by thermostatic control. At convenient intervals throughout the shop are a number of Halsey Taylor drinking fountains. These have a large ice receptacle, 18 in. diameter x 18 in. high. The fountains are set on a pedestal with the top of the bowl about 40 in. above the floor. The drinking bowl is of porcelain. Water is turned on against a slight spring pressure, and is automatically shut off when the handle is released.

Kansas City Reconstruction Program Well Under Way

Eight Miles of Track Was Reconstructed or Built New Following the Lifting of the Receivership on Oct. 15 and Before Cold Weather Set In

REHABILITATION of the Kansas City Public Service property is one of the outstanding duties of the new management. An urgent program of some 8 miles of city track was started last October and completed in approximately two months, the total expenditure involved being \$354,870. A part of this cost was for the dismantling of the superstructure of the elevated road.

This is the first step of a \$6,600,000 program of rehabilitation planned by the new owners under the leadership of President William G. Woolfolk of the William G. Woolfolk, Inc., engineers of Chicago, Ill.

The receivership was officially terminated on Oct. 15, but in order to get the most urgent work done before winter, permission was obtained to start the work on Oct. 11. Very little material was on hand, but rush orders were placed within a week, and no serious delays in the several jobs were encountered as material was received promptly. On Oct. 11 400 men were employed and on the following day this force was doubled and work was started at six locations.

During the receivership a standard type of track construction was adopted which will be continued. This consisted in the use of 7-in. tee-rail, Lorain section 93



Part of the Initial Track Reconstruction Program in Progress on Troost Avenue, Kansas City. The Standard Construction Is 7-In. Tee-Rail on International Steel Ties Imbedded in a 14-In. Concrete Slab



Putting on the Concrete Wearing Surface on Main Street, Kansas City. This Is Part of a Rush 8-Mile Reconstruction Program Completed Within Eight Weeks Following the Termination of Receivership Last October

No. 507, supported on International steel ties imbedded in a 14-in. concrete slab. The rails were canted 1 in 25. The base concrete consisted of a 1-3-6 mix. It was first poured up to the base of the rail and after the initial set concrete was tamped firmly under the tie plates and under the rail base. After this, concrete was poured to within 2 in. of the top of the rail and again thoroughly tamped against the web of the rail. Following this a 2-in. wearing layer of concrete using a rich mixture of 1-2-3 was placed and finished with an electric tamper and finishing machine. The work moved on smoothly, so that at the end of the construction period early in December approximately 1 mile of paved track had been constructed each week. This was considered a good record of progress in the face of the shortage of material when the work was undertaken in October.

just completed is only a forerunner of many more planned for this year's program. The company has just announced its intention of reconstructing 23 miles, beginning as soon as weather permits.

Government Active in Standardization Movement

STEADY development has been shown in the fifth year of Mr. Hoover's division of simplified practice. About fifty simplifications have been carried through. These include a wide range of commodities. In a survey of nineteen of these commodities it is stated that from 51 per cent to 99 per cent of the sales are in accordance with the simplified practice recommendations, the average of the nineteen being 79 per cent.

The unification of government specifications under the federal specifications board has now reached a point where the main lines of government commodities are covered. More than 400 specifications have been approved, and a considerable number have reached the second edition. While contact with industrial groups has been maintained in the work, to a very considerable extent through the A.E.S.C., much yet remains to be done in thoroughly co-ordinating these government specifications with those in general use in the industries.

The bureau of standards has proposed an interesting plan of certification under which any manufacturer who is willing to supply goods made to comply with a given government specification may file with the bureau a statement to that effect. Consumers upon request will be given a list of such manufacturers. This plan has been widely discussed in a large number of organized industrial groups, since this proposal in some form may ultimately have far-reaching effects upon sales policies and upon our present method of distribution.

KANSAS CITY TRACK RECONSTRUCTION IN THE TWO MONTHS FOLLOWING END OF THE RECEIVERSHIP

Location	Feet Single Track
Main Street, 40th to 43d.....	3,320
Grand Avenue, 20th to south end Viaduct.....	920
Main Street, Armour Boulevard to 39th.....	5,250
27th Street, Indiana to Cleveland.....	2,530
Troost Avenue, 31st Street to 37th.....	7,500
S. W. Boulevard, 19th and Main to Broadway.....	3,510
Main Street, Linwood Boulevard to Armour.....	3,140
Ninth Street, Mulberry Street to James.....	5,700
State Line, Olathe Boulevard to 45th.....	2,600
Country Club Line, 65th to 75th (new second track).....	5,010
Total track reconstruction	39,480
Total cost for 7.5 miles.....	\$338,800
Dismantling elevated road structures and double track	4,530

In most of the locations street car traffic was carried at one side of the street during the reconstruction of the tracks. The work was done under the direction of A. E. Harvey, engineer of construction. The 8 miles

Better-Appearing Cars Needed

Electric Railway Industry Has Accepted the Challenge for More Attractive Rolling Stock—New Equipment Should Be Provided Where Possible and at the Same Time Increased Attention Must Be Given to Sprucing Up Existing Cars

MORE attractive cars were given consideration at a meeting of the rolling stock committee of the American Electric Railway Engineering Association held in New York Dec. 13 and 14. A resolution was adopted directing attention to the need of more attractive rolling stock. The opinion was voiced that concentrated effort in an attempt to acquire new rolling stock was not enough, and that there still existed a large field for improving existing rolling stock to provide more comfort, greater conveniences, increased safety and more attractive appearance. Many railways are rehabilitating existing cars which still can be operated economically and are providing these with improved devices and devoting particular attention to producing a trim, neat appearance by stream-lining in the car body construction and by attractive color schemes in painting.

The problem regarding rolling stock that is now presented to the electric railway industry is first to provide new equipment where possible and second to bring existing rolling stock which still possesses some useful life to a higher standard of attractiveness by incorporating in it as many of the splendid ideas as possible which are now used in new car designs.

We are living in an age of prosperity and the patrons of electric railways look for increased comforts and conveniences in cars over what was considered adequate a few years ago. The public has awakened to the idea that a higher fare is needed to pay for the added attractions and it is willing to pay it. The physical equipment of the railways must be made capable of giving the character of service demanded.

The rolling stock committee decided that the publication of articles discussing methods which have been used successfully by various railways in bringing existing rolling stock to greater usefulness was desirable. Various members of the committee volunteered to tell of results which have been accomplished on their properties, or of ways in which cars can be spruced up and be provided with added conveniences. In addition, any operator who believes that more attractive rolling stock will produce results was invited to express his views for publication. Two of the articles giving suggestions for the improvement of existing cars follow.—EDITOR.

Study Car Equipment with Reference to Appearance, Comfort and Convenience

By W. R. MCRAE

Superintendent of Rolling Stock and Shops Toronto Transportation Commission, Toronto, Canada

FUNDAMENTAL ideas behind improved cars are to increase the passenger sales value of the rolling stock, to attract a greater volume of traffic than at present habitually patronizes a particular road, to increase the car riding habit and to induce people by

every seductive method possible to abandon other competitive means of transportation.

If it were possible, the logical solution would be for a railway to replace the old and out-of-date rolling stock with new, incorporating the many splendid ideas now available, but there are few companies in this happy financial condition. With this done, it would be a comparatively easy matter to keep these cars in a condition with regard to appearance and comfort that would be a continual delight to the traveling public. The problem before the industry just now, however, is not only the design and evolution of new rolling stock but also the inclusion of as many as possible of the helpful ideas for additional comfort, convenience and attractive appearance to existing rolling stock.

The most difficult problem in connection with improvements in comfort, convenience, safety and appearance of cars does not occur so much on roads that operate in the large centers of population, and which are fairly strong financially, as to the owners of small railways which are waging a strenuous fight against all kinds of modern rubber-tired competition and with a comparatively low number of potential riders on whom they have to depend for revenue and their continued existence. There are many ways in which such roads can augment materially their revenue by careful attention to many of the suggestions and ideas that have been collected by the A.E.R.E.A. committee on this subject. Many of these roads are not in a position to go in for heavy capital expenditure and quite a number of the committee's ideas can be carried out at no very great expense.

The upholstered type of seat is the thing, undoubtedly, to adopt for the smaller railway with the attendant competition factors. A smooth and well-maintained track is a most important factor in easy riding quality of the car and systematic maintenance and inspection are necessary.

In dealing with the problem of comfort, one factor that is stressed in the committee's report is the discomfort and annoyance caused by improper handling of equipment in starting and stopping. In this matter, too little attention is sometimes given to the important factor in this operation—the human element, and the instruction of operators. Any additional comfort a passenger might derive from cushioned seats and more silent cars will be eliminated if the car is in the hands of an operator who, through lack of adequate instructions and training, or through carelessness, operates his car with jerky starts and stops. The training of a motorman is thus a large factor in the subsequent smooth and economical operation of the car. The establishing and equipping of a school of instruction for this purpose, with regard to the peculiar needs of the railway, would be an excellent investment for any electric railway. The expense involved is comparatively small and the results are felt ultimately in many ways.

The treadle-operated exit door, no doubt, has been instrumental largely in eliminating the inconvenience of the earlier one-man cars and made possible the development of the large one-man, double-truck car. A loud speaker for the announcement of approaching stops would add very materially to the convenience of passengers in this type of car and is worth attention.

Standardization of car entrances to eliminate confusion is well worth any expense. The resulting convenience to passengers and speeding up of the system has been amply demonstrated in Toronto, where the program of reorganizing to front entrance only has now been completed.

With front-entrance cars there is real need for the installation of some form of anti-slip aisle covering in the forward half of the car, and some improvement could be made in available commercial materials. At present we have installations of two types which take the place of the slats in parts of the car floor. Under diverse conditions these have given varying satisfaction.

A very great deal can be accomplished to add to the attractive and fresh appearance of cars by intensive attention to cleaning and washing and systematic painting. A clean and well-groomed car is a distinct selling asset and should be well within the economic capacity of the average railway. Without this feature it is impossible to attract the additional patronage so much desired. If every system was spurred to make supreme efforts in this direction the resultant gains soon would be apparent. An untidy appearance, eloquent of slovenly and haphazard care and attention, has the effect of alienating the public good will and support, without which no system can be successful.

With regard to painting, the psychological effect of the freshly painted car is undoubtedly that of a very persuasive and insistent salesman and, to the limit of its resources and income, there is no question that any railway will reap a very considerable patronage from the utmost effort that can be made in this direction. The spick and span, clean and newly painted car literally compels the patrons to sit up and take notice and is a constant perambulating advertisement of the fact that the management is doing its best to live up to the motto "It pays to please." There can be no excuse for cars being dirty, even though they may need paint and varnish. Soap and water are both cheap.

Rolling Stock Should Give the Best Impression Possible

BY A. T. CLARK

Superintendent of Rolling Stock and Shops United Railways & Electric Company, Baltimore, Md.

FIRST impressions are lasting impressions, according to an old adage. No wonder, then, that when a prospective street railway patron sees a dirty, poorly painted car approaching he concludes immediately that the railway company and all its endeavors are slipshod and in keeping with the appearance of this part of the equipment. No matter what later impressions of a better kind this patron may obtain, he still is of the opinion that the company, like the car, needs an overhauling. Not only has he acquired a poor idea of the system as a whole but he is ready to kick and complain of all the small incidents that may occur during his ride.

Now let us suppose that instead of a dirty, poorly painted car that came along while he was waiting the

car had been well painted and was still in good condition, and in addition generally clean and attractive. In this case the patron would feel that the management behind the system was taking the best of care of what it had and was keeping its cars inviting in appearance. In most cases this car patron would not be so apt to be critical of any shortcoming; i.e., if the car was a minute behind he would be less likely to berate the conductor about this condition or to start an argument with some other complainer about how poorly this particular system may be operated. All because the first impression has put him in a pleasant frame of mind rather than the reverse.

Many companies believe that the cost of keeping cars in good paint condition and generally clean in appearance is very high. While it may require an unusual expenditure to work out a system of frequent and regular car painting and car cleaning, eventually this cost soon drops to a low amount well within the ability of any well-organized company to maintain indefinitely.

In addition to the better reaction of the riding public from well painted and thoroughly cleaned cars the management will obtain a direct benefit from the motormen and conductors, who naturally and unconsciously react on a higher and better plane of endeavor because of the higher morale resulting from the better appearance of the cars.

Sun Visor Protects Motorman from Glare

A SUN visor, similar to those used on automobiles, is the latest safety device which is being used on the Ogden-Main line of the Menominee & Marinette Light & Traction Company, in Marinette, Wis. This line runs principally east and west and the glare of the



Car Equipped with Sun Visor Over Front Window Shields Operator from Glare

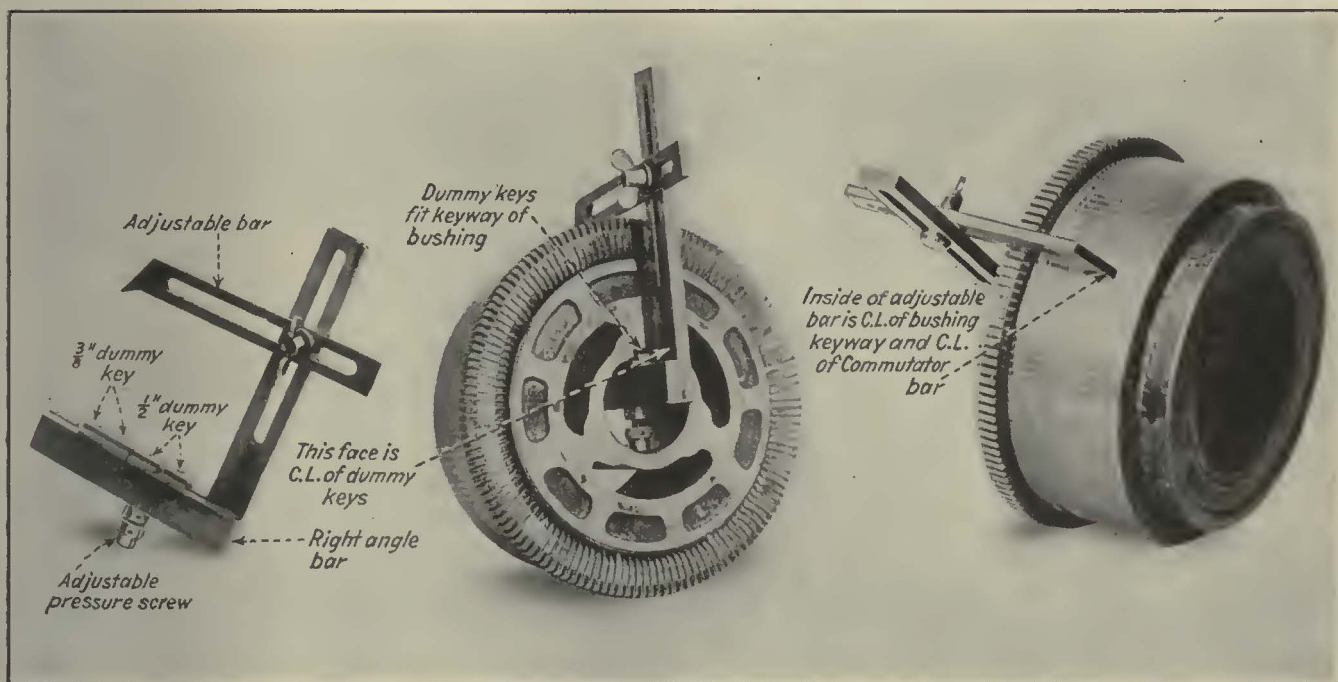
sun was found to be uncomfortable and irritating to the car operator. A local operator consequently suggested a shade which was designed and installed on the cars in the shops. The shade is made of sheet metal, is neat appearing and serviceable, and is proving very effective.

Methods and Equipment for Efficient Assembling of Commutators*

By Jesse M. Zimmerman

Renewal Parts Engineering, Westinghouse Electric & Manufacturing Company

Many Important Considerations Must Be Taken Into Account in Assembling the Individual Parts of V-Bound Commutators and in Pressing the Complete Commutators on the Spider—Methods of Tightening and Aligning Commutators Are Described, Together with Some Handy Tools that Will Facilitate the Shop Operations



Methods of Aligning the Commutator Bars with Respect to the Commutator Spider Keyway

COMMUTATORS can be made tight fitting only if the parts are accurately machined and particular care is given to assembling. The order of the assembling operations is, first, to fit the steel V-ring over the spider. This may require some filing to remove paint and rust. Next, the commutator nut should be tried on the bushing. It may be necessary to clean out the threads of the bushing to allow the nut to screw up by hand. Then, when the detachable V-ring is under pressure, the commutator nut can readily be run up against the detachable V-ring, thus retaining the steel V-ring under the pressure given it.

The parts should then be dismantled and all dirt and paint must be scraped off, especially from the metal V's. The V's in the assembled segments can be cleaned with fine sandpaper, but should not be scraped with a knife, as it may deposit copper over the mica. After blowing out the dirt the commutator should be checked for short circuits with 600 volts between bars and after the V's

have been cleaned and tested they should be brushed with a thin coat of shellac. The mica V-ring should be cleaned carefully with sandpaper, especially at the fit of the V's. After the surface which touches the copper has been thoroughly cleaned it should not be touched by the hand or any object whatsoever. This eliminates the possibility of dirt or moisture getting on the ring and causing a short circuit between bars after the commutator has been assembled.

The armature should be stood upright with the commutator spider uppermost while the rear mica V-ring is assembled. Then the assembled segments can be placed on the spider and the detachable front steel and mica V-rings assembled. The 3-deg. angles of the mica V-rings will bind against the 3-deg. angle of the copper V's before the banding wire is removed. The front mica V-ring must not be forced down, as to do so would injure the mica.

The commutator nut or bolts, if the commutator is a bolted type, should be located carefully as it is probable that the threads of the nut or bolts will not catch the threads on the bushing. Two pieces of cotton tape should be tied around the segments, one above the top banding wire and the other below the lower banding wire. Then a U-shaped clamping bar can be placed

*This is the fifth of a series of articles on commutators for railway motors. The others were: Choosing Materials for Railway Motor Commutators, published Aug. 21, 1926; Important Considerations in Replacing Commutator Bars, published Oct. 23, 1926; Accurate Machining of the V's of Assembled Commutators Is Essential, published Nov. 20, 1926, and Mica V-Rings and Bushings Have Important Functions in Commutators, published Dec. 18, 1926.

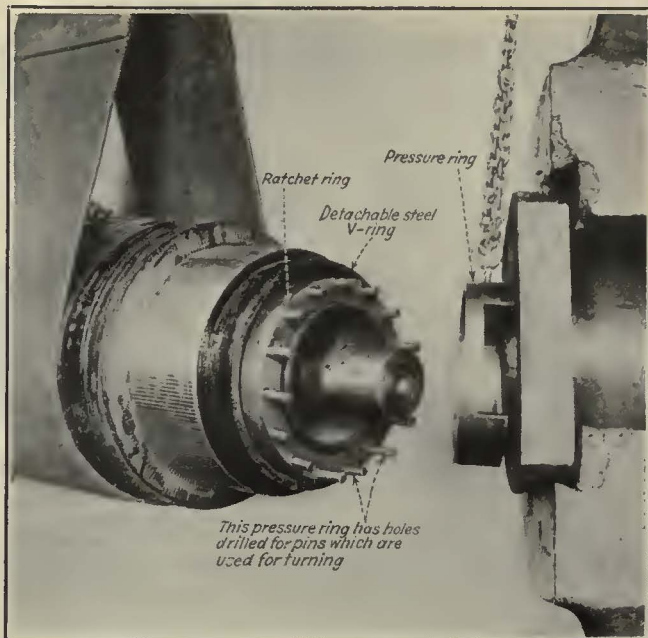
acetylene torch. The ratchet ring shown in the illustration for tightening a commutator in a hydraulic wheel press has fifteen pressure pins instead of the six slots. Either slots or pins will be satisfactory.

On the other end of the ring two holes for spanner pins are drilled 180 deg. apart and on the same bolt circle as the spanner holes in the commutator nut. A smaller hole should be drilled through the ring. This hole should be redrilled approximately 1 3/4 in. deep for the spanner pin. This will provide a stop for the spanner pins, thus keeping them from driving too far into the ring. By having the hole drilled through the ring the pins can be driven out should they break off.

Diametrically opposite from the spanner pin hole and on the same bolt circle two additional 1/2-in. holes should be drilled through the ring. The holes are for two bolts, which will be used to hold the ratchet ring to the commutator nut. It will be necessary to drill and tap two 5/8-in. holes in the commutator nut besides the two spanner pin holes which are already drilled. This will eliminate the difficulty of holding the ratchet ring in place during the tightening operation.

In order to relieve the strain on the two holding bolts described in the preceding paragraph it is well to bore the inside diameter of the ring in the front 1/4 in. larger than the diameter at the rear. A circular guide plate should be placed in this offset and spot welded in place. The guide plate must have a hole bored in it large enough to fit over the shaft. It is best to wrap the shaft with a strip of thin sheet copper to keep the guide plate and the wrench handle from marring the polish on the journal.

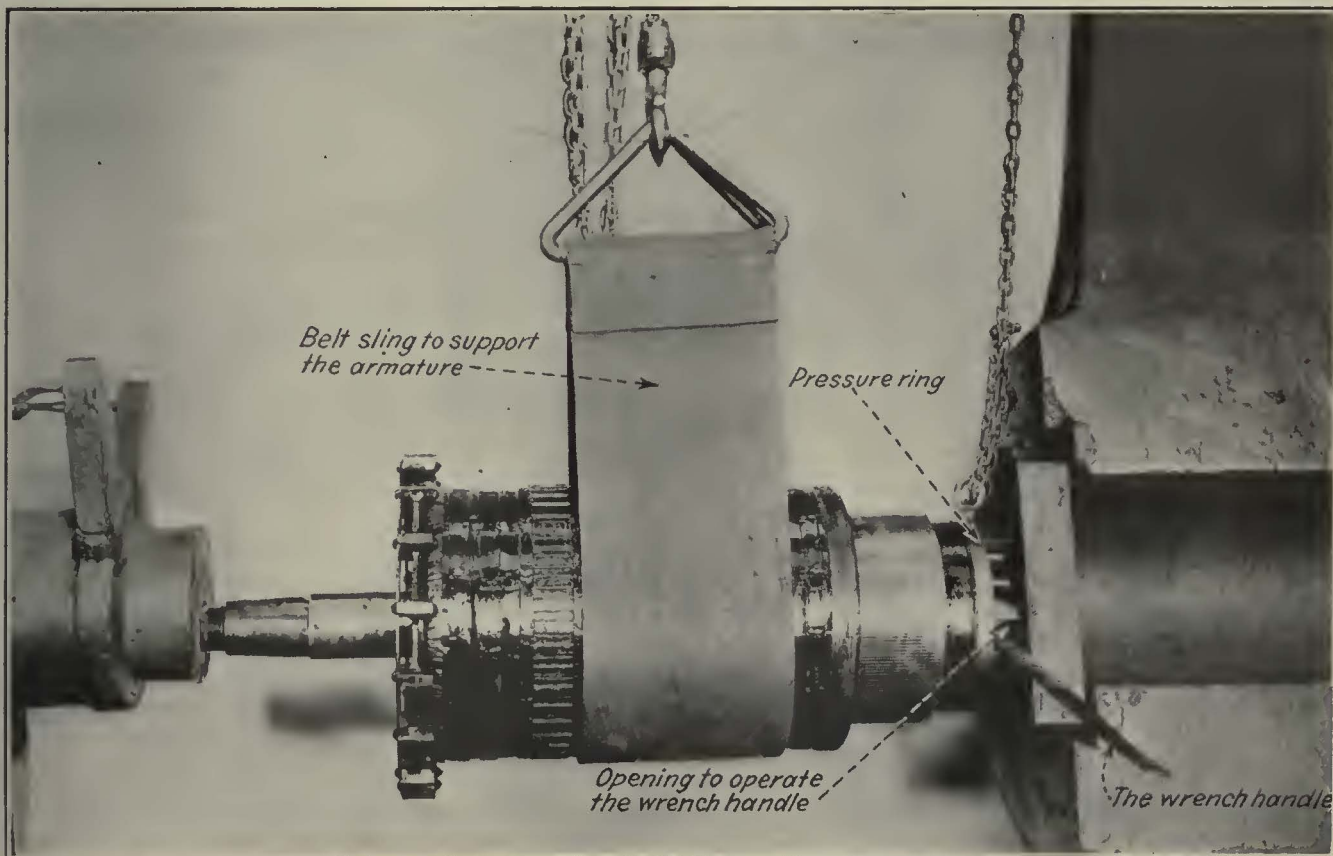
The features outlined in the two preceding paragraphs are not necessary where a vertical press is used, because the weight of the ring will keep the spanner pins



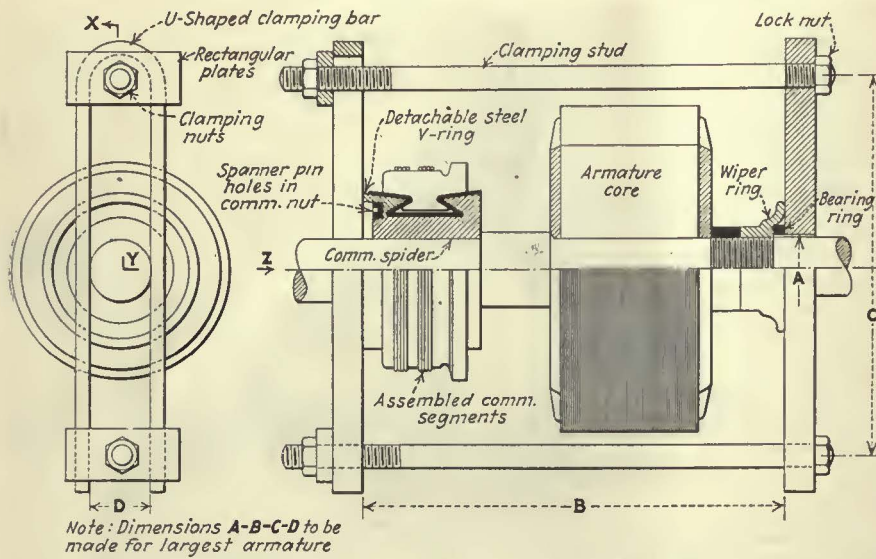
Parts Used in Tightening Operation in Wheel Press

in the hole in the commutator nut. However, where the wrench is to be used in a horizontal press one will appreciate the necessity of bolting the ratchet ring to the commutator nut after trying to hold it in place during the tightening operation.

Since the duty of the pressure ring consists in transmitting the pressure from the press to the detachable steel V-ring during the tightening operation it is essential that the face which comes in contact with the detachable V-ring should be solid in order to transmit



Tightening a Commutator in a Hydraulic Wheel Press with the Use of the Commutator Wrench

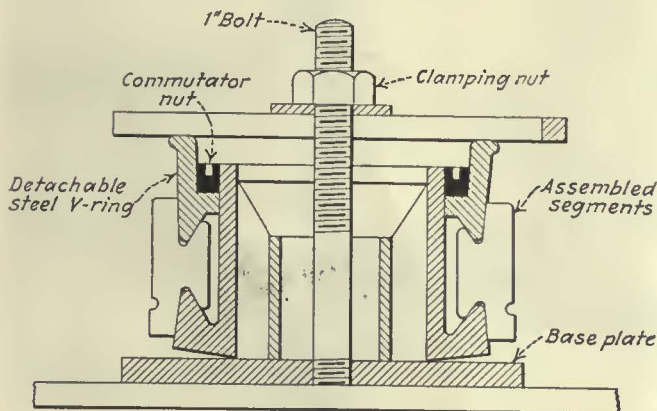
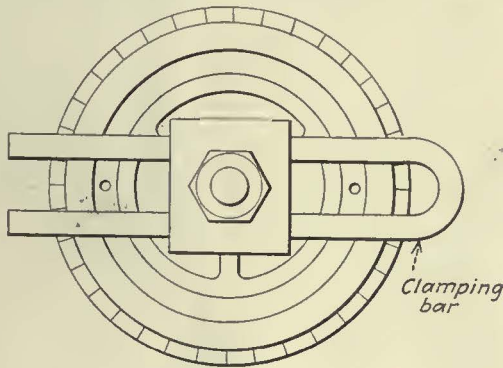


Press Which Can Be Used for Assembling Commutator When the Commutator Assembly Is on the Armature Shaft or Spider

the pressure evenly. It will be necessary to cut an opening in the other end for the operation of the wrench handle. If the slots in the ratchet ring span 60 deg., then the opening in the pressure ring should be at least 80 deg.

The outside diameter of the ring should not be smaller than the outside diameter of the steel V-ring. The inside diameter of the ring should be small enough so that the pressure face of the steel V-ring is covered. However, it should be at least 1/4 in. larger than the ratchet ring. The thickness of the ring should be approximately 3/4 in. or more.

The wrench handle should be curved at one end to fit over the shaft. The straight end of the handle can be used when the commutator is assembled before the



A Simple Assembling Plate Which Will Facilitate the Assembling of Commutators When They Are Not Part of the Assembly

commutator spider is pressed on the armature spider. A wrench similar to the one described above was made by Roy Clark, master mechanic, and Sam Augel, assistant master mechanic of the Saginaw, Mich., shop of the Michigan Railroad to be used in the assembly of Westinghouse 557 and 333-V commutators. These commutators being similar, it was possible to adjust the dimensions so that one wrench could be used on both commutators. This wrench was made as follows:

The ratchet ring was made from the hub of an old gear, the spokes being cut off with an acetylene torch. The hub was then placed in a lathe where the outside diameter was turned to 10 1/2 in., and the inside diameter bored 8 3/4 in. The ends of the ring were faced so that the finished ring was 7 in. long. The slots were made by first drilling 1 3/4 in. holes and then cutting the rest of the metal out with the acetylene torch. The bolt circle, A for the spanner pins and the holding bolts was made 9 5/8 in. The drilled holes for the spanner pins and the tapped holes for the holding bolts in the commutator nut were drilled and tapped on a 9 5/8-in. bolt circle. The guide plate was located by boring the front inside diameter 8 1/2 in. and 2 5/8 in. back. The diameter of the guide plate was machined 8 1/2 in. in diameter. It was held in place by six spot welds.

The pressure ring was forged out of a hot rolled steel plate 7/8 in. x 8 in. x 36 in. It was forged around an old pinion whose outside diameter was 10 1/2 in. The ring being large, it was not necessary to weld it. The opening for the spanner wrench was made with the acetylene torch. The forged ring when cold was slightly smaller than 10 1/2 in. Therefore, it was placed in the lathe and the inside bore machined to 10 1/2 in. The two pressure faces were machined, thus making the finished length approximately 7 in. With this wrench and a wheel press Mr. Clark feels that he has made the tightening operation of his commutators a simple and sure operation.

It is bad practice to tighten the commutator nut with a special drift and a heavy hammer without applying a pressure to the steel V-ring. This batters up the commutator nut and steel V-ring and tends to turn the steel V-ring, which in turn skews the bars. The commutator nut should not be tightened until after the steel V-ring has been subjected to a pressure and the assembly heated. This method of heating the commutator and applying the pressure will be described for two conditions: First, where the commutator spider has not been pressed on the armature spider, and, second, where the commutator spider has been pressed on the armature spider.

TIGHTENING A COMMUTATOR WHERE ITS SPIDER HAS NOT BEEN PRESSED ON ARMATURE SPIDER

The most efficient method of heating the commutator under the above conditions is in an oven which will heat a commutator from 125 deg. to 150 deg. C. A simple heating stand for commutators can be made as shown in an accompanying sketch. The hole in the stand

should not be larger than the opening in the commutator spider. This opening allows the flame of a gas torch to pass through the commutator spider. An asbestos board, with a hole for the gas to escape, should be placed over the top of the detachable steel V-ring. It is not advisable to use a sheet steel plate, as the heat will cause it to warp and allow the flames to pass between the plate and the detachable V-ring, thus consuming the bond in the mica V-rings.

The temperature should be measured with a thermometer, it being placed on the copper bars next to the V-ring, with the bulb covered with putty. This will give a true indication of the temperature of the copper. The thermometer should register from 125 deg. to 150 deg. C.

Skewing of commutator bars can be prevented by placing the commutator on a clamping plate, as shown. It consists of a steel base plate, a bolt and a clamping bar. After the bars have been properly aligned the commutator is placed on this plate and the clamping bar is drawn down. The clamping bar serves as a press and prevents the detachable steel V-ring from turning. Several blows on the steel V-ring with a rawhide mallet will cause the V-ring to take its place. After the clamping bar has been drawn tight the commutator nut can be tightened.

For small commutators the clamping bar as just described will furnish sufficient pressure to obtain a tight commutator. However, on large commutators it will be necessary to use a press and a special wrench as described in the first part of this article.

VERTICAL PRESS METHOD OF TIGHTENING COMMUTATORS

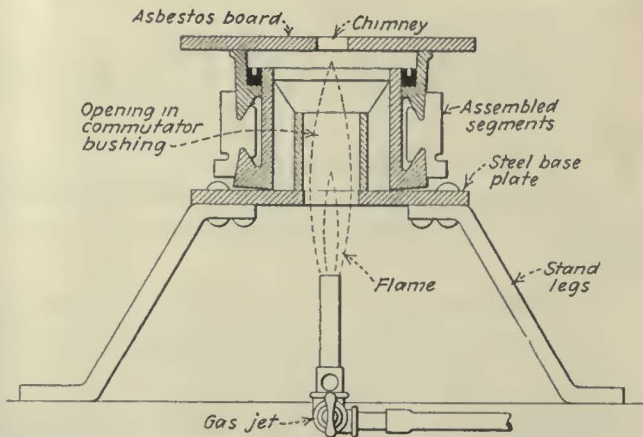
After the commutator has been heated and the bars aligned properly the commutator is ready to be placed on the vertical press with the front of the commutator up. The ratchet ring should be placed so it will engage the two spanner pins in the holes in the nut and the ring should be bolted to the nut with two bolts. The pressure ring can then be slid over the ratchet ring so that the solid side of the ring will be against the steel V-ring. The pressure ring should be subjected to a pressure of 20 to 30 tons, depending upon the size of the commutators. The wrench handle placed through the opening in the pressure ring into the slots in the ratchet ring will draw the commutator nut home.

It is possible to use the press without this commutator wrench by applying the pressure to the steel V-ring and by tightening the nut with a drift. However, this is more difficult and the results will not be as good.

TIGHTENING A COMMUTATOR AFTER ITS SPIDER HAS BEEN PRESSED ON THE ARMATURE SPIDER

Before undertaking to assemble a commutator it should be heated to 125 deg. to 150 deg. C., regardless of the method used. The heating operation is necessary to soften the bond in the mica V-ring and the commutator strip. Subjecting mica to a pressure while it is cold pulverizes the bond. On the other hand, if the mica is heated the bond will soften and allow the mica to conform itself to the metal parts when a pressure is applied. For this reason only is it necessary to heat the commutator.

In heating a commutator it is best not to allow the flame to touch the copper. However, where no oven is available, to a certain extent the flame will have to be

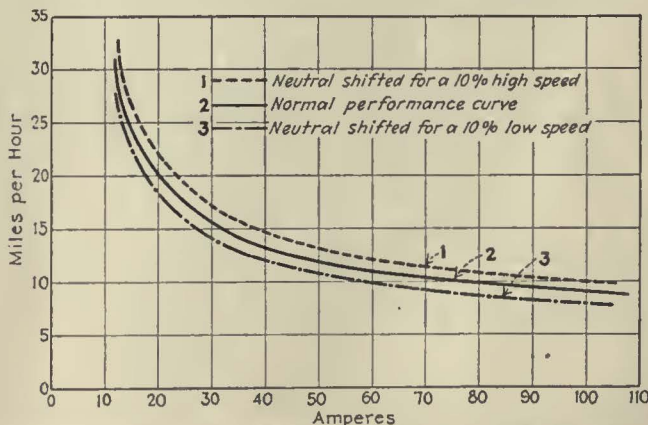


Method of Heating a Commutator When the Commutator Is Not Assembled on the Commutator Spider

played on the copper. Before starting to heat the commutator, the mica V-ring should be covered with asbestos cloth so that the flame will not burn the bond in the mica V-ring. It is well to do most of the heating on the commutator spider and steel parts of the armature core as they will retain the heat longer, thus keeping the mica V-ring hot during the tightening operation.

The ideal method of tightening a commutator under this condition is with the wheel press after the commutator has been heated. In this operation the armature should be supported in a sling and the ratchet ring should be bolted to the commutator nut. The pressure ring can then be slid over the ratchet ring, after which the slack on the press should be taken up and the pressure ring adjusted. By applying the necessary pressure the commutator nut can be drawn home with the curved end of the handle against the shaft.

For various reasons some companies will not feel like spending the money for a commutator wrench or a press for tightening their commutators. For commutators used on 30-hp. motors or less than 30 hp. a very efficient press can be made to do the work at a very low cost. Such a press is shown in an accompanying line drawing and was made by placing an old car wheel or some sort of a base plate on a level foundation. Two 2-in. holes were drilled in the web of the wheel near the flange and two upright posts were fastened with two nuts, one on each side of the wheel. These posts were made of 2-in. bolts about 30 in. long and were threaded at both ends, the thread at the top being 12 in. long. The armature shaft is placed in the hole in the hub and the necessary collars are inserted so that the



Performance Graphs of a Westinghouse No. 508-A Railway Motor Showing Effect of Shifting Commutator

armature will be supported from the wiper ring face and not by the extreme end of the flange of the wiper. A U-shaped bar is placed over the shaft so that it will rest on the interchangeable steel V-ring and the necessary pressure is applied by screwing the bolts down so as to turn the commutator nut home.

This press can be modified to suit existing conditions. However, its use should be limited to small commutators.

ALIGNMENT OF COMMUTATOR BARS IS IMPORTANT

Correct alignment of commutator bars with respect to the center line of the starting coil, when rewinding the armature, will insure correct location of the neutral commutating zone. If the commutator bars are not correctly aligned with the center line of the armature coil the neutral commutating zone will be shifted. This will produce the same results as shifting the brushes the same distance in the opposite direction.

Shifting the commutating zone will cause the motor to have a higher or lower speed, depending upon the direction of rotation. Let us assume a possible case. A car is equipped with two motors, both having the commutator bars shifted the same distance but in the opposite direction from the neutral zone, the one motor having a 10 per cent high speed and the other a 10 per cent low speed. If the car runs continuously in one direction, below 10 m.p.h., the motor with the high speed will carry approximately 50 per cent more of the total load. When the car is operating at a higher speed this difference in load will decrease as the speed increases. This is illustrated in the motor curve, reproduced. There is a 50-50 chance that the motor having the higher speed may also have the larger wheel diameter, assuming that one set of wheels may be worn more than the other. The above illustration shows the importance of having the motors run at as near the same speed as possible, thus eliminating undue overheating.

The conditions may not be as bad as pictured above, but they will vary in proportion to the distance that the commutator bars are out of alignment. Motors having wider bars will produce a greater variation in speeds and commutating difficulties. The commutating pole motor is more sensitive. Therefore, the alignment must be more accurate.

Shifting of the commutating zone will agitate sparking. Sparking will cause flashing, when the motor is operating at a high speed, as well as numerous other commutation troubles.

TOOL FOR ALIGNING COMMUTATOR BAR WITH ARMATURE SLOT

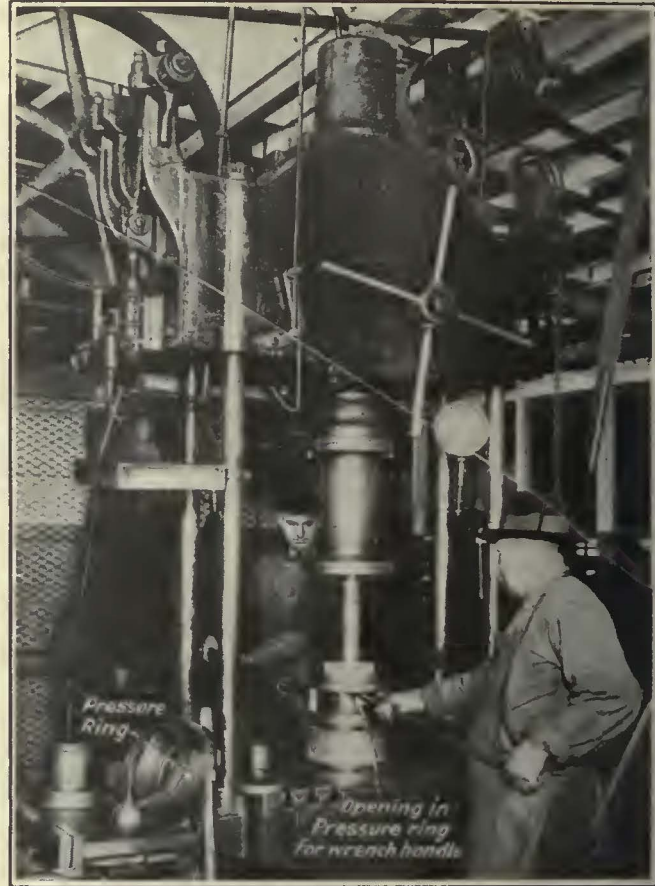
A simple aligning tool can be made from a straight edge bar about 1 in. wide with two stationary pins and one movable, so spaced along the center line of the bar that the two stationary pins will rest on the center line of the armature tooth while the movable pin will be above the commutator. This tool is inexpensive and easy to make. It can be used on all types of armatures.

The center line of the keyway in the commutator bushing is usually the center line of a slot in the armature core. This definite relation is maintained by the relation between the common center line of the keyways in the armature spider, the commutator bushing and the armature punchings.

One aligning tool can be made to fit all the com-

mutator spider keyways by using different sizes of dummy keys, as shown in accompanying illustrations. The right angle bar is made so that the inside of its vertical bar is the center line of the dummy key, which would make it the center line of the keyway in the commutator bush. This makes the inside of the adjustable bar the center line of the dummy key.

The dummy key fits the keyway in the bushing. The gage is held in place by the adjustable pressure screw. This particular commutator calls for the center line of the keyway to line up with the center line of a commutator bar. If the center line of the bar coincides



Assembling a Commutator in a Vertical Hydraulic Press

with the inside of the adjustable bar, then the center line of the commutator bar will be in alignment with the center line of the armature slot when the bushing is pressed on the armature spider. If a commutator calls for the center line of the mica to align with the center line of the keyway, the inside of the adjustable gage must coincide with the center line of the mica.

In the final test the following important dimensions should be checked. These dimensions should be recorded before the old commutator segments are moved:

1. The distance from the rear of the bar to the rear end of the bushing. This determines the correct location of the commutator.

2. The width of the neck. This will determine whether the clearance between the brush-holder and the neck will be correct.

3. The length of face to make sure the brush surface is the proper width.

4. The outside diameter of the face to give the correct clearance between the brush-holder and the commutator.

We Are Acquiring a New Viewpoint*

Manufacturer and Operator Have a Common Interest in the Future of the Transportation Business
—Former Methods and Precedents Are Subject to Question—There Is Growing
Evidence that Improvement of Facilities Is a Paying Process

By Willits H. Sawyer

President American Electric Railway Association
and President East St. Louis & Suburban Railway

WE ARE beginning to get proof of the soundness of the policies adopted by those electric railway properties which have had sufficient confidence in the local transportation business to go ahead in the expenditure of money and effort for the improvement of their facilities and the development of an aggressive merchandising program. Today we are not going to conventions for the purpose of commiserating with each other and talking about our troubles. We are beginning to look forward with courage and enthusiasm, instead of backward with self-pity and doubt. We are now asking ourselves what we should be doing instead of reciting our troubles and begging some one else to do something. We are looking to the future. And as we look, we see more clearly every day the incontrovertible fact that the public must have public transportation service, and that even the coming of the private automobile has not changed that fundamental requirement.

TRANSPORTATION IS A NECESSITY

We can nail down hard this one basic fact, "The public must have transportation." We, as transportation men, are the logical people to furnish it. Our job is to supply a character of service which will adequately meet present-day conditions. Once we do that our difficulties will diminish rapidly. It is to the growing appreciation of these facts that the present-day difference in the character of conventions such as this is attributable. We are now going to conventions to get new ideas for self-improvement. We are trying to learn how to do a better job than we have been doing. And the man who misses that point in a convention is missing the very reason for his attendance.

During this meeting of the Midwest Association we have been talking about the advantages of new cars. We have been considering the reasons for new cars. There has been presented here the experiences of some of the properties that have tried them and figures showing the price the industry is paying as the result of the operation of obsolete equipment. It has been a most convincing story. The effect of modern cars on operating costs and revenues has been demonstrated. But that is only part of the story which has been told. In the past cars have been considered as an engineering matter. Today they are being considered from the sales viewpoint. We have given much consideration to



WILLITS H. SAWYER

their design, from the standpoint of engineering and economics, but the most important thing we have been discussing is the use of new and modern cars as a means of selling interest, enthusiasm and pride in our service, to our employees and public. That is a phase of the car situation which we have entirely overlooked in the past.

We have talked much of the need for co-ordination, but we are beginning to see more clearly a condition which calls for greater co-ordination within our own industry. I have always been a staunch advocate of the value of the service rendered the electric railway industry by the manufacturers and of the part they have played in its upbuilding. But today there is another group of manufacturers playing an active part. They represent the automotive point of view and automotive methods. They are setting a pace in merchandising effort with which the electric railway manufacturer is failing to keep pace. We are faced with new conditions. Our entire viewpoint is undergoing a rapid and deep-seated change. We operators are revising our conception of the transportation business and of our responsibilities to our properties and our public. We are trying out new tools, and we still have much to learn about how to co-ordinate them with those to which we have been accustomed. We have made many mistakes, and we shall continue to make them until we learn how to adapt ourselves and our methods to conditions that exist today.

In all of this the electric railway manufacturer has a primary interest and a primary responsibility. He furnishes the tools with which we work. Our success spells his success, our failure means failure for him. Operator and manufacturer are in the same boat. We float or sink together. If he permits new tools to be used where the old ones, properly improved, are better adapted; if he fails to keep his products up to the need of the times; if he hesitates to express frankly his views, or to invest money in the development of his product, he fails to meet his responsibility to the industry of which he is a part, and to his own stockholders. In the struggle to co-ordinate various vehicles into modern transportation systems the electric railway manufacturer must meet the development and merchandising aggression of his competitors. Only in that way will the car and bus finally be fitted together on a sound, economic basis. The electric railway manufacturer must tell his story frankly, even bluntly, if he expects to move ahead under modern conditions.

*Abstract of address at the meeting of the Midwest Electric Railway Association, Tulsa, Okla., Jan. 6-7, 1927.

Something was said here today about the tendency to use our hearts instead of our heads in the consideration of buses and cars. We can't afford to do that. We must act on the basis of strict business considerations. Every precedent of the industry is subject to question in the light of changed conditions. The fact that we have always done a thing in a given way is good reason for questioning the wisdom of that practice.

Getting back to the bus, there is no question but that it is here to stay, and has a permanent place in the scheme of transportation. But in many instances it was introduced on the wrong basis. High-pressure selling was not always accompanied by wise merchandising. The bus manufacturer himself has not always properly analyzed the situation. Enthusiasm was and is being accompanied by much loose talk as to what the bus can and cannot do. There is danger that this may react against the proper development of the bus as a transportation agency on a basis which will permit it to be operated at a profit. The manufacturer who, in his eagerness for immediate sales, fails to consider the limitations as well as the advantages of the bus is storing up future trouble for himself and for every bus operator. We have talked much of co-ordination, but have made little progress in interpreting it into operating practice. There are buses in service today where they should not be operating. Many others have been installed under conditions which are subject to serious question as to character of service rendered and rate of fare charged. On the other hand, there are possibilities for bus operation that have hardly been tried. Co-ordination does not mean just putting some buses in service. Nor can a successful bus manufacturing organization be built by just selling buses wherever and whenever they can be forced into service.

WE ARE ACQUIRING A NEW VIEWPOINT

There is need for greater co-operation between manufacturers and operators in the development of the transportation business. There is increasing evidence that the electric car is economically the backbone of a properly co-ordinated transportation system. It should continue to handle the bulk transportation needs of our cities. Use of buses as street cars on rubber tires, for feeder and extension service is merely a stop-loss application suitable for thinly settled territory which will not support a rail investment. But there is a broader field for the operation of buses, particularly in the larger cities. The margin between street car fares and automobile operating costs and between street car service and automobile service is so wide that the bus offers an opportunity to develop entirely new business for a public transportation system by rendering a service which approaches more nearly than does the electric car that of the private vehicle. It is in that direction that the opportunity seems to lie for making bus operation really profitable. It is in that direction that the effort of the bus manufacturers should be directed, if their business is to be put on a sound basis. Only by making bus operation profitable can it be established on a sound foundation.

We, as transportation men, have a duty to the communities we serve. We are beginning to acquire an entirely new viewpoint in the discharge of that obligation. In the past we have thought merely as the producers of transportation. We have been primarily engineers. We have selected and operated our cars from an

engineering viewpoint. Merchandising and salesmanship are not new words to us, but today they have a new significance as applied to our business. We are actually beginning to think more as merchants and less as engineers. Our big job is to develop and sell a product which will attract patrons. But the industry is far from doing the job which it should be doing, and which it will have to do before real success can be won. In the past our methods have been wrong. If that had not been the case we would not have had a hard luck story to tell. Our success in the future will be achieved by conducting our business differently than in the past. The process of improvement consists of the application of those methods and ideas which other companies have already found beneficial. We can't stand still. If we attempt it we shall continue to slide down, and finally out. When we go to conventions it should be to seek new ideas and suggestions, not to exchange our troubles. When we learn of ideas which have helped others, we must go back to our properties and find ways and means of applying them. Properties which have adopted a policy of progressive improvement of their service have made that improvement pay. The money spent for new cars and new facilities has been a profitable investment in every instance where it has been intelligently applied. In the experiences of those who have gone ahead in the last few years there is a real inspiration for the industry which points the way toward general improvement and financial success.

Curbstone Parking Can Serve Only a Few at Best

PARKING facilities on downtown streets are woefully inadequate at best, according to Dr. Miller McClintock, director of the Albert Russel Erskine bureau of Harvard University. A recent survey of seventeen American cities in which 1,424,660 automobiles entered the business district daily had curb space available for parking only sufficient to accommodate 147,081 cars.

In Chicago alone the Metropolitan Street Traffic Survey reveals the fact that the famous Loop in that city when used to its fullest capacity and with 100 per cent turnover every 30 minutes provided parking facilities for only 15 per cent of the 122,000 automobiles that daily enter this district. Storage garages and off-street facilities provide room for only 8,000 additional cars.

"There is no city in the country," declares Dr. McClintock, "that possesses curb space in the central district capable of accommodating the parked cars of more than a small fraction of the motorists who enter the district daily."

Dr. McClintock believes that the motor car is of sufficient importance as a means of transportation to warrant the provision of housing facilities at reasonable costs near the office or downtown destination of the driver and states in this connection that: "There is no more important improvement that can be undertaken to encourage the use of the automobile as a standard and daily means of personal transportation than for cities to encourage, either by public construction or by private means, the construction of storage space for automobiles near the center of the business district. There should be accommodation for every motor car that is brought into the city in some safe, off-street storage space."

Development of Commercial Sense Needed*

Modernization of Town and City Transportation Demands More than New Physical Equipment — A Large Amount of Business Can Be Developed, but It Requires the Right Attitude—Formation of Commercial Department Urged

By R. N. Graham

Manager of Railway the Pennsylvania-Ohio Electric Company,
Youngstown, Ohio

BEFORE the automobile existed there were communities too small to support a public transportation service. Communities where the entire area was easily within walking distance never presented a field for such enterprise. However, in those days, when a community expanded to such an extent that traversing the average distance between the residence portion and the business portion took too great a period of time or effort on the part of the individual, there immediately became a field for public transportation.

While the horse and buggy furnished a perfectly good conveyance, there was too much trouble and expense attached to its care to warrant the individual freely making use of it in preference to public transportation. With the great use of the automobile the field of public transportation in communities has narrowed. The community must be larger than under the former conditions. Even where a community is large enough to support a system of public transport, there is a large possible market which swings between the use of private automobiles and the vehicles of a public service.

Consider the typical urban community. A certain number of the people who live in it and whose livelihood is earned in the business center will walk from their homes to their work and vice versa. They are not customers of the public utility. A certain number live too far from the business center to walk and do not own automobiles; they will be customers of the public utility. A certain number live too far from the business center to walk but have their own automobiles; they may or may not be regular customers of the utility. Whether they are customers of the utility or not depends on several factors: (1) The service given by the utility; (2) the public attitude toward the utility; (3) the custom of the community; (4) the degree to which eco-

nomical considerations are factors in determining choice of means of carriage.

I will not attempt to analyze all these factors but will content myself with a few general observations. The American people today do not examine closely comparative costs when these are small. If the private automobile is more convenient and comfortable than the public transportation system, the greater cost of

the private automobile will not be a serious factor against it. On the other hand, the public is influenced by such factors as comfort, convenience, custom, prestige and even social consideration. If the public transportation offered is efficient and convenient, if it is considered snappy, modern and up to date, if the use of this public transportation does not constitute a social inferiority nor force the prospective passenger to mingle with undesirable companions, there is no reason why he should not avail himself of such service.

Therefore, in any community capable under any circumstances of supporting a public transport sys-

tem, there is a large business which either may come to the utility or be withheld from it. For the purpose of this discussion, it is not even necessary for us to agree upon the factors involved. If there is such a business, it is manifestly the job of the utility to secure the maximum amount of it. Granted this, we must immediately concede that it is not sufficient for the utility to lay its tracks and operate its street cars and buses through the streets of the community and maintain its vehicles and facilities in an efficient and workmanlike manner. The transportation utility is engaged in a business in which a large proportion of the traffic that it will enjoy depends on the discovery and handling of factors which, to a large extent, may be individual and personal to the community it serves. It is engaged in a commercial venture whose prosperity depends on factors merchandising in their nature. Therefore, the first step in

WE OPERATE buses in every city in which we furnish transportation. . . . As a result of our experience we do not consider the bus in any sense a successor to the street car and yet we consider it a useful part of our transportation system and a modern development of help to our operation. . . .

We have discovered that the so-called rubber urge is simply a figure of speech. There is no apparent difference in the attitude toward our facilities in the portion of the communities we serve with street car lines and the portion we serve with bus lines. . . .

On account of the low seating capacity of the bus with its comparatively high operating cost, the average length of haul which can be given profitably with a standard city fare is lower than with the street car, so that the street car must remain the backbone of urban transportation.—R. N. GRAHAM.

*Abstract of a paper read at the meeting of the Midwest Electric Railway Association, Tulsa, Okla., Jan. 6-7, 1927.

modernization of town and city transportation with respect to the condition that existed before the present use of the automobile is the development of the commercial sense of the transportation organization.

On every transportation property, regardless of size, we will find a department head charged with the responsibility for the maintenance of equipment, another charged with the responsibility for the upkeep of track and permanent structures, another whose duty it is to see that the cars are operated according to schedule and in a proper and workmanlike manner. These duties and responsibilities have become so fixed through a long period that we expect to find such division of responsibility on every property. Taking the business as a whole these functions are carried on in an efficient, capable and modern manner.

However, the present need of the business is for an additional operating department, which can be termed the commercial department. It will be the function of this department to secure that business which may be given the utility or withheld from it. Naturally there will fall to this department the following chief responsibilities:

1. Development of the platform personnel of the organization to be not only efficient motormen, conductors or operators, but business getters.
2. Checking of the traffic that is carried and the traffic that can be carried, in order to adjust schedules to obtain the maximum amount of profitable business.
3. Preparation of schedules that can take care of the maximum amount of profitable business and that will best serve the traveling public.
4. Proper publication, announcement and posting of the scheduled facilities of the company to render it as easy as possible for the public to avail itself of the facilities offered.
5. Advertising of the facilities of the company through such mediums and in such manner as will best divert to the company the business that can be diverted.
6. Handling of all points of contact with the public in such manner as will make the relationship between the utility and the public as pleasant as possible, so that actual business shall not suffer through unfriendliness, prejudices or dislikes.
7. Development of such improvements in organization, equipment or practices as will be economically sound and at the same time either result in improved business to the utility or prevent loss of business already enjoyed.

This commercial department is at least of equal importance with the maintenance of way, equipment or transportation operation. In my opinion, it is of greater importance than any of the three mentioned and its head must be of at least equal caliber to those who act as heads of the departments conveniently considered necessary.

From this it will be evident that I consider that modernization of transportation does not consist of concrete acts such as purchasing new cars, putting up billboards,

adopting a new uniform, or perhaps replacing a car line with a bus line. True modernization consists in changing the conception of the purpose of the particular utility to take care of certain business that must be carried to that of an aggressive sales organization which not only operates in an efficient mechanical way, but whose organization and manner of thought are directed to acquiring all the business possible.

With such a purpose and such an organization it will follow naturally that the concrete acts that have been or that may be suggested will be properly considered and weighed, will be adopted when such adoption seems feasible, but when adopted will not be unrelated desperate experiments or expedients, but will be followed up and continued as a definite and ordered business program.

The commercial department of such a transportation organization, if functioning properly, will develop along the lines most proper to the field where it is working. There are a few general observations that I would like to offer along the line of modernizing transport:

On our Pennsylvania-Ohio system we have made rather sweeping changes in our physical plant in the

past several years. We have embarked on a comprehensive bus system, overhauled a number of our operating practices and practically replaced all our street cars with more modern ones. However, among the numerous letters of commendation we have received there have been very few that have referred to these matters. These letters of commendation from the public almost invariably concern themselves with unusual acts of courtesy or thoughtfulness on the part of our working force. This illustrates the importance of the item of personnel. A street car may be very attractive in appearance, be kept clean and otherwise satisfy the passenger, but if the operator is surly or dirty, the impression left upon the passenger will be unpleasant. It is, therefore, as necessary to check the work of the operator from the standpoint of courtesy, cheerfulness and neatness as it is from the standpoint of safety and efficiency.

The commercial department should be able to classify the operators from the standpoint of their ability as business getters. Those operators who are disagreeable to passengers should not be permitted to remain in the business, regardless of their mechanical efficiency. An efficient and capable operator who does not possess the right mental attitude toward his job from the standpoint of attracting business should not be discarded without every effort having been made to enlist his interest and co-operation in this respect. I have found the booklet "Salesmanship" by George Baker Anderson, manager of transportation of the Los Angeles Railway, the best printed document on this idea as applied to motormen, conductors and operators. A booklet of this kind, couched in simple words, brief and suitable with respect to the local conditions of the property, should be in the hands of every platform employee.

THE general subject of advertising and publicity is concerned to a large extent with the general attitude of the public of a given community toward the transportation utility. The utility is there living with them; even though they are not its customers they see it and come in contact with it. They may view it as a decrepit, outworn institution, as something obsolete and passing, or as a live, vivid portion of the community's life. To secure this latter reaction is in general, I think, the real purpose of publicity.

—R. N. GRAHAM.

The outstanding convenience of the private automobile in the control of a man to use in taking him from his residence to his work and back is that it avoids the necessity of standing on the corner waiting for a more or less indefinite period. This objection to the street car or bus facilities is, of course, eliminated when the headway is very close. In the small city or town the headway must be governed by good business economy. The public convenience of a close headway can be obtained where headways are long by informing the customers fully of the time they may expect the car to arrive at their corners. This, in turn, requires very careful scheduling and thorough advertising of such schedules. It also requires the use of intermediate time points and adherence to them. This further means that on any property, large or small, there must be a complete running check at all times of schedule at such time points.

On our system, our practice in this regard is so completely developed that on our suburban transportation lines the leaving time at each intermediate stop is shown on painted boards at these stops. We have changed headways on lines from one hour to two without diminishing our business.

Changes of routes and schedules afford a chance for unpleasant misunderstandings. For more than a year we have issued monthly a printed schedule book which is distributed at our stations, at hotels, clubs and other public places. A copy of this schedule is mailed regularly to any one requesting it on his letterhead. The mailing list for the schedule at the present time is about two thousand. In the schedule attention is called to the manner in which to secure such regular mailing.

Except in the largest cities, it is entirely practicable to have displayed in the car itself the schedules and time points of the line so that the people using the line can familiarize themselves with the scheduled leaving time of the cars from each time point. If the schedules are not closely followed, such information naturally will call attention to bad service. It consequently follows that the commercial department not only must have a complete check of actual operation of schedules, but must ascertain and report the reason for inability to fill properly devised schedules.

The general subject of advertising and publicity is concerned to a large extent with the general attitude of the public of a given community toward the transportation utility. The utility is there living with them; even though they are not its customers they see it and come in contact with it. They may view it as a decrepit, outworn institution, as something obsolete and passing, or as a live, vivid portion of the community's life. To secure this latter reaction is in general, I think, the real purpose of publicity.

Snappy, modern uniforms of whipcord; badges that are shapely and attractive; a coat of arms or other trade mark indicating that the utility wishes to establish a personality; cars which, while they may not be new,

are at least kept bright and attractive with frequent lacquering; windows that are kept clean and polished; all these furnish a basis of the service to which attention can be called in many ways.

We have organized from our force an orchestra and quartet which, through constant practice, have become fairly proficient. A cheap scenic representation of a street car furnishes the background for this musical organization, which has appeared and is appearing before the luncheon clubs, improvement clubs and other civic organizations of our various communities.

On our suburban lines we have marked stations with electric signs, have placed on the highways zone markers in the shape of our coat of arms, and have freely used illuminated billboards. We do not anticipate that because some one reads of our service on a billboard or in the newspaper he will immediately put up his automobile to avail himself of our service, but we want every one in our communities to know that at any time they desire, they have a modern utility, aggressive and growing and eagerly desiring to be of service to them.

There has been much discussion in the industry of the advantage of secur-

ing new and more comfortable equipment. From our own experience, I am unable to express an opinion as to whether in any case the financial returns would warrant the replacement of good, usable equipment with more attractive equipment, with the question of attractiveness the only purchase consideration. While practically all the rolling stock on our property has been newly purchased within the past seven years, in no case was the request for such purchase made merely on the basis of securing attractiveness. Our property was being changed to one-man operation and the controlling factor in the decision to purchase new cars was the ability to operate them with one man and to secure light weight. The economies to be gained dictated the policy of purchasing equipment.

However, in the case of our last city cars and inter-urban cars, the question arose of whether it would be advisable to purchase the light-weight, one-man equipment constructed as cheaply as possible, or, with additional outlay, to give greater comfort to our customers and provide better looking vehicles. The difference in price between the plainest cars we could buy and cars in which many elements of comfort and sightliness were incorporated was a comparatively small amount.

To receive the proper benefit in business from the additional cost, it is necessary that the cars be maintained with the same attention to appearance and comfort as when they are built. Otherwise, the money spent for comfort and appearance becomes a passing spasm, not resulting in permanent accession of good will and business to the utility.

The thought of modernization immediately brings up the question of buses. Probably most people outside the industry and a number in it consider the bus a suc-

MODERNIZATION of transportation does not consist of concrete acts such as purchasing new cars, putting up billboards, adopting a new uniform, or perhaps replacing a car line with a bus line. True modernization consists in changing the conception of the purpose of the particular utility to take care of certain business that must be carried to that of an aggressive sales organization which not only operates in an efficient mechanical way, but whose organization and manner of thought are directed to acquiring all the business possible.

—R. N. GRAHAM.

cessor to the street car. We operate buses in every city in which we furnish transportation. In the city of Youngstown one-fourth of our passengers are carried on buses. As a result of our experience we do not consider the bus in any sense a successor to the street car and yet we consider it a useful part of our transportation system and a modern development of help to our operation. Our city bus routes reach parts of the city that were not reached by our car lines. They enable us to give a complete service to all parts of our community when it would be impossible for us, with the exercise of good business judgment, to give the same service by building new street car lines. In some of our communities we were able to operate buses over certain routes on which we would probably never be able to build a street car line, yet the very giving of this service fills out the full measure of duty that as a transportation monopoly we owe these communities.

We have discovered that the so-called rubber urge is simply a figure of speech. There is no apparent difference in the attitude toward our facilities in the portion of the communities we serve with street car lines and the portion we serve with bus lines. On the sole route in the city of Youngstown on which, as a result of purchase of a competing certificate, we operate both street car and bus for the same city service, our bus line is little used. Yet our 72 city buses are a splendid adjunct to our transportation facilities.

On account of the low seating capacity of the bus with its comparatively high operating cost, the average length of haul which can be given profitably for a standard city fare is lower than with the street car, so that the street car must remain the backbone of urban transportation.

Therefore, in making use of this modern vehicle, which in itself is an efficient means of transportation, careful consideration should be given to its complete co-ordination with the existing street car system. The bus is not a substitute for street car service except under peculiar conditions that interfere with proper street car service. It serves no useful purpose as an alternate means of transportation on the same route and with the same rate of fare, but as a supplementary and co-ordinated means of transportation is a great step in the modernization of public transport.

The Readers' Forum

What Constitutes a "Pull-in?"

ELECTRIC RAILWAY ASSOCIATION OF EQUIPMENT MEN.
SOUTHERN PROPERTIES

MEMPHIS, TENN., Jan. 5, 1927.

To the Editor:

We note an editorial in your Dec. 18 issue, "Pull-in Comparisons Not Always Reliable." In the second paragraph you say:

... Last summer at the Chattanooga meeting of the Southern Properties equipment men records of car-miles per pull-in were reported and published in the JOURNAL varying from 5,000 up to 98,000. It seems reasonable to suppose that the methods of determining pull-ins must vary widely in order to obtain such different results.

We wish to state that the members of the Electric Railway Association of Equipment Men, Southern Properties, have a standard classification, a copy of which

is shown herein. Their rules for determining car pull-ins, which we have good reason to believe are strictly adhered to, are as follows:

"A 'Pull-in' is a phrase used by the fraternity designating an equipment failure.

1. A car which has to be removed from service prior to completion of its regular prescribed run for any mechanical, electrical or man failure, or accident, will be termed a "Pull-in."

2. Should a car having a failure delay the car following, and even though at the end of the line is repaired or replaced by a tripper, such disabled car shall be termed a "Pull-in."

3. A derailment that ties up the line shall not be termed a "Pull-in" unless such car be considered defective and sent to the barn.

4. Should a car having a failure reach the end of the line without delaying the schedule of car following, and there be replaced by a tripper car, such will not be classed as a "Pull-in."

In the last paragraph of the editorial you say:

For determination of the total record there is some background of opinion for counting every pull-in without reference to cause. These pull-ins can be analyzed to determine those arising from traffic accidents, shop failures or inspection failures. Even on this basis there will be some difficulty in determining a standard, although if no attempt be made to use the figures as a means of discipline much valuable information may be obtained from them.

Following is the list of items for analysis of failures which are used in the comparative statement of car pull-ins on the street car systems of the cities of the Electric Railway Association of Equipment Men, Southern Properties. These are given by months and cumulated for the year to the date of the report.

Chargeable to Carhouse. — Armatures; armature bands; armature shafts; armature bearings hot; axle bearings hot; commutator; brush yoke; brushes and holders; fields; field jumpers; motor leads; gears and pinions; gear cases; other motor trouble; trolleys; circuit breakers; line breakers; main fuse; controller; cables; rheostats; air brakes; safety car equipment; door engines; whistles; frozen air; other air troubles; lights; headlights; signal lights; door switch; heaters; electric bells; lightning; car charged; axles; wheels; journals and boxes; hot journals; hand brakes; slack adjusters; brake rigging; other truck troubles; doors and riggings; door treadles; windows; seats; steps; registers; signs; gongs; sand rigging; fenders; draw bars; snow scrapers; other body troubles; unclassified; total chargeable to equipment; total car-miles; average pull-ins per day; average miles per pull-in.

Not Chargeable to Carhouse. — Accidents; split switches; derailments; doors and steps; broken glass; trouble reported, none found; unclassified; total not chargeable to equipment; average pull-ins per day; average miles per pull-in; total pull-ins; total average pull-ins per day; total average miles per pull-in.

It will be noted from the above classification that it is divided. The first classification shows the mechanical defects, for which the mechanical department is held responsible. The second classification covers pull-ins for which the mechanical department is not held responsible. It is obvious that, with this classification, there should be no difficulty in determining a standard for car pull-ins.

We would appreciate your giving this statement space in your next issue of the JOURNAL, so that the industry may be familiar with the classifications as used by members of the Electric Railway Association of Equipment Men, Southern Properties.

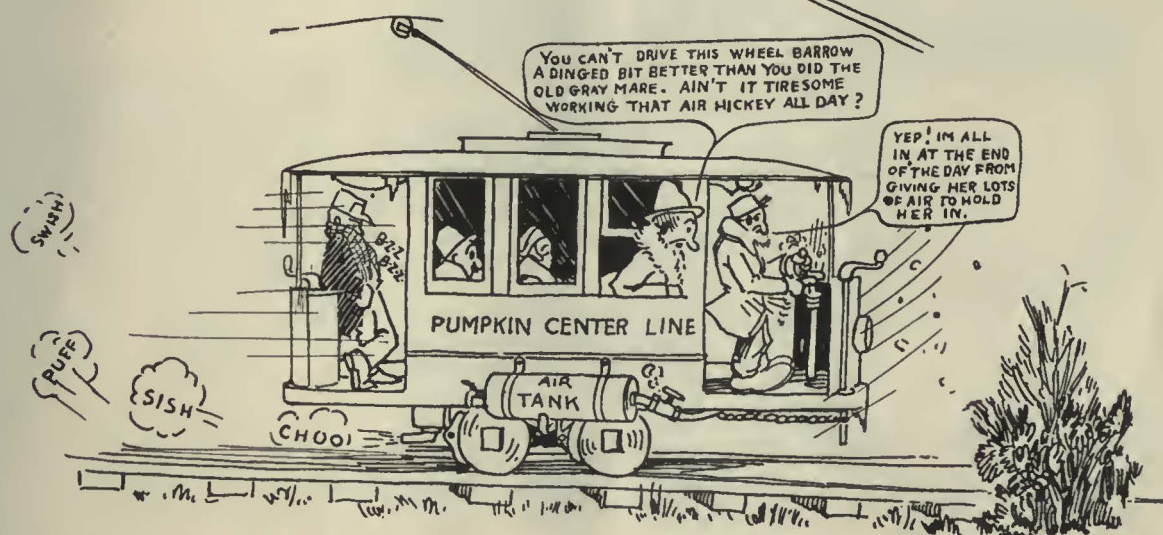
A. D. MCWHORTER,
President

Adventures of Old Man Trouble on the Hicksville Railway

Eliminate waste, reduce repairs and prevent trouble from worn air valves, governors and compressors by making fewer air brake applications.

There are many motormen who continuously all the way down a hill "monkey away at the air hickey" and make thirteen air applications to every car stop when under average conditions one is sufficient.

Save Air, Wear and the Old Gray Mare



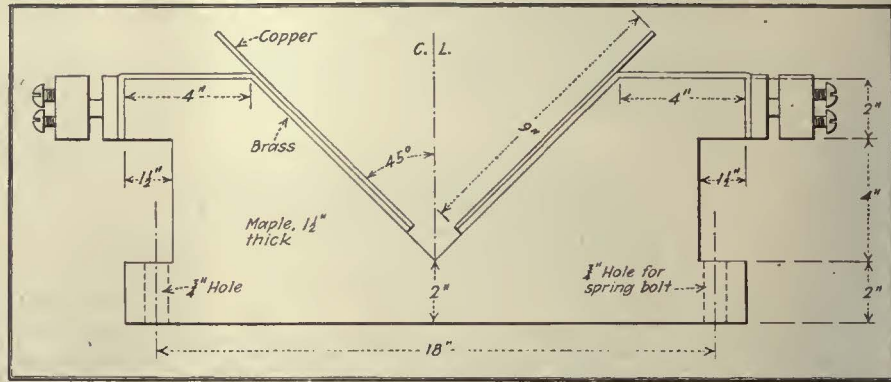
ELECTRIC RAILWAY JOURNAL will be glad to furnish proofs of this page free of charge for posting on bulletin boards and will supply electrotypes of this series at cost for use in company publications.

Maintenance Notes

Convenient Contact Yoke for Bar-to-Bar Test

WHEN testing armatures by the bar-to-bar method it is common practice to connect the series circuit to commutator bars 90 deg. apart and then to explore the coils with a millivoltmeter, with its leads placed on two adjacent commutator bars.

For making the series current connections to the commutator bars a convenient type of contact yoke is used in the department of electrical repairs of the Brooklyn-Manhattan Transit System, Brooklyn, N. Y. With this yoke, in making the bar-to-bar test, the commutator is placed so as to rest in the V-shaped section.



Construction of Contact Yoke for Bar-to-Bar Test

Contact is made to the commutator bars by copper strips, one terminal being connected to ground while the other terminal connects to a bank of

lamps the other side of which is connected directly to the line. An accompanying diagram shows the connections in the test as used. Four circuits of five 95-watt lamps each are in parallel. This gives about 0.8 amp. per circuit or a total of 3.2 amp. when all four circuits are connected. The current can be varied by cutting out one or more of the circuits so as to give a convenient deflection of the millivoltmeter. With the armature in position in the yoke the top quadrant is tested and then



Making a Bar-to-Bar Test in the Department of Electrical Repairs, Brooklyn-Manhattan Transit Corporation

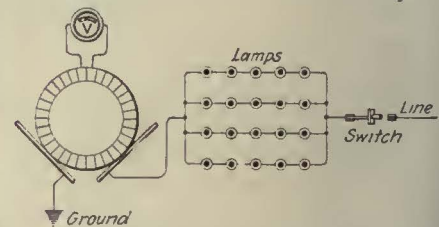


Diagram of Connections Used for Making Bar-to-Bar Test

the commutator is turned to a new position.

An accompanying line cut gives the construction of the contact yoke which can be used for testing large armatures with commutators up to 19 in. diameter and for smaller armatures such that the commutator will not pass through the lower ends of the soft rolled copper contact plates. The two faces of the V-shaped notch are arranged accurately 90 deg. apart. Brass strips are screwed to the maple framework and the copper contact plates are soldered to the brass strips, the entire contact portion being held to the maple yoke by screws. The brass strips extend over the edges of the yoke and are provided with ter-

minals for convenient attachment of the leads.

In order to provide pressure for the contact between the copper plates and the commutator the yoke is supported on springs. For this suspension two $\frac{5}{8}$ -in. bolts pass through the extended portions at the lower sides of the yoke and the suspension

springs are carried around these bolts. The holes in the yoke for the suspension bolts are located 18 in. apart. For supporting the other end of the armature shaft an ordinary type of armature stand is used. This is adjusted so as to bring the armature shaft nearly horizontal when the commutator is placed in the V.

left, removed from the pinion and returned to the truck brackets.

Where various sizes of pinions are in service it is necessary to have a collar for each size.

Pinions Removed by Hydraulic Puller

TO SIMPLIFY and hasten the removal of pinions the Interborough Rapid Transit Company of New York developed and is using a simple type of hydraulic puller built in the shop.

This machine consists of a small four-wheel truck upon one end of which is installed a pump pedestal with a hydraulic pump and on the other a pinion collar mounted on a small hydraulic cylinder. The pump and the hydraulic cylinder are connected together with a high-pressure pipe. Pressure in the cylinder may be released by opening a valve controlled by a small hand wheel on the pump pedestal. The pinion collar is bored larger than the outside diameter of the pinion to be pulled, except for a short section about $\frac{1}{2}$ in. from the outer end. In this section are cut the same number of teeth as on the pinion to be pulled. Protruding into the collar from the hydraulic cylinder is a short piston of slightly smaller diameter than the pinion bore.

To remove a pinion the truck is rolled to position in front of the motor. The collar is then slipped over the pinion, its teeth passing be-



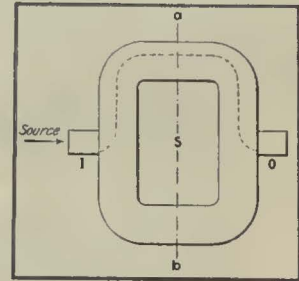
Puller in Position on Motor. Pressure Applied to Hydraulic Cylinder Forces Short Piston Against End of Armature Shaft

tween the pinion teeth. It is then given a turn to the right so that the collar teeth line up with the pinion teeth. The pump is then operated by hand. As pressure is built up in the cylinder, the short piston is forced out against the end of the armature shaft and the collar teeth pull against the back face of the pinion. Pressure is increased until the pinion is loosened. The collar is then turned back to the

Insuring Correct Installation of Motor Fields

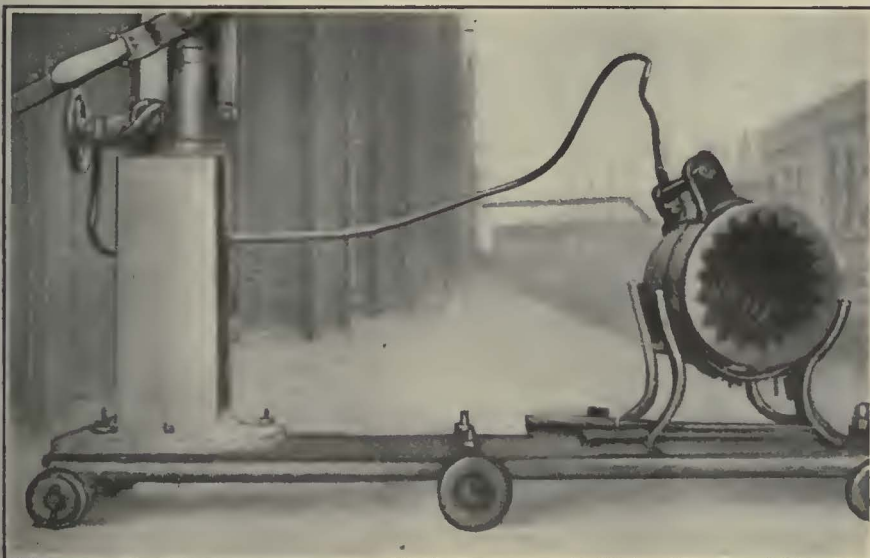
POLARITY tests for railway motor fields are not popular with repairmen. A number of railways have devised ingenious methods for insuring that the fields when installed give the proper polarity, but few railways follow up this testing consistently. In most cases familiarity of the motor repairmen with the various types of fields and connections are relied upon to insure that they are installed properly. Mix-ups in motor fields occur most frequently with those types which can be reversed either end for end or front side for back side.

There are no standard arrangements that can be applied to all field



With Current Entering at "1" a South Pole Will Be Produced

windings. In the more modern types of motors it has been necessary to place the field terminals at the ends of the coils in order to provide clearance for the commutating coils. By the use of open and crossed coils the wiring around the frame of the motor is simplified, but this method requires carrying in stock two types of coils, which adds to the chance of getting the coils mixed when a damaged field is repaired. It is now considered the best practice by railway manufacturers to use cables which come out of the body of the coils instead of employing heavy brass terminals to make the wiring around the frame. The use of this type of coil, however, does not overcome the difficulty of having fields whose proper position in the motor



Hydraulic Pinion Puller Built in Interborough Shop. Arrangement of Teeth in Collar Is Shown at Right

Too little motor end play may cause a car delay; too much motor end play and there's H... to pay.

cannot be determined. Some sort of marking is evidently essential in order to reduce the number of troubles which occur from this source.

As an illustration of the ease with which some types of coils can be installed improperly and the effect which results from installing a new coil in a wrong position an accompanying diagram is shown. This is for a common type of railway motor field coil and the dotted line represents the winding as connected to the two terminals located at the center of either side. If a sketch of

this nature be made on transparent paper this can be turned to various positions to show the effect of installing a field coil improperly and is an excellent method of demonstrating to repairmen the wrong effects that will result. With the field coil in a position as shown in the sketch, if the current enters the coil in the direction shown by the arrow, clockwise current will result in the winding, which will produce a south pole at the inside surface of the pole face. If the coil be swiveled around end for end in its own plane, the ter-

minal *O* will become the source of power, so that counterclockwise current will result and a north pole will be produced. If the coil be rotated on the line *a-b* as an axis, the terminal *O* will again be the source of power, but the current in this case remains clockwise and the pole produced is south. Rotation of the coil around an imaginary line *I-O* as an axis gives the same effect as swiveling the coil in its own plane; that is, current circulation becomes reversed, and with it the polarity is changed.

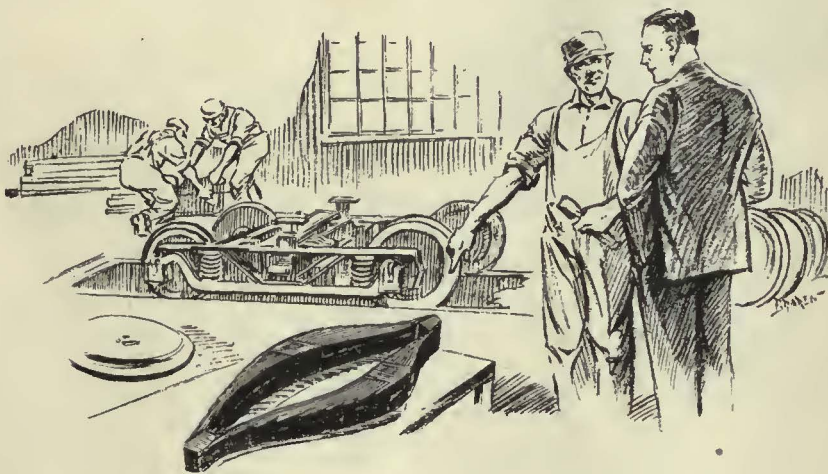
Such a sketch as this can be made up for each type of coil used by a railway and it is particularly applicable to the demonstration of coils, the terminals of which are located both on the same end, or one front and the other rear. Also for compound wound coils which have terminals both at the ends and at the sides, such a sketch makes it easy to show how a mistake in installing the coil may result in reversing one winding without reversing the other.

The principal method which has been used successfully so that a field coil will not be installed improperly is to mark the terminals and to have the holes for the screws which clamp the leads so located that they will indicate which is the top or bottom side of a coil. The practice of the General Electric Company is to mark the two terminals of a field, one *I* and the other *O*. This terminology means inside end and outside end, or, as some railway repairmen have shortened this, "In" and "Out." The Westinghouse Electric & Manufacturing Company uses the letters "F" and "R" to indicate "Front" and "Rear" respectively. If this marking is carefully maintained and the repairmen are made familiar with it trouble from swiveling coils around in their own plane should be reduced.

To prevent coils being turned bottom side up, probably the most effective method is to put screws in only on the top side, so that if the coil is installed bottom side up it will be quite difficult to reach the screws and so to tighten the leads. This requires, however, two types of terminals, and on some railway systems this is considered a particular disadvantage. However, terminals in general are small parts and the carrying of a few more in stock will be more than offset by the damage which will result from wrongly connected fields.

Dick Prescott Discusses a Spring Substitute

And Discovers Bad Practice



DICK PRESCOTT, assistant shop superintendent of the Consolidated Railway & Light Company, was interested immediately in the presence of the wood block under the center bearing of the truck he was inspecting. Joe, the workman in charge of the overhaul gang, looked up as Dick asked the reason for the wood block.

"They put them blocks in there to raise up the body so the brake pull rods don't drag on the motors," he replied.

"Well, are they in there when the cars are new?" asked Dick.

"No, the springs ain't sagged then."

"How much of that do we do?" continued Dick. "Are there blocks like that under most of the cars?"

"Sure, they've nearly all got blocks under the center bearings," Joe replied. "Some of 'em have two blocks when the springs get very bad. Sometimes they put some on top of the journal boxes too."

"While they are trying to get plenty of clearance that way, doesn't that boost the bodies up and make the steps too high?" Dick asked.

"Yeh, sometimes they get pretty high," replied Joe.

"That certainly looks like bad practice to me," continued Dick. "There must be something the matter with our springs."

"We tried getting 'em higher," volunteered Joe. "These full elliptics now are two inches higher than they used to be, but they sag right down and git too low."

"That's funny," commented Dick. "Did they lengthen the bolster links when they put in the higher spring?"

"No, we didn't need to make 'em longer. All we do is t' press down the spring and put the pin in the links."

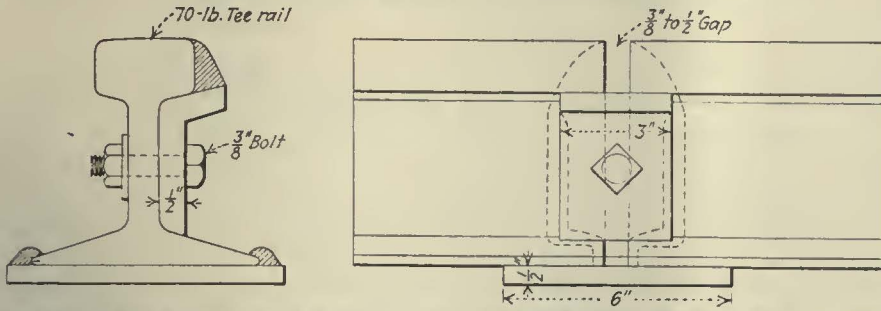
"Oh, I see," said Dick. "But that doesn't help the situation a bit. All you do is put a heavy initial load on the spring when you assemble the truck. So you get very little, if any, spring action for a light car body. Then when the load goes on you probably exceed the elastic limit of the spring and it begins to sag. As a result we get rough riding cars when they're light and then stick in these blocks to try and keep the bodies up off of the motors. Who specifies the design of our springs?"

"Why, the storeroom jest sends out samples," Joe replied.

"Oh, I see," exclaimed Dick. "That's where the trouble is. We don't know anything about the capacity of the springs we're putting into these trucks. Do we have any drawings of the various types we use?"

"I never seen none," replied Joe.

Rail Joints Welded with Small Plates



Rail Ends Are Separated and the Intervening Space Filled with Welding Metal in This Type of Joint Developed by the Bangor Hydro-Electric Company

GOOD results have been obtained by the Bangor Hydro-Electric Company, Bangor, Me., through the use of an electric welded joint in which small plates are employed to carry the welding metal. Rail ends are separated by a $\frac{3}{8}$ to $\frac{1}{2}$ -in. gap. A joint plate 3 in. long is held in position by a $\frac{3}{8}$ -in. bolt passing through this gap and secured on the far side by a washer and nut. Underneath is a base plate 6 in. long.

First the joint is lined up and crowned slightly. Then the base plate is caught by welding all four corners to the bases of the rails. The gap between rail ends is filled, starting at the base and welding up through the web, and at the same time welding through onto the cen-

ter of the side plate. This is continued until the joint has been welded well up under the head of rails. Then the base plate is welded by starting at the center and welding each way on both sides of the base. This is done with a single heavy layer. The next seams to be welded are those of the side plate. This is done with a single heavy layer as indicated by the dotted lines on the accompanying sketch. Then the gap between the rail heads is welded and the shelf formed by side plates is filled.

This type of joint was designed by the foreman of the welding crew. After three years of service no signs of pounding out or cupping have been noticed.

a Mogul socket. It is adapted for use with standard 1,000 to 1,500-watt type "C" Mazda lamps with the PS-52 bulb for regular floodlighting or the 1,000-watt type "C" Mazda lamps with the G-40 bulb for highly concentrated long-range work. The over-all height is 37 in., over-all width 34 in., weight 125 lb. The entire unit is mounted on a swivel trunnion, allowing for directing the beam of light in any direction and with provision for locking firmly in position.

Motor-Driven Grinding Machines

MOTOR-DRIVEN double-end grinding machines, buffing and polishing machines, with both open-type and incased-type spindle extensions, are being offered in a complete new line by the Hisey-Wolf Machine Company, Cincinnati, Ohio. The



Floor Stand Grinder with Two Grinding Wheels

driving motors are arranged for both alternating and direct-current service.

Some of the improved details which have been incorporated in this line of machines are high-grade oversize ball bearings mounted in end heads in close proximity to the wheels. Buffing and polishing machines with incased-type spindle extensions are equipped with four ball bearings. It is recommended that the bearings be lubricated with a good grade of oil, and after the bearing chamber or oil reservoir is once filled it should last for two or three months under ordinary service. Oil chambers are provided with flush or drain-out plugs to permit an occasional cleaning. Wheel guards are adjustable to the wear of the grinding wheel.

New Equipment Available

Floodlighting Projector for Long-Range Service

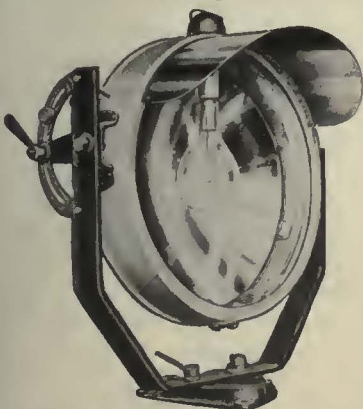
GOLDEN GLOW floodlighting projectors of 24-in. diameter have been placed on the market by the Electric Service Supplies Company, Philadelphia, Pa. The new projector is known as type FLA-2430 and is to meet service conditions such as imposed by the longer railway yards where space for tower

location is available only at either end of the area to be floodlighted. This new unit projects a long-range beam of high intensity.

These floodlighting projectors consist of a cast aluminum alloy case, approximately $\frac{3}{8}$ in. thick, equipped with a hinged rear door made of the same material and in which a 24-in. diameter "Golden Glow" or crystal mirror glass reflector is flexibly mounted.

The front of the lamp is regularly equipped with a molded convex lens made of special heat-resisting and annealed glass, approximately $\frac{1}{4}$ in. thick. The lens is also held in position by flexible retaining clamps, thus resulting in the practical elimination of breakage. The focusing device permits adjustment in both the vertical and horizontal planes. This focusing device is mounted at the top for use with PS-52 floodlighting lamps or at the bottom for use with G-40 lamps, where a highly concentrated beam is desired.

The focusing device is fitted with



New Projector Which Provides Both Vertical and Horizontal Adjustment

A Big Capacity Snow Loader

SNOW removal is an important and costly item of the winter's work of electric railways and a great deal of engineering knowledge has been applied to devising mechanical devices to lessen the time and labor required for hand shoveling. Snow-loading machines have been on the market for two or three years, but every season sees improvements and the development of new designs. A new type has been brought out this year by the George Haiss Manufacturing Company, New York, N. Y. The Haiss company's portable bucket

Reduce the "static" in your equipment and improve its reception, by careful tuning and adjusting.

the paddles to push any spillage back into the pile which is being loaded. The recent 7-in. snowfall in New York gave an opportunity for a thorough test of this machine. The local traction company had plowed and swept the snow from its tracks into windrows 2 ft. high and 7 or 8 ft. wide. The snow was fine and dry, not at all adhesive and, there-

New Features in Recording Instruments

FOUR new features have been incorporated in the General Electric Company's CR type round pattern recording instruments. The new pen is of greater capacity, with a glass body and metal stylus, and can be refilled without impeding the operation of the instrument. There is a new shipping device, operated by turning a knurled knob on the back. A new polarizing adjustment, by which the instrument calibration can be altered, can be locked in any desired position. There is also a new



loaders are said to have proved to be capable machines for digging and loading sand. It has been natural for that company to adapt the sand loader to snow loading, although this has involved the design of an entirely different style of elevating mechanism.

The new snow loader is a creeper-tread-mounted machine with a 37-hp. Waukesha motor and a heavy set of transmission gears and clutches, all housed in one case and running in oil. The snow elevator is a flight or scraper conveyor, with the high flights built as heavy as the buckets used for crushed stone. Quarter-inch steel plate is used with toothed reinforcing edges and side plates, which also brace the bottom of each flight unit. These flights are shaped to prevent dry snow from rolling back over their upper edges. The flights are bolted at each side to endless chain belts which carry them up the elevator at a speed of 140 ft. per minute. Each flight as it comes in contact with the bottom of the snow pile presents its toothed edge at the most effective angle for cutting effect.

Revolving paddles are used for feeding materials from the sides toward the center of the machine. In addition the snow loader has a clean-up scraper immediately behind

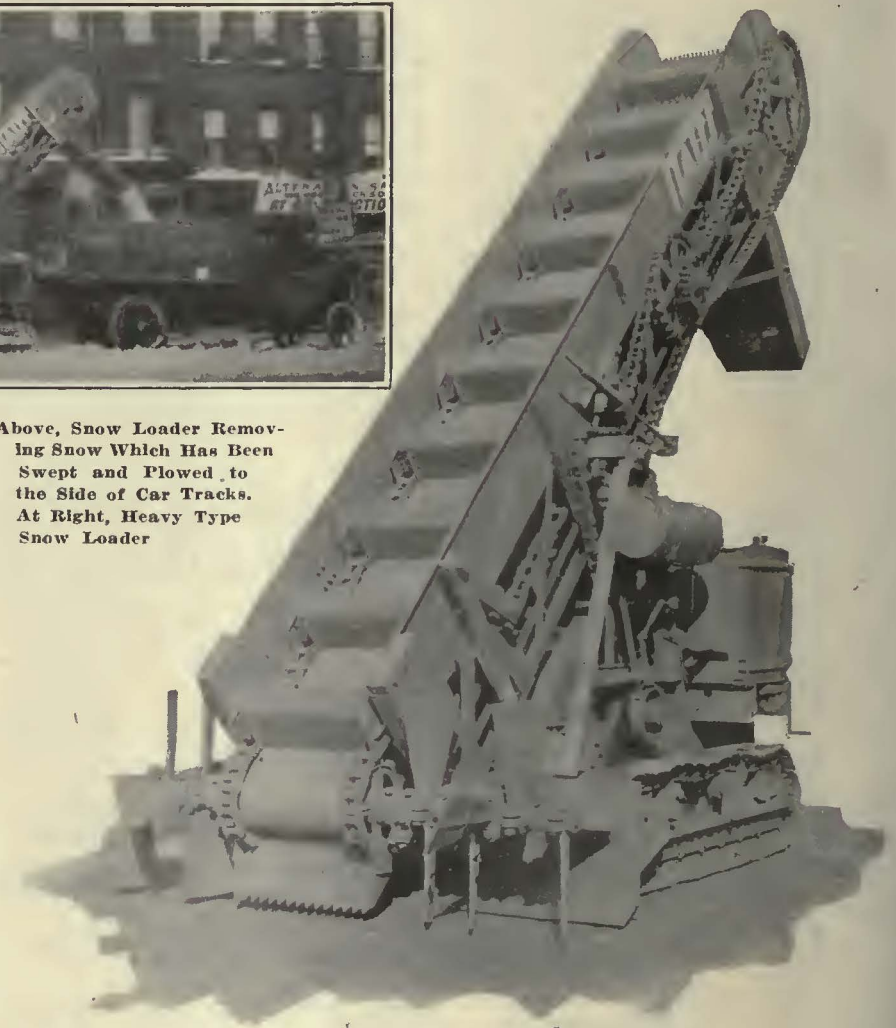
Above, Snow Loader Removing Snow Which Has Been Swept and Plowed to the Side of Car Tracks. At Right, Heavy Type Snow Loader

fore, most difficult to handle. A fleet of five trucks with high sides was gaged each to carry 8 yd. per trip.

With five trucks available the loader put up 100 loads in nine hours. No truck loads were timed to take longer than $1\frac{1}{2}$ minutes and a number were loaded in 60 seconds, or at a rate of nearly 10 yd. a minute. The loader was idle two-thirds of the time waiting for the trucks to dump and return. With ten trucks it would have been easy to put up 200 8-yd. loads in nine hours.

suspension link of indestructible character, which retains the calibration and sensitivity of the instrument.

The CR recording instruments, for either alternating or direct current, are available for switchboard mounting or as portable instruments. The ammeters are for 5 to 200 amp. and the voltmeters are supplied for any range from 0 to 750 volts. The charts, 8 in. in diameter, are driven by one-day or eight-day clocks or by Warren synchronous motors.



Association News & Discussions

Midwest Association Discusses Service Improvement

DURING a two-day session in Tulsa, Okla., on Jan. 6 and 7, a preliminary report of which was published in this paper last week, the Midwest Electric Railway Association devoted its attention to discussion of ideas for the improvement of service and the development of business. The experiences of representative properties which have made progress and won their way back toward a favorable financial showing were analyzed with a view toward their application on roads which are still in serious difficulty from the standpoint of traffic and revenue.

This kind of collective thinking developed a lively discussion of each of the papers and addresses on the program. The meeting was characterized by the presence on the program of representatives from properties that have won a substantial degree of success, and a decided note of optimism grew out of this first-hand testimony by men whose properties have already profited by the application of modern operating ideas and practices.

R. N. Graham, manager of the railway properties of the Pennsylvania-Ohio System, winner of the 1926 Coffin Award, was one of the headliners on the program. In a paper abstracted at length elsewhere in this issue, he marshaled together the principles on which the success of his property was built. He interpreted modernization to mean more than merely bringing the physical property up to date. This he held to be an important and essential part of an improvement program, but only the first part. He insisted that a railway property must go much further in order to win a substantial number of riders from those who have a choice between the use of private and public transportation. He interpreted modern transportation salesmanship to mean the acquirement of a true commercial outlook on the part of the entire operating organization from management to platform employees. He recommended the advantages of a special commercial department, in which the building of business and the training of transportation salesmen should be the primary responsibilities.

Supplementing Mr. Graham's paper was an address by Charles Gordon, editor *ELECTRIC RAILWAY JOURNAL*, presenting the equipment situation from the standpoint of the industry as a whole. Mr. Gordon's discussion was illustrated with lantern slides showing the experience of several properties which have made progress in modernizing their equipment. This was translated into an estimate of the economics

of the car situation in the entire industry, by a comparison of operating costs on groups of properties with and without modern cars. From these figures it was shown that the industry could buy approximately 12,000 new cars per year out of the excess operating costs attributable to the continued use of run-down and obsolete equipment.

MR. SAWYER DRIVES HOME MODERN IDEA

The climax to the meeting was reached in a straight-from-the-shoulder address by W. H. Sawyer, president American Electric Railway Association. Mr. Sawyer did not mince his

words. He introduced his remarks by pointing to the need for plain speaking in the industry. He cited the need for co-operation among transportation companies in the solution of their common problems and complimented the Midwest Association on the excellence of its program and the evidence of renewed interest and enthusiasm shown by the active discussion during the meeting. The opportunity thus afforded to railway men for the interchange of ideas and experiences he held to be the primary advantage of state and sectional associations. In such meetings time is available for a detailed discussion, which is obviously impracticable in a national meeting. While thus commending the purpose and activities of the sectional associations, he made a strong plea for co-operation on the part of all railway men in the work of the national association. "The American Association's policies are carried out by men who have been willing to give of their time and energy in the service of the industry," he said. Only with the co-operation of the industry itself, however, can the work of the national association be made really effective and helpful. He urged that all railway men take a part and an interest in the association's work, and make suggestions for improving its policies whenever such changes seem to be desirable. Mr. Sawyer explained further that association committees are selected with a view to picking men who will actively take part in the work. He pointed out that the results of this effort are not utilized by the industry as they should be and made a strong plea for greater utilization of the association's facilities by all member companies. An abstract of Mr. Sawyer's address is printed elsewhere in this issue.

Public relations, popularizing of electric railway service and advertising were handled in papers by Edward F. McKay, manager Oklahoma Utilities Association, and J. B. Donley, assistant commercial manager Pittsburgh Railways. Mr. Donley's paper will appear in abstract in a later issue. Mr. McKay took an unusual angle in presenting the much-discussed subject of public relations. Taking scripture as his proof of the fact that human nature has not changed in its essentials these many centuries, he explained that little new can be said on the subject of public relations. On this point particularly he held that actions speak louder than words. "Performance," he said, "rather than promises, proclaims public relations, and in a language that the public is certain to understand." To emphasize this further, the speaker said that public relations consists in being, not pretending to be, what we ought to be.

Modernization of the interurban railway was discussed by J. M. Bosenbury,

COMING MEETINGS

OF

Electric Railway and Allied Associations

Jan. 18—American Society of Safety Engineers, annual meeting, Cafe Boulevard, New York City, 6:30 p.m.

Jan. 19-20—Central Electric Traffic Association, Keenan Hotel, Fort Wayne, Ind.

Jan. 21-22—Central Electric Railway Accountants' Association, Fort Wayne, Ind.

Jan. 25—New York Electric Railway Association, winter meeting, Hotel Commodore, New York City.

Jan. 26-28—Association of Equipment Men—Southern Properties, Peabody Hotel, Memphis, Tenn.

Feb. 3-4—Central Electric Railway Association, winter meeting, Toledo, O., Commodore Perry Hotel.

Feb. 4—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

Feb. 7-10—American Institute of Electrical Engineers, annual convention, Engineering Societies Building, New York City.

Feb. 10—Central Electric Railway Master Mechanics' Association, Toledo, Ohio.

Feb. 13-19—Kentucky Association of Public Utilities, annual convention, Brown Hotel, Louisville, Ky.

April 26-29—Southwestern Public Service Association, convention, New Orleans, La.

Oct. 3-7, 1927—American Electric Railway Association, annual convention, Public Auditorium, Cleveland, Ohio.



Midwest Electric Railway Association Meets in Tulsa, Okla.

superintendent of motive power Illinois Traction System. The speaker described the methods used on his property for building up carload freight business, pick-up and delivery express and passenger revenue. In all of this work improved equipment and facilities played an important part in providing a character of service which could be successfully merchandised. Intensive selling effort, backed up with widespread advertising and the enthusiastic co-operation of every official and employee on the property, was responsible, according to Mr. Bosenbury, for the success achieved.

Passenger service was improved by the inauguration of the "Tangerine Flier" service with remodeled and repainted cars fitted with semi-parlor car interiors and operating on much faster schedules than had formerly been run. Freight traffic was built up by intensive solicitation of business, negotiation of interchange agreements with steam railroads, provision of more freight equipment and specially designed locomotives with increased capacity but arranged so as to negotiate the short-radius curves on the system and at industrial sidings. Additional substation capacity and belt lines around important cities permitted longer trains to be handled and thus decreased the cost and increased the efficiency of freight handling. Improved signals helped further to expedite movement of traffic. Prompt operating reports helped to check the performance of the entire organization from day to day. Special light-weight and attractive motor trucks enabled the company to undertake the development of pick-up and delivery business at standard express rates. Combined with all of this, co-operation between departments and team work brought about the desired increase in business. Committees were appointed during the progress of this campaign for more revenue, to study conditions and to assist by reports in the development of new operating and merchandising ideas.

New York Electric Railway Association's Mid-Year Meeting

MORNING and afternoon sessions will be held at the mid-year meeting of the New York Electric Railway Association at the Commodore Hotel, New York, on Tuesday, Jan. 25. In addition, the usual banquet will be held in the evening. The morning session will begin at 10 a.m. and the afternoon session at 2 p.m. There will be an intermission for luncheon.

Four papers are to be presented at these sessions, as follows:

"Modern Inventories and Purchasing Methods," by Samuel Porcher, assistant to the vice-president Pennsylvania Railroad."

"Accident Prevention," by H. K. Bennett, safety manager United Electric Railways, Providence, R. I.

"Improvements in Cars and Car Maintenance," by W. C. Bolt, superintendent rolling stock and shops Eastern Massachusetts Street Railway.

"The Accounts, the Auditor and the Operating and Executive Organization," by H. D. Chamberlain, auditor Delaware & Hudson Company.

It is expected that each of these papers will be followed by discussion.

The afternoon session will conclude with a series of moving pictures showing methods of the manufacture of steel wheels, axles, etc., to be presented by George A. Richardson of the Bethlehem Steel Company.

Those intending to attend the banquet in the evening are urged to make their reservations promptly. Tables will be arranged to accommodate eight or ten people. The price of the dinner will be \$7.50 per plate, and check should be inclosed with any request for reservations to cover the number of places desired. Request for reservations may be made to the secretary, W. F. Stanton, 267 State Street, Rochester, N. Y., or to any member of the dinner committee, as follows: A. L. Hodges, chairman, Brooklyn City Railroad; H. M. Norris, Interborough Rapid Transit Company; Joseph R. Ellicott, Westinghouse Traction Brake Company; T. R. Langan, Westinghouse Electric & Manufacturing Company; John J. Jordan, Brooklyn-Manhattan Transit Corporation; Ross F. Hayes, 30 Church Street, New York, and W. B. Wheeler, Third Avenue Railway.

Birney Club Elects

ONE-MAN operation, safety devices and modernized cars were the topics considered at the annual meeting of the Birney Club of St. Louis, held at the Missouri Athletic Club on the evening of Jan. 3. E. B. Meissner, president St. Louis Car Company, presided. R. S. Frehse, sales engineer National Pneumatic Company, opened the program with a paper entitled "Circulation of Passenger Load with One-man Operation."

New officers were elected for the coming year, as follows: President, F. A. Richards, vice-president American Car Company; vice-president, E. A. Roehry, general manager St. Louis Electric Terminal Railway; secretary, B. W. Stemmerich, division manager Westinghouse Electric & Manufactur-

ing Company; treasurer, O. E. Turner, special representative railway department, General Electric Company.

American Association News

Making the Railway Popular

NEW traffic can be created for the electric railways and a large measure of public good will can be secured by intelligent energetic efforts, according to the speakers at a meeting of the Metropolitan Section, American Electric Railway Association, held Jan. 7 at the Engineering Societies Building, New York City. "Popularizing Service" was the subject of the meeting, which was in charge of J. T. Hamilton, chairman of the sponsor group committee for the evening.

Traffic and transportation conditions in Europe and in the United States were compared by Lucius S. Storrs, managing director American Electric Railway Association, the first speaker. New cars are being designed in London, Mr. Storrs said, with special attention being paid to popularizing the service. Paris also is experimenting with new cars. Operation of buses by the railway management in districts where no rail facilities exist has done much to win public favor.

Co-ordination of transportation facilities rather than competition is the endeavor throughout Europe, Mr. Storrs said. He cited Berlin as being probably the best example of co-ordinated service. Transportation authorities in that city have adopted as a hypothesis the existence of rail routes without rolling stock and have attempted to visualize the type of car which should be built under such circumstances. Mr. Storrs thought it would be helpful to attempt a similar visualization in American cities by assuming the existence of no transportation facilities whatever and theorizing as to the kind of system which should be created.

L. S. Miller, president New York, Westchester & Boston Railroad, said that "popularizing" is a difficult word for a slogan. He mentioned three characteristics of the American public which should be borne in mind by railway men. These are intelligence, fairness and an unwillingness to have anything "put over." In the past public relations have been conducted too often by lawyers and not enough by the operating men. This situation,

however, is gradually changing for the better. "Give service before preaching it," he said. A smile goes a long way to popularize the service. Personal contact with the patrons is extremely valuable. While this existed in former days, it was lost to a large extent after the consolidation of smaller companies into big systems. General policies dictated by the head office of a large system may not always serve local conditions.

W. E. Thompson, vice-president Third Avenue Railway, New York City, spoke of the efforts being made by his company to secure public good will. Radio broadcasting has been effective, he said. C. E. Morgan, vice-president and general manager Brooklyn City Railroad, emphasized a point brought out at a previous meeting of the Metropolitan Section, that the public is interested only in the quality of the service furnished, not in the difficulties encountered by the company in providing that service. He said that a railway passenger is just like a customer in a store, that he favors goods offered in an attractive-looking package and that this thought should be borne in mind in connection with the rolling stock. C. J. Norstrand, general manager Jamaica Central Railways, told of the efforts being made by his company to build up traffic.

Effective methods of dealing with the public were outlined by Leonard Ormerod, advertising manager Pennsylvania Bell Telephone Company. He said that courtesy on the part of the railway employees often demands a considerable effort. At the end of a long, tiresome day it is not easy to greet the patron with a smile. Only by sustained effort can this kind of friendly relationship be maintained. Personal relations between the employees and the public should be augmented by proper advertising, he said. In this connection he stressed the importance of having advertising copy properly represent the company. Cheap advertising is a poor economy, in his opinion. The public is discriminating and judges the advertiser by the quality of his advertising matter.

Traffic and Safety

CONDITIONS of competition for the Anthony N. Brady Memorial Medal formed the principal topic of discussion at a meeting of the committee on traffic and safety held at association headquarters, New York City, Jan. 13. It was the consensus of opinion that it would be impracticable for electric railways at present to comply with the original conditions laid down for this award. The suggestion was made that the award be based on answers to certain simple questions propounded by the committee following the general lines of the Charles A. Coffin Award, and on accident records similar to those reported to the association. It was thought that all transportation facilities operated by a railway or any affiliated company should be included. Recommendation was made that the silver and bronze replicas provided for individuals be dispensed with. After hearing this expression of views of the committee

on traffic and safety, T. Fitzgerald, chairman of the committee to formulate conditions, prepared an outline which received the indorsement of the former committee.

A sub-committee was appointed to study the classification of accidents being made by the electric railway section of the National Safety Council. Study will be made during the coming year of recent traffic investigations in Chicago, Baltimore, Detroit, and elsewhere. Copies of the article in *ELECTRIC RAILWAY JOURNAL* for Jan. 8 outlining the Chicago traffic study are to be distributed to all members of the committee, along with an index of similar studies abstracted in the *JOURNAL*.

Members present were: Samuel Riddle, sponsor; C. S. Evanson, chairman; F. L. Butler, H. K. Bennett, S. W. Baldwin, A. J. Fink, R. W. Emerson, J. A. Greig, A. G. Jack, J. A. Miller, E. J. Paige, E. S. Rider and J. A. Stoll.

Way and Structures

MEMBERS of the general committee on way and structures and members of various special way and structures committees met at association headquarters, New York City, Dec. 9 and 10, and outlined a program of work for the coming year. Those present included C. A. Alden, E. B. Entwistle, W. G. Hulburt, H. F. Merker, E. M. T. Ryder, A. T. Spencer, C. A. Smith, H. M. Steward, W. W. Wysor and H. H. George, chairman of the general committee. Special committee members present were W. R. Dunham, Jr., C. F. Gailor and E. P. Roundey.

After outlining briefly the work done last year in connection with review of the Manual, Mr. Dunham recommended that the A.E.R.E.A. specifications for countersunk rivets in the bottom of plates under frogs be changed to conform to those of the A.R.E.A. This was approved.

The desirability of including in all cases drawings of other associations referred to in A.E.R.E.A. specifications was considered. It was thought that in the case of specifications in general use by the American Electric Railway Association the specifications and drawings should be printed in full in the Manual, but that consideration should be given to special cases where the cost would be large and the use infrequent. If complete details are omitted in such cases reference should be made in the Manual to the publications of other associations where the data can be found.

Splitting the Manual in two or more sections at the time of the next reprinting was discussed. While there was some difference in opinion as to the number of subdivisions which should be made, the committee was unanimous that it should be divided. The committee recommended, therefore, that the next Manual be divided into two or more volumes on departmental lines.

The special committee on switch tongues and hard centers recommended tolerances in the depth of flangeway $\frac{1}{8}$ in. under and $\frac{1}{2}$ in. over when flange bearing and $\frac{1}{8}$ in. under and $\frac{1}{4}$ in. over when non-flange bearing. This was approved. Mr. Ryder reported that the special committee had voted to change

the specifications concerning depth of groove from " $\frac{1}{8}$ in. less than the depth of the wheel flange" to read " $\frac{1}{8}$ in. less than the depth of the wheel flange except that the minimum depth of the flangeway shall be $\frac{1}{8}$ in." This committee also recommended the inclusion of a clause to the effect that "when so specified continuous flange bearing shall be provided through crossings and in involved special trackwork except on the inner rail of curves." These recommendations were approved. Blueprints of the standard switch tongue design on which this committee has been working were submitted for inspection.

It was decided to recommend to the executive committee that the special committees on switch tongues and hard centers and on special trackwork be combined. Mr. Roundey reported that the special committee on special trackwork had voted to recommend for approval and adoption as standard by the A.E.R.E.A. the A.R.E.A. drawings for 7-in. and 9-in. solid manganese crossings, steam railroad over electric railway. Discussion of these plans brought out the fact that the only criticism was due to the feeling that there should be clearance on the web between manganese steel and rolled rail so as to insure a tight fishing fit. It was decided to refer the plans back to the A.R.E.A. with the request that it agree to make this revision.

Work for the special committees on rails and on track ballast and drainage was discussed briefly. Mr. Gailor reported that the special committee on arc welding had the necessary data in shape to prepare the preliminary draft of specifications for welding wire.

In connection with the work of the special committee on pavement, it is suggested that investigation be made to discover why different railways used certain types of pavement, the results being obtained, etc.

For the special committee on rail corrugation, Mr. Wysor reported that particular attention will be given this year to vibration tests. Some chemical tests have been arranged for and measurements of corrugation in the field will continue.

Mr. Spencer presented a brief progress report of the committee studying alloy steels other than manganese for special trackwork. An attempt will be made to secure additional data on this subject. Brief reports were submitted by the special committees on motor bus garage design, carhouse and shop construction and wiring and joint railway and bus terminals. Personnel for the special committees on light section rail and on track gage has not yet been completed and these committees had nothing to report.

Stores Accounting

WORK of the committee on stores accounting was outlined at a meeting held in New York Jan. 10. It was decided to concentrate on two subjects, namely, the accounting and handling of gasoline, oil and grease used in bus operation and the accounting and handling of special materials used for construction. Members present were R. A. Weston, chairman; W. S. Stackpole and A. E. Wilkin.

The News of the Industry

Mr. Insull Urges Need for Community Interests

In an address delivered before the annual meeting of the St. Louis Convention and Publicity Bureau on Jan. 12 Samuel Insull, Chicago, made a plea for greater participation by the leaders of industry and business in the solution of the difficult transportation problem as well as in such community matters as recreation and education. Controversies sometimes arise, he said, because such matters are left exclusively in the hands of those people who have a direct and selfish interest at stake.

In speaking on the subject of civic leadership development and responsibility, Mr. Insull cited the need for greater participation by responsible business men in the development and execution of forward-looking civic projects. Under the existing political methods he considered it the exception rather than the rule for a public official to make party or personal interest secondary to that of the general welfare. Frequent changes in administration prevent the execution of a co-ordinated program of major civic improvements. He considered that this was an inherent characteristic of the existing political structure.

Mr. Insull made it clear that he had no criticism to offer of our form of local or state government and considered it the best so far developed. His suggestion, however, was that the business men of a community represent the only element which is in position to take an active part in the formulation of consistent community policies and plans.

The experience of Chicago in the struggle to develop a transportation program was cited as illustrating the need on the part of leaders of business for participation and co-operation. As a result of the transportation controversy there he pointed out that the money invested for the improvement and expansion of this extremely important community service during the last ten years has lagged far behind that made by other utilities.

More Moves in Buffalo Cases

Justice Clinton T. Horton, in Supreme Court at Buffalo, has issued a temporary injunction restraining the city of Buffalo from revoking a number of franchises held by the International Railway. The injunction was issued upon application of counsel for the railway. Most of the lines of the International Railway affected by the threat of the city to revoke franchises on 18 miles of track are operating under terms of consent granted to the old Buffalo Crosstown Railway, merged with the International Railway. The city contends that the company has failed to comply with the terms of the

franchise which it assumed at the time it acquired the franchises and obligations of the Crosstown Railway.

Federal Judge John R. Hazel in Buffalo granted the application of the city of Buffalo for postponement until

Jan. 20 of the hearing of the railway's equity suit in the United States Court for the Western District of New York to charge a 10-cent fare in Buffalo and increase its rates on all parts of its interurban lines.

No More Service in Newark, Ohio

Hasty Action by Council in Granting Competitive Rights Makes It Appear Unlikely that City, Now Regretful of Its Action, Will Ever See Co-ordinated Service Resumed

THERE appears to be very little prospect that co-ordinated railway and bus service will be restored at Newark, Ohio, by the Southern Ohio Public Service Company or that trolley operation there will ever be resumed by the company. Not since Aug. 10 last, when such service was withdrawn, have conditions changed so as to make the resumption appear desirable from the point of view of the company, although a large and important element of the community wishes that conditions were different from what they really are at present. These conditions are far from satisfactory. That is generally admitted, but there appears to be no present avenue of escape from them.

It did appear at first as though there was a possibility of re-establishing the railway service, as the citizens and the press desired the company to do so. Unfortunately, the City Council had awarded bus operators the right to run competitive services on the same streets the railway was using. The Chamber of Commerce and influential people agreed to do everything possible to induce the railway to re-establish service, but the City Council, having acted on the competitive franchise, was unable to rescind that grant. It would simply have been futile for the utility to re-establish operations either at the same or a higher fare as it would have had to meet parallel operation competitive with its service. Newark could hardly support one transportation service, much less two. The company therefore finally explained this matter to the people and definitely withdrew from the local transportation field. The assistance proffered by those willing and anxious to make almost any concession to have the company continue service had come too late to be of any real assistance.

Every one of these situations has its background. For years railway operation in Newark has failed to pay expenses. Despite this, service has been maintained through two receiverships and after great effort and absorption of heavy losses a new franchise was granted by the city of Newark effective on Nov. 22, 1924. This ordinance relieved the company of certain paying, extended the franchise life for 25 years

and allowed the company to charge a fare necessary to pay for the service. It fixed the fare for the first year. The franchise also carried a clause allowing the company to withdraw any portion or all of its rail or bus service if any competitive lines should be granted a permit to operate.

The granting of this franchise was one of the elements which enabled the company to reorganize and emerge from the second receivership. This it did as the Southern Ohio Public Service Company, which operates the light, power and railway in Zanesville, the railway in Newark, and the interurban line connecting Zanesville, Newark and Columbus.

As a part of the reorganization plans the company acquired control of all bus operations in Newark and has been giving the city of Newark a co-ordinated service of rail and bus even at a substantial loss after operating expenses for the combined operation. In accordance with the terms of the franchise, the company asked the Council for an increase in fare to 10 cents cash and four tickets for 25 cents. The Council took no action. After a period of three months the company further, in accordance with its franchise, announced that the new fare would become effective as of March 5, 1926, whereupon an injunction against the increase in fare was obtained, and before final disposition of the injunction proceedings the court declared a vacation.

Not satisfied with this, the Council, contrary to the spirit of the past two years negotiations, granted a competing franchise for an independent to give service paralleling all the company's rail and bus lines at a 10-cent cash fare and tickets at a reduced rate. Sixty days after this fare permit eight buses appeared on the street.

In view of the lack of faith shown by the Newark City Council and the extensive losses sustained by the company during the past several years the company decided to close down its entire local bus and rail service. On Aug. 9 officers of the company met with the men and advised them of its intention. The company, however, allowed its men, thus thrown out of work, ten days wages. On Tuesday night the

company ran a full-page advertisement in the local papers outlining the series of events that led to its action and announcing the fact that the service would be discontinued as of that day.

The company's rate was maintained through the injunction proceedings at a 6-cent cash fare with nine tickets for 50 cents.

The franchise granted by Newark is similar to that passed by the city of

Zanesville at a prior date. The greater faith of Zanesville has resulted in a high-grade co-ordinated bus and rail service in that city at the same fare asked in Newark. Zanesville is pleased with the service and the relations between the public, the Council and the company are excellent.

The entire situation in Newark was reviewed at length in an article in the ELECTRIC RAILWAY JOURNAL for Aug. 14, 1926, page 268.

Multiplicity of Moves in Chicago

Day-to-Day Agreement Likely—Two New Ordinances Before Council, One of Which Contemplates Unified System with Gross Investment of \$1,003,626,000 by 1950—Hearing on Jan. 17 on Latest Project

WITH two freshly received ordinances before it for final consideration—one from the present surface and elevated lines companies, the other embodying the revised Lisman plan for a 20-year grant—the local transportation committee of the Chicago City Council, entering the most critical period of its traction negotiations, received on Jan. 11 a third and still more pretentious plan for the solution of Chicago's local transportation problems. Whether the plan will permanently supersede the companies' unified ordinance now pending or be considered as an independent proposal was not made known.

The new plan was outlined in a letter received by Chairman Joseph B. McDonough and temporarily, at least, pre-empted the others in the Aldermen's attention. It was prepared by Henry A. Blair, chairman of the Chicago Surface Lines and co-receiver of the Chicago Railways, and contemplates the improvement and expansion of surface, elevated and bus lines, with a present value of \$273,000,000, into one great unified system representing an aggregate investment of more than \$1,000,000,000 by 1950, with extensive subway construction and elevated track-age extensions.

Within the intervening 23-year period Mr. Blair proposes amortization of \$134,237,000 of the capital account, with municipal ownership at the end of the period at a cost to the city of \$869,000,000. The purchase of this vast system could be brought about, the letter stated, by turning over to the unified company \$429,037,000, which will include the old capital account figure of \$237,000,000. The figures disclose that in this 23-year period the company would add \$156,037,000 to the capital account, while the city would provide \$440,352,000 for subway construction by special assessment or other methods. The company would provide funds for all equipment and other properties incidental to operation.

Mr. Blair defended the extraordinarily heavy investment by saying that the investment for rapid transit in 1950 will be only \$145 per capita, the same as required by Detroit for its initial rapid transit system. The \$145 in Chicago by 1950 is compared with \$260 in New York by 1931, he asserted. The rate of return on this investment

is placed at 7½ per cent and the amortization at from 1 to 2 per cent, starting in 1933 at the lower figure.

As revealed to the Aldermen, the Blair plan, which was prepared independently of the new terminable unified ordinance of the surface and elevated lines, envisions a complete revolution of transit methods for millions of riders yearly. During 1926 the Surface Lines carried about 870,000,000 revenue riders, or 75 per cent of the traffic; the elevated lines some 224,500,000, or 20 per cent, and the Chicago Motor Coach Company about 60,000,000, or 5 per cent.

Under the latest plan, the surface lines and bus routes will be considered "slow transportation," while the elevated and subway lines will constitute rapid transit facilities. By 1935, it is predicted, 955,000,000 riders will use the surface cars and buses for all or most of their ride and 390,000,000 will use the rapid transit lines. In 1940 the "slow" lines will carry 1,073,000,000 passengers and the "fast" lines about 475,000,000. And by 1950, when the city has a population of 5,000,000, Mr. Blair estimated that the "slow" riders will number 1,200,000,000 and the rapid transit riders some 800,000,000.

Operation of the proposed consolidated system would be on a service-at-cost basis, discontinuing the present policy of paying 55 per cent of the net traction earnings to the city, but with

no fare increase, it was pointed out. The ultimate, but not immediate, aim of the plan is to adopt free transfers among the various units in the consolidated system. All of these things and much more in the way of greater convenience and speed, Mr. Blair believes, can be accomplished on an average fare of 7.35 cents, with a maximum fare of 7.71 cents six years hence and a minimum of 7.06 cents at the end of 1950.

In Mr. Blair's opinion, the adoption of this plan will give Chicago the most comprehensive local transportation system in the world.

The first period of construction under this plan would be between 1928 and 1935. In that period it is proposed to build 13.7 miles of subway and 305 miles of elevated structure. Some time before 1931 40 miles of surface lines and 60 miles of bus line extensions would be made and 1,000 new elevated cars and 600 surface cars purchased. During this time three sides of the present elevated loop would be torn down and replaced with subways and all surface lines tracks removed from the streets of the Loop district. A mezzanine floor level would also be built immediately over the tubes for pedestrians. For these improvements the company would advance \$113,902,000 and the city \$172,920,000.

During the second period of construction—from 1926 to 1940—for which the company would put up \$62,520,000 and the city \$110,034,000, Mr. Blair proposes to build approximately 10 miles of subways, 21.5 miles of elevated lines and such surface and bus line extensions as will be considered necessary to keep abreast of the city's growth. Between 1940 and 1950, the third period of expansion, 64.5 miles of elevated and subway line are to be added. The company would bear \$113,852,000 and the city \$157,398,000 of this cost.

Like the other unified surface and elevated line plan which was presented to the committee the same day, in the form of an ordinance drawn by city and company attorneys, the Blair plan cannot be made effective without enabling legislation.

Mr. Blair explained to the Councilmen that "these proposals are submitted by only one of the interested parties," but said that other interests "have agreed to co-operate in efforts to secure unification of the properties and undoubtedly this plan provides a basis for negotiations."

Following the reading of the Blair proposal, the Aldermen returned to the consideration of the ordinance worked out by city and elevated and surface lines attorneys and of the ordinance submitted for a second time by the F. J. Lisman interests of New York. The companies' ordinance, which after nearly three months of preparation was made public this week for the first time, provides for the consolidation of surface, elevated and bus lines into a single new corporation with unified service. It contemplates large extensions of the "L" lines, the building of subways, the operation of feeder bus lines and the expansion of the surface lines system.

Day-to-Day Agreement Likely in Chicago

THE crisis which appears to impend with the expiration of the Chicago Surface Lines' franchises on Feb. 1 may be temporarily averted by a day-to-day franchise extension approved on Jan. 14 by the local transportation committee and the companies. This measure now awaits only the approval of the City Council and the federal court. It includes all the requirements of the existing ordinances, is not to exceed six months and is terminable by either party on thirty days' notice. Meanwhile Mr. Blair's \$1,000,000,000 project is scheduled for hearing on Jan. 17.

It is claimed for the proposal made by the companies that it also is a service-at-cost program and no limit is named for the amount of investment needed. The franchise would be held during the good behavior of the proposed consolidated system and regulation of the company would be vested in a local commission. It is, however, subject to enabling legislation which will give the city power to issue a terminable permit.

The so-called Lisman plan, as presented to the Council on the same day, is a rewritten draft of the proposal made to the city several months ago. It proposes to operate the surface cars on a 20-year franchise under present legal limitations, maintain a 7-cent fare, supply \$100,000,000 of new capital in 20 years and \$50,000,000 for an additional ten years, amortize the entire investment in 30 years and turn the lines over to the city clear of indebtedness. It also provides for compulsory unification of the various properties and for the construction of subways out of the city's traction fund and leasing to the operating company.

The Lisman proposition was subsequently taken up, but detailed consideration of its various parts was deferred.

A fourth plan for settlement of the local traction problem—the proposal of the Chicago Motor Coach Company to substitute buses for street cars in city-wide service—has not yet reached the stage for the drafting of an ordinance. The matter has been in the hands of a sub-committee but the company has asked for more time to submit a detailed franchise plan.

Terms of Detroit Bargain Found Burdensome

The financial agreement entered into by the city of Detroit, Mich., with the Detroit United Railway in 1922 when the city took over the local lines of the railway is imposing a burden upon the system so onerous that some other method must be found to permit the Department of Street Railways to give proper service. Announcement to this effect was made Jan. 6, when John J. Barlum, member of the Street Railway Commission, suggested that a new financial policy be adopted.

Commissioner Barlum, Del A. Smith, acting general manager of the D.S.R., and William M. Hauser, auditor, are of the opinion that refinancing should be brought about in the form of the issuance of 25 or 30-year bonds to replace the mortgage bonds in favor of the Detroit United Railway, which become due in 1931. These mortgage bonds are payable semi-annually in sums of \$500,000, with a final payment of several millions due in four years.

Commissioner Barlum suggested that either new bonds be issued, or the fare increased 1 cent. This latter course would probably increase the revenues of the system \$3,000,000 annually. He is reported to have said:

We are suffering from lack of working capital, and there are only two methods by which we can increase working funds. The first would be an increase in fare and the second plan would refinance the bonded debt of \$14,000,000. This latter course would save the system \$210,000 in interest and also release money paid into the sinking fund to be used as working capital.

Mayor Smith is opposed to any project that would involve an increase in fare.

Under the agreement of 1922, the city paid \$2,777,000 to the D.U.R. on the purchase contract for the city lines, which involved \$19,800,000. The remainder was to be paid in semi-annual installments of \$500,000. The balance is due in 1931.

Rapid Transit Enabling Act for St. Louis

The rapid transit committee of the Board of Aldermen of St. Louis, Mo., has approved the draft of an enabling act to permit the city of St. Louis, Mo., to build a rapid transit system, including subways and elevated tracks, by bond issues and to assess benefits against property served by the new facilities. The measure must be submitted to the Missouri General Assembly for passage.

One-Man Car Accident at Superior

Six persons were reported killed and seventeen injured, three of them probably fatally, when a one-man car running on the Billings Park line of the Duluth-Superior Street Railway downtown bound became stalled on the Great Northern Railroad crossing at 21st Street, Superior, Wis., and was struck by the oncoming "Gopher Limited." Reports of eyewitnesses disclose that the car had stopped as usual at the crossing and then started over the railroad tracks. The record of subsequent events appears to be obscured, but the car was trapped on the railroad tracks when the crossing gates knocked the trolley pole on the car off the wire, cutting off the current. This made it impossible for the car to clear the crossing in time to avoid the crash. The towerman, in charge of the gates at this crossing, testified that he tried to stop the car by putting down the gates, but that the motorman continued ahead until the center of the car was directly in the path of the oncoming train.

The Car's the Thing in Richmond

The Virginia Electric & Power Company is operating on the various lines of its Richmond division two white cars as a part of its present program for merchandising electric railway and bus service. The cars are being run on the different routes for three or four days at a time. Appropriate slogans, in bold but attractive black lettering, are painted on the sides of the cars and in the space on either side on the interior usually given over to advertising. Some of the slogans painted on the outsides of the cars are: "When you ride a street car or bus, you save the difference," "No parking worry," "More economical," "Safest mode of travel," "We appreciate your service," "Come on, folks, ride with us and 'Save the Difference,' Hop on." On the inside, just over the heads of the passengers, the entire length of the cars, reads:

The present-day electric railway system was first operated successfully in Richmond. Today it saves money for two-thirds of the population of Richmond every day. Forty million people in this country depend on street car and bus service daily. Holidays and workdays, rain or shine, hot or cold, your transportation service is always on the job.

The advent of the white cars was heralded by the placing of cards on other street cars bearing the caption: "Look out for the white cars." This was followed by another, reading, "Have you seen the white cars?"

Other cards being displayed in and on the general run of cars read as follows:

Your neighbors have no parking troubles. They ride in street cars and buses and save the difference not only today, but every day. Why don't you?

Get acquainted with the man who lives next door and the one who lives on the next block. They're both on this street car.

Shop by street car or bus. All important stores are conveniently located along our lines. No parking worry and you save the difference.

The cops don't tag your street car or bus while you shop. That's why street car and bus shoppers can keep their minds on their shopping.

The program for merchandising electric railway and bus service is being handled by A. H. Herrmann, of the public relations department.



The White Car Is an Important Factor in Merchandising Railway and Bus Service in Richmond

Illinois Employees Seek Increased Wage

Trainmen of the Illinois Traction System, operating from St. Louis, Springfield, Peoria, Decatur, Champaign and Danville, Ill., whose wage agreements expired on Dec. 1, recently asked a 10-cent increase over the present scale of 55 to 70 cents an hour, and having failed to reach an agreement will submit their claim to arbitration. The personnel of the arbitration board has not been decided and pending settlement of the questions involved the system is operating at the old scale, with the new contracts to be retroactive to Dec. 1, 1926. The traction company is said to have advanced a proposal for reduction in wages. Brakemen receive 55 cents, passenger motormen and conductors 67½ cents and freight conductors and motormen 70 cents.

Would Increase Powers of Maryland Commission

An effort will be made to have the Maryland General Assembly, now in session at Annapolis, enact a law which would give the Public Service Commission of the state the authority to suspend proposed rates until the commission can determine whether these rates are reasonable. Under the present law a public utility can change its rates by giving a 30-day notice to the commission. This gives only a short time for the commission to investigate before the change goes into effect.

Several other bills, all backed by the state administration, and dealing with the Maryland Public Service Commission law, have been introduced. They include a measure to require the consent of the commission to abandon franchises acquired and exercised before as well as after passage of the Public Service Commission law; a measure to require the commission's consent for extensions by utilities under franchises which have been exercised before the passage of the law; a measure to empower the commission to fix minimum as well as maximum rates; a measure to authorize joint investigations, hearings and orders in conjunction with commissions of other states or the federal government in cases of interstate utilities.

Parkway Plan in St. Louis Abandoned

The plan for widening Olive Street, St. Louis, Mo., with a parkway set aside for the use of street cars has been abandoned by the aldermanic committee on streets, sewers and wharves. The committee voted unanimously to file the bill presented by the Board of Public Service providing for paving the street with a 23-foot neutral strip for street cars. Had the parkway plan gone through the United Railways intended to put into effect a system of stopping the Olive Street cars only every three blocks between Grand Boulevard and Twelfth Boulevard. The parkway plan had been bitterly fought by property owners along the street. The various steps in promulgating this plan have been referred to from time to

time in these pages. President E. R. Kinsey of the Board of Public Service has had new bills prepared providing for the paving of the street from curb to curb.

Virginia Employees Receive Higher Wage

Made possible by the granting by the State Corporation Commission of increased fares for the Norfolk and Petersburg divisions of the Virginia Electric & Power Company, a straight increase in the wages of all trainmen, including motormen, bus drivers and platform men, amounting to 6½ per cent of the present wage scale, was announced recently by Vice-President William E. Wood. The recent adjustment of transportation affairs in Richmond and Portsmouth also played a part in the determination of the company to play Santa Claus to its more than 1,000 employees in the four cities. The increase was effective on Jan. 1, the date set for the starting of the new fare schedules, and will total more than \$100,000 annually. The employees receiving the higher wage will get approximately \$100 more a year in 1927 than in 1926. Employees in the divisions affected are about evenly divided in number between Richmond and Petersburg as a unit and Norfolk and Portsmouth as an entity, it was said. The Richmond-Petersburg interurban and the terminal men also will receive the wage increase.

The latest wage increase is the second since the Virginia Electric & Power Company was taken over by Stone & Webster, Inc., in July, 1925. The last raise was made when the company obtained the right to charge a 7-cent fare in Richmond and became effective on the date of that increase, Sept. 1, 1925.

The new increase, Mr. Wood said, will consume a considerable amount of the additional revenue to accrue as a result of the Norfolk and Petersburg fare increases just granted.

Pittsburgh Paper Praises Men's Effort

THE wage increase that has been awarded the conductors and motormen of the Pittsburgh Railways constitutes recognition of the co-operation of the "platform men" with the management that has been a factor of magnitude in the rehabilitation of the service and the creation of public good will on which the success of the business seems now to be solidly founded. This recognition is thoroughly deserved. It is not too much to say that the courteous attention which conductors and motormen give to the public they serve has done more than anything else to create the popular confidence and trust in the Pittsburgh Railways that is a delightful contrast to the ill-will that prevailed only a few years ago. These men have earned their "raise," will be the common verdict. — *Pittsburgh Gazette Times*.

New York Commission Not Bound by Franchises

Franchise agreements between municipalities and electric railways with limited fare provisions may be disregarded by the Public Service Commission in fixing fares. The Appellate Division, third department, has so decided on an appeal from an order of the commission by the United Traction Company, Albany, N. Y.

The decision was unanimous. In that respect it blocks an appeal to the Court of Appeals unless special exception is given by the Appellate Division and throws the fare controversy involving the company and the cities of Albany, Rensselaer, Troy and others served by the company's system back where it was before proceedings were started for a 10-cent fare last February.

The finding of the court was that the Miller law, passed in 1921, which gave the commission power to disregard local fare franchises, permanently invalidated the agreements. The law was repealed in 1923, but the court held this did not restore the agreements to force.

Counsel for the company declared repeal of the Miller law did not affect the validity of the ruling of the commission in 1922 within the scope of its authority fixing a 7-cent rate.

Clever Holiday Gifts at Levis

In accord with the spirit of Christmas, the Levis Tramways, Levis, Que., made two kinds of gifts to its patrons combining convenience and ride salesmanship.

During the period Dec. 24-Jan. 10 purchasers of the weekly pass were presented with a leather pass case, an unusual feature of which is the sealing in of the owner's name and address to assist recovery of a lost case and its contents. The pass case was delivered free during the holiday season, when there is a tendency for sales to fall off, but even after the holidays the pass case will be available at cost price. Incidentally, it is worth mention that the December, 1926, revenue of the Levis Tramways constituted a record.

The second gift is one that was invented by H. E. Weyman, general manager, to meet a real need. Mr. Weyman found that many a parent was averse to having the children ride to and from school because younger children are especially prone to lose their tickets, or, if they have a purse, to lose the purse too. He therefore originated a ticket wrist purse for presentation to anyone who bought \$1 worth of school tickets or \$1.80 of adult tickets during the period mentioned. Thereafter, these purses will be available to patrons at cost. Railways interested in this helpful way of selling rides may secure further particulars by writing to Mr. Weyman.

A pleasing feature of these gifts was a paper slip in French, which, translated, read substantially as follows:

JUST A BRIEF WORD

The little things that one gives; the little actions that one does; the little things that provoke a smile or a jest—all of these are just so much to the good in making life worth while.

Ohio Committee Issues Informative Pamphlets

Seventy-five thousand students of Ohio junior and senior high schools and vocational training schools are studying a school booklet recently issued by the Ohio Committee on Public Utility Information. It is a 56-page booklet, entitled "Aladdins of Industry," and was compiled by the Ohio committee for use of students in English, current topics, science and social science classes, and for reference in preparing debates. It deals with the history and methods of operation of the electric railway, electric light and power, gas and telephone industries. At the end of each chapter suggestions are given for classroom work on the text of the chapter and a number of suggestions for classroom work on new topics, designed to help those students who desire to learn more about each industry on which they must depend to carry on successfully in the present day and age.

Among subjects discussed in the chapter on electric railways are the dynamo, the first complete and practical system, the interurban, the motors, controllers, and starting resistance, the propulsion of the electric car, air brakes, third-rail system, cost of cars, safety-first measures, the rush-hour peak, and various problems of the street railway, including increased riding and fare variation. The 69 electric railway companies in Ohio have track and equipment costing more than \$300,000,000, according to the booklet, and operate a total of 3,038 miles of track. In 1925 they carried 871,509,382 passengers; paid taxes of \$6,098,010, and operating expenses of \$55,439,846.

These booklets are being supplied free of charge to school students in Ohio upon request of school authorities. While the first booklets have been off the press only two months requests for them are rapidly nearing the 100,000 mark. These requests have come so far from more than 600 Ohio schools.

Court Decides Against Chicago Company on Paving

Reversing the decision of the Circuit Court, the Illinois Supreme Court has ruled in favor of the city of Chicago against the Chicago Surface Lines in a suit over payment of the cost of relaying tracks to conform with the widening of 22d Street in that city. The decision will mean an immediate saving of \$315,000 to the city, according to Corporation Counsel Busch, and an eventual saving of several millions. It would also aid the city in the present transit negotiations. Other improvements that would probably be affected are the relaying of tracks on Indiana Avenue, costing \$200,000, and the removal of tracks at the municipal pier, costing \$100,000, Mr. Busch predicted.

Work Started on Maine Road

Preliminary work for the construction of an electric railway across the northern part of Maine has been started. The proposed route, which is known as the Quebec extension, is to

Arthur R. Gould. It will be 111 miles long with terminals at Washburn, Me., and Lake Frontier, Que. The early work now under way in the Washburn section consists of clearing the right-of-way by cutting down trees and underbrush. Camps are being established along the course and crews will be started as needed to cut ties and poles to be used in the actual construction of the line. Transportation facilities have long been needed for business progress in this and other sections of Maine that are rich in timberland. This project was referred to in the *ELECTRIC RAILWAY JOURNAL*, issue of Jan. 1, 1927, page 57.

Would Sell Forty-five-Cent Ticket in Fort Worth

The Northern Texas Traction Company has asked the city of Fort Worth, Tex., for a revision of the railway fares in that city. The wholesale distribution of transportation that is suggested is the sale of a ticket good for a week the bearer of which may ride the street cars for 5 cents as often as he desires. The ticket is to be sold for 45 cents. For persons who ride seldom a cash fare of 10 cents is suggested, while three tokens may be bought for 25 cents.

The company explains that it is earning a net return on its investment of less than 2 per cent and that new money cannot be secured with that meager showing of earnings. But the company points out that it has constantly improved its service and made it more extensive. The company is "selling" its plan to the people of Fort Worth by newspaper advertising and in many other ways.



News Notes

Fare Hearing Postponed.—Hearing upon the petition of the United Traction Company for increased fares in Albany, Troy and Rensselaer, scheduled for Jan. 12 at 10 a. m., was postponed until Jan. 31 at Albany. The hearing will be continued on Feb. 1.

Increases Interurban Parlor Car Service.—The Northern Ohio Power & Light Company, Akron, Ohio, has placed another modern parlor car in the Canton-Akron-Cleveland service. Others will be placed in the interurban service just as soon as they can be built. These cars seat 50 passengers in individual chairs. There is no extra fare. The time from Akron to Cleveland is one hour and 25 minutes.

Christmas Party a Huge Success.—The sixteenth annual Christmas party was held by the Beaver Valley Traction Company, New Brighton, Pa., on Dec. 21 last. Among the happiest of the guests were the boys and girls of the Beaver County Children's Home, who were transported in a large coach of the Beaver Valley Motor Coach Company to the Junction Park pavilion. The ladies of the Home for the Aged were also the happy recipients of a similar courtesy from the company. Plenty of goodies were provided and

in addition boys and girls were presented with dolls, games, mechanical toys and marbles. There were many hours of happiness and fun. Officials and committee men of the company worked indefatigably to make the sixteenth annual party a success.

To Advance Safety Cause.—The Public Service Commission on Jan. 6 directed the New York State Railways to cause all car movements over its crossing of the Pittsford-Palmyra highway No. 776, about 1 mile east of Pittsford, to proceed at a speed not in excess of 5 miles an hour. Motormen are ordered to sound car whistles within a distance of 150 ft. of the crossing and to continue the sounding until the train is over the highway. Evidence submitted at a hearing before Commissioner Van Voorhis showed that the highway was heavily traveled and the view on both sides of the crossing of approaching cars was obstructed to such an extent that additional protection was required.

Increased Rates Delayed.—The Public Service Commission has extended the date on which the Nashua Street Railway, Nashua, N. H., was to put into effect its proposed fare increases from Jan. 10 to Feb. 10. The extension was authorized to allow time to take up further matters relative to the proposed changes. The city of Nashua is objecting to the proposal of the railway to issue fourteen-ride tickets for \$1, all of which must be used in one week. The City Council wants the tickets issued without any time limit. A vote was taken by the Board of Aldermen, which was unanimously in favor of no restriction of time tickets.

Transfers Made Larger in St. Louis.—The United Railways, St. Louis, Mo., has enlarged the size of its transfers to facilitate their handling by conductors. The new ones measure 5½ in. x 1½ in., about the same size as the transfers used prior to last October. At that time transfer regulations were changed to prevent improper use by car riders and new transfers were printed which were much smaller in size. However, it was found that these were entirely too small, so that very often the names of lines were punched out. The transfer regulations have not been changed, and the company will continue to use pink slips in the mornings and white slips between noon and midnight. The new transfers have fifteen-minute intervals so that a conductor can more clearly indicate time for transfer to a new line.

Insurance Policies as Christmas Gifts.—Employees of the Illinois Power & Light Corporation, Chicago, Ill., received insurance policies as 1926 Christmas gifts from the company. Along with a holiday greeting many old policies were renewed and new ones issued. The gift includes all employees eligible in the following company groups: Illinois Power & Light Corporation, Illinois Traction System, Iowa Power & Light group, Missouri Power & Light Company, and the Kansas group of properties. The card announcing the \$500 life insurance policy gift extended best wishes for the holiday season and expressed a hope that each person who received a card would be a member of the corporate family when another Christmas came around.

Recent Bus Developments

More Delay on New York Bus Applications

Chairman Delaney of the Board of Transportation of New York City called on the Mayor on Dec. 12 and informed him it would be physically impossible to report to the Board of Estimate on Jan. 13, as directed last Monday, an analysis of the 40 or more amendments and supplementary data to bus franchise applications which had been filed in the last few days.

Mayor Walker then decided that he would have to defer presentation of his formal resolution on the awards until the regular meeting of the Board of Estimate on Jan. 20. Mr. Delaney assured the Mayor that he could complete his analysis by that time.

It was explained that while the Mayor deeply deplored further delay, his determination to lay the matter over was made so that the city might have every opportunity to peruse the latest offers made by bus franchise applicants and to investigate the financial responsibility of each competing bidder.

Until the unexpected reversal of policy following the consultation between the Mayor and Chairman Delaney every indication pointed to the probability of a deadlock on Jan. 13 in the Board of Estimate if the Mayor persisted in his declared intention to force the issue to an open vote.

Ordinance Would Eliminate Jitneys in Miami

Action on the passage of a new bus and jitney ordinance was deferred recently by the City Commission of Miami, Fla., in order to permit all interested groups to offer suggestions for the solution of what is admitted to be an intricate transportation problem. The ordinance, which had its first reading in December, 1926, will virtually eliminate jitneys in the close-in downtown business section, leaving buses as the major passenger vehicles. The bus lines have assured the city that routes now being served with jitneys will be supplanted with buses in the event the jitneys are taken off.

The new ordinance is so worded that only financially responsible and well-equipped lines can qualify to operate and dependable and regular service to the public must be furnished at all times. Also, city officials claim, simplification of the transportation system and elimination of jitneys in the close-in business district will reduce traffic congestion and represent a saving of thousands of dollars annually to the city by dispensing with extra police and traffic supervision.

About a year ago, when transportation facilities were inadequate, the city decided to add buses to relieve the situation and also to serve territories not heretofore reached. An agreement was made with the Miami Beach Railway whereby the latter was to operate buses for the city. The city guaran-

teed the actual operating cost of the coaches only, but in turn was to receive half the net profits. The railway advanced the funds for the purchase of 50 buses.

State Law Requirements on Motor Vehicles Sustained

In a series of decisions without written opinions, the United States Supreme Court on Jan. 10 dismissed four cases which sought to invalidate state laws requiring registration fees for motor vehicles and imposing gasoline taxes. The effect is to sustain state laws with these requirements. On the authority of prior decisions involving similar questions, the high court dismissed the cases on the ground of lack of jurisdiction. In all four cases the lower courts had held that there was no cause for action; that the registration requirement was a reasonable state matter, and that the gasoline tax was a tax on sales and not on use.

Missouri Bus Lines Would Be Placed Under Commission Control

Senator McCawley has prepared a bill placing control of all bus lines under the Missouri Public Service Commission and granting that body the authority to refuse to license a bus line when in its opinion the territory is now properly served by a steam railroad or electric railway. The measure would apply alike to either strictly city bus lines or those which operate between cities. In effect the bill would consider bus lines as public utilities, and as such their schedules, routes, rates and practices would be subject to the supervision of the state commission. Under the provisions of the measure, when a bus line applies for a certificate for any route the commission must immediately send notice of such application to every steam railroad and electric railway operating in the territory in which the bus company plans to give service, and also to every city and town through which the bus line would pass. The bill would confirm the rights of existing bus lines, but charges the commission with the responsibility of hereafter deciding whether the evidence overcomes the presumption that such lines are necessary.

Buses in Topeka Do Big Service

In all 23 buses are in daily use on five regular runs in Topeka, Kan., with a total daily mileage of nearly 2,600. This figure has been increased somewhat by trippers, which go on during peak-load periods in the morning and in the evening. The average daily mileage for each motor coach on a regular run totals about 180.

This service is being supplied by the Topeka Railway, owned by the Illinois Power & Light Corporation. On Feb. 1, 1925, the bus service was started by the Topeka Railway as a supplement to its railway service. The first run

was a trifle under 5 miles for the round trip. At that time the company owned only five buses. Three railway lines have been abandoned in Topeka and bus service substituted. In other districts the coaches act as auxiliaries and feeders to the existing transportation system.

One Small Line Temporarily Abandoned.—The Stroudsburg, Water Gap & Portland Railroad, operating between Portland and Stroudsburg, Pa., ceased operations on Jan. 1. The line will resume service again on June 1. Meantime the company will run a bus to accommodate school children from Water Gap. This line is operated by the Stroudsburg Traction Company.

Buses Replace Cars.—The Shawnee-Tecumseh Traction Company substituted bus service in Shawnee, Okla., for railway service on Jan. 9. The company also substituted buses for trolley equipment on its electric interurban line between Shawnee and Tecumseh. The plan is to put in force improved service on its lines as a result of the change. The buses in Shawnee are to have a fifteen-minute schedule instead of half hourly service maintained by the street cars. Between Shawnee and Tecumseh a 40-minute service will replace the hourly schedule on the interurban line. The company will use 21-passenger buses. The railway equipment will be sold.

Abandonment Conditional Upon Bus Operation.—The Public Service Commission granted on Jan. 5 the petition of the New York & Stamford Railway for approval of a declaration of abandonment of all that portion of its route in the village of Port Chester on Westchester Avenue, and all that portion in the village consisting of its routes on South Regent Street and North Regent Street. These portions of the road constitute a loop outside of the main track of the road on which operations are to continue. The village of Port Chester consented, conditional upon removal of rails and poles and the operation of bus routes on substantially the same route.

First Fatal Bus Accident in Kansas City.—In 3,000,000 miles of bus operation by the Kansas City Public Service Company, Kansas City, Mo., the first fatal accident occurred there Christmas Day, when a 39th Street bus struck and killed Mitchell F. Burch, an eleven-year-old boy who dashed into the path of the bus after a new Christmas football. The railway began operating buses in Kansas City in October, 1925.

Buses Substituted.—The New York Public Service Commission approved on Jan. 7 the petition of the Lewiston & Youngstown Frontier Railway for permission to abandon portions of its lines in Youngstown and the town of Porter, Niagara County, N. Y. This line has been under lease to the Niagara Gorge Railroad. No objection was raised at the hearing by the city authorities or others to its abandonment. Buses have been substituted for service in the village. The railway is directed to remove all existing structures from the streets and highways along the abandoned route and restore the streets to a condition as good as adjacent parts thereof.

Financial and Corporate

Financial Readjustment Suggested for Boston "L"

Attention is called by *Barron's* to the fact that common shares of the Boston Elevated Railway, Boston, Mass., recently sold at 87, close to the highest price recorded since 1922, and up ten from the 1926 low of 77. In connection with the recent demand for the stock, that authority says, it is of interest to note that in the portion of the report of the Division of Metropolitan Planning which outlines a suggested readjustment of the Boston Elevated Railway the statement is made that "it is our belief that the stocks of the new corporation will, under normal conditions, sell at par or better . . ."

The proposed new corporation is the Boston Transit Company, and under the division's plan Boston Elevated common stockholders would receive for each present share of 6 per cent stock a share of 5 per cent common stock in the new company, the dividend on which would be guaranteed by the state for 40 or 50 years, or whatever period of public control might be decided upon. It is the conviction of the Planning Division that the long-time state guaranty would not only compensate for the 1 per cent reduction in dividend but would in normal times add fifteen points to the present market value of the stock.

As *Barron's* points out, there is not the slightest certainty that the plan recommended by the Planning Division will be adopted by the Legislature or accepted by the stockholders, but that commentator says it is worth noting that, in the opinion of the division, if a plan is put through substantially as recommended it would result in both the 4½ per cent preferred and 5 per cent common stocks of the new company selling at around par.

The present holders of the outstanding preferred stock of the Boston Elevated Railway would under the plan

receive for each share new 4½ per cent preferred on the following basis: Present 8 per cent preferred, not more than 1.3 shares; 7 per cent "third preferred," 1.05 shares. Unlike the common, the preferred stock of the new company would carry a guaranty that at the end of a new period of control the state would purchase the stock of the owners at par if they so desire. An arrangement such as that mentioned would in effect lend to the stock the status of a Massachusetts bond, except in respect to exemption of the income return from federal supertax.

Loss on San Francisco Municipal \$315,830

For the Year Ended June 30, 1926, This Loss Shows an Increase of \$10,668 Over the Year Ended 1925—Excess of Income Over Operating Expenses, Depreciation and Accidents Was \$7,131

TOTAL revenue of the Municipal Railway of San Francisco, San Francisco, Cal., for the year ended June 30, 1926, was \$3,409,965, against \$3,281,498 the year before. Interest on securities owned fell off to \$43,467. A consideration of detailed operating expenses shows an increase in every account, leaving the total of \$2,705,146, or \$160,426 greater than in the year 1925.

The report, prepared for and approved by the finance committee of the Board of Supervisors, explains that for the purpose of securing a comparison between the results of operation of the municipally owned utility and similar utilities operated by private capital the charter of the city and county of San Francisco provided that the operating reports should include certain comparison charges consisting of items which constitute part of the actual cost of operating privately owned companies but which the municipally owned utility is not required to pay. These charges in 1926 amounted to \$322,961, leaving

a net loss of \$315,830 for the year. The deficit in the cumulative account from Dec. 28, 1912, to June 30, 1926, was \$1,645,378.

Items in the balance sheet are listed in detail. Capital assets include road and equipment, \$8,245,107, and general expenditures, \$324,872. Current assets consisted of \$860,946 securities bought for the depreciation fund, \$26,202 in accounts receivable and \$170,149 in materials and supplies. The item of deferred assets was the same figure of \$132,123. Thus the total assets was \$10,817,735. Current liabilities included accounts and vouchers payable, \$267,916, and interest on funded debt, \$40,845. The reserves included a depreciation of \$1,117,484 and a reserve for compensation of \$127,756.

The Municipal Railway has no capital stock and the excess of its assets over its liabilities represents surplus. This surplus has been divided into two classes, a contributed surplus and a surplus from income. The contributed surplus includes an item of \$26,000,

COMPARATIVE INCOME ACCOUNT, MUNICIPAL RAILWAY OF SAN FRANCISCO

	—Year Ended June 30—		Dec. 28, 1912		—Year Ended June 30—		Dec. 28, 1912
	1925	1926	to June 30, 1926		1925	1926	to June 30, 1926
Passenger revenue.....	\$3,268,383	\$3,395,950	\$32,079,523	Excess of income over operating expenses	\$781,372	\$748,286	\$9,730,256
Miscellaneous revenue.....	13,115	14,015	137,485	Less: Interest on funded debt.....	186,678	177,133	2,738,774
Total revenue.....	\$3,281,498	\$3,409,965	\$32,217,009	Excess of income over operating expenses and interest.....	\$594,694	\$571,153	\$6,991,482
Interest on securities owned.....	44,595	43,467	404,736	Less: Reserves for depreciation and accidents.....	588,308	564,022	5,726,167
Total income.....	\$3,326,093	\$3,453,432	\$32,621,745	Excess of income over operating expenses, depreciation, accident reserves.....	\$6,385	\$7,131	\$1,265,315
Operating expenses:				Less: Charter comparison charges.....	311,548	322,961	2,910,693
Way and structures.....	\$115,073	\$134,911	\$1,049,905	Net loss.....	\$305,162	\$315,830	\$1,645,378
Equipment.....	197,619	200,365	1,893,471	Analysis of comparison charges:			
Power.....	464,990	488,812	4,323,507	State franchise tax.....	\$172,279	\$179,036	\$1,689,869
Conducting transportation.....	1,600,499	1,694,704	14,295,324	Municipal franchise tax.....	130,735	135,838	1,090,731
Traffic.....			3,836	Municipal car licenses.....	3,135	3,135	36,528
General and miscellaneous.....	166,333	186,351	1,317,054	Federal income tax.....			13,270
Loss on road retired.....			8,184	Salaries of clerks.....			4,872
Total operating expenses.....	\$2,544,515	\$2,705,146	\$22,891,284	Law expenses.....			13,500
Other deductions:				Insurance.....	5,398	4,951	61,920
Taxes—motor bus.....	205		205		\$311,548	\$322,961	\$2,910,693
Total operating expenses.....	\$2,544,720	\$2,705,146	\$22,891,489				

Italics indicate loss or deficiency.

COMPARATIVE GENERAL BALANCE SHEET, MUNICIPAL RAILWAY OF SAN FRANCISCO, AS OF JUNE 30, 1926

Assets:	1926	1925	Increase or Decrease
Capital assets.....	\$8,570,280	\$8,317,283	\$252,997
Current assets.....	2,115,331	2,146,136	30,805
Total assets.....	10,685,611	10,463,419	222,191
Liabilities, reserves and surplus:			
Funded debt.....	\$3,590,100	\$3,791,000	\$200,900
Current liabilities.....	308,761	383,995	75,234
Reserves.....	1,469,225	1,476,143	6,918
Contributed surplus.....	356,552	332,552	24,000
Surplus from income.....	5,093,096	4,611,851	481,244
Total surplus.....	\$5,449,649	\$4,944,404	\$505,244
Total liabilities, reserves and capital.....	\$10,817,735	\$10,595,543	\$222,191

Italics indicate loss or deficiency.

premium on funded debt and contributions from general taxes, \$306,552. In surplus from income is included \$1,984,100, an item actually set aside for bond retirement. Of this amount the item of \$1,887,000 represents bonds redeemed and canceled and the item of \$97,100 cash.

An item of considerable interest is the charter reserve of \$1,414,258 for

STATEMENT OF BUS LINE OPERATIONS, MUNICIPAL RAILWAY OF SAN FRANCISCO YEAR ENDED JUNE 30, 1926

Revenues:	
Passenger earnings.....	\$53,467
Quartermaster's tickets.....	5
School tickets.....	1,067
Local transfers.....	18,358
Total revenue credits.....	\$19,431
Total passenger revenue and credits.....	\$72,898
Operating expenses:	
Repairs to buses.....	\$13,282
Tire expense.....	9,627
Gas and oil.....	13,477
Cleaning, washing and greasing.....	10,179
Conductor-chauffeurs' wages.....	36,323
Depreciation.....	6,748
General and miscellaneous.....	16,307
Total operating expenses.....	105,945
Net loss for year.....	\$33,046

insurance and taxes, which is part of the sums set aside for comparison with private operation explained above. The report states that as the municipal system does not have to pay any of these charges the receipts from operations were deposited in the operating cash fund without any restrictions as to how they were to be used. Most of the cash in the operating fund represented by such comparison charges was actually spent in new construction and addition and betterment work, so that these reserves representing obligatory comparison charges have in reality been used as reserves for betterments. For the purpose of making the balance sheet reflect the actual result of operations the amount expended in addition and betterment work has been reflected in an account entitled "Additions and Betterments from Income," and the charter reserves for insurance and taxes carry a balance equal only to the unused portion of the original reserves. The amount included in the additions and betterments is \$2,874,570.

The net loss on bus operation for the year was \$33,046, against \$16,987 in 1925.

STATISTICAL DATA, MUNICIPAL RAILWAY OF SAN FRANCISCO FISCAL YEAR ENDED JUNE 30, 1926

	Total Amount	Per Car-Mile	Per Car-Hour
Total passenger revenue.....	\$3,395,950.24	\$0.3651	\$3.5321
Total operating expenses (taxes and depreciation not included).....	2,705,146.10	0.2908	2.8136
Total operating earnings (taxes and depreciation not included).....	690,804.14	0.0743	0.7185
Ratio of earnings to passenger revenue.....	0.2034		
Total taxes and charter charges.....	322,961.61	0.0347	0.3359
Ratio to passenger revenue.....	0.0951		
Depreciation.....	564,022.09	0.0606	0.5866
Ratio to passenger revenue.....	0.1661		
Operating expenses, depreciation and taxes.....	3,592,129.80	0.3861	3.7361
Ratio to passenger revenue.....	1.0578		
Net deficit from operation.....	196,176.56	0.0210	0.2040
Ratio to passenger revenue.....	0.0578		
Passenger car mileage.....	9,302,073		
Passenger car-hours.....	961,451		
Platform expense (6 1/4 cents per hour July 1, 1925, to April 15, 1926, 7 1/4 cents per hour April 16, 1926, to June 30, 1926.) Bus operators 5 cents per hour additional. Time and one-half for overtime after eight hours; and after ten hours range; time and one-half for seventh day work. Twelve days vacation per year with pay.....	1,413,684.62	0.1520	1.4704
Number of passenger cars owned.....	209		
Number of work cars owned.....	6		
Total number of cars owned.....	215		
Total number of buses owned.....	13		
Total number of cars and buses owned.....	228		
Passengers carried—5-cent fares.....	67,285,956		
5-cent fares—government tickets.....	35,385		
2 1/2-cent fares—school tickets.....	1,156,110		
2-cent fares—revenue transfers.....	301,441		
Free transfers.....	14,062,150		
Free passengers—employees.....	549,866		
Total passengers carried.....	83,390,908		
Number of passengers carried per car-mile.....		8.96	

†The sum of \$201,000 expended from depreciation fund for bond retirement.

‡Includes car mileage of buses.

§Includes car-hours of buses.

Transfers lifted at Fillmore and Union Streets treated as revenue transfers pending result of present litigation with the Market Street Railway.

Italics indicate loss or deficiency.

Operating surplus of the Municipal Railway of San Francisco is made up as:

Operating surplus.....	\$1,311,956	
The following is an analysis of the above:		
Surplus, June 30, 1926.....	\$1,052,316	
Credits: Transfers from depreciation fund to operating fund to cover deficits in the latter.....	\$95,420	
Insurance refunds credited to compensation reserve but deposited in operating fund.....	337	
Adjustment of reserve for bond redemption.....	3,900	99,657
		\$952,658
Debits: Interest on securities credited to income but deposited in depreciation fund.....	\$43,467	
Amount transferred from income account.....	315,830	359,297
Total.....	\$1,311,956	
Total surplus from income.....	\$5,093,096	
The total surplus derived from the operations of the road is as follows:		
Bonds retired through income.....	1,887,000	
Reserve for bond redemption.....	97,100	
Advance general fund—Twin Peaks Tunnel.....	82,152	
Advance general fund—Stockton Street Tunnel.....	18,971	
Advance general fund—Ocean Shore Railroad switching.....	1,000	
Charter reserves.....	1,414,258	
Additions and betterments from income.....	2,874,570	
Operating surplus.....	1,311,956	
Total.....	\$5,093,096	

Italics indicate loss or deficiency.

The total single track mileage as of June 30, 1926, was 74.12. The total bus route mileage as of that date was 7.40.

Another Step in New Haven Acquisition

The New York, New Haven & Hartford Railroad, New Haven, Conn., which a short time ago received the necessary approval from the municipalities served by the Worcester Consolidated Street Railway, Worcester, Mass., and the Springfield Street Railway, Springfield, Mass., to take over and control both railways, has taken the next step in order to commence rehabilitating both properties.

Before the New Haven can start actual work, the act passed by the 1926 Legislature provides that the New York, New Haven & Hartford Railroad shall acquire all the common stock of the New England Investment & Security Company, present owner, which also controls the voting stocks of the two electric railways. The New Haven has entered into an agreement with all holders of this stock, through which the railroad will deliver \$290,000 par value, of the fifteen-year notes of the Investment company, for all the common stock. The New Haven owns \$13,115,000 of these fifteen-year notes. The exchange is expected to take place shortly, and the New Haven will have full control of both railways with the power to operate these utilities subject to the approval of 75 per cent of the municipalities served.

Refunding of Illinois Power Debentures Proposed

In view of the present favorable condition of the money market and the excellent investment standing of its securities the Illinois Power & Light Corporation, Chicago, is in a position to refund its 7 per cent debentures, now

outstanding in the principal amount of \$9,614,800, by a new issue of debentures bearing a substantially lower rate of interest, probably 5½ per cent, at a very considerable saving to the company.

In conformity with the charter and by-laws of the company, it is the intention to retire the debentures, by purchase or redemption, on or before April 1, 1927, and to create, issue and sell new debentures or debenture bonds in a principal amount not to exceed \$9,500,000, bearing interest at a rate of not to exceed 6 per cent, and with such maturity or maturities, and redeemable at such price or prices, as may be determined by the directors. The new debentures will probably be dated as of March 1, 1927, and issued about that time. The principal amount of the new debentures will not exceed the amount of the debentures at present outstanding.

Receiver Named for Missouri Property

Frank C. Schwenk, Allenton, Mo., was appointed receiver on Dec. 30, 1926, by Circuit Judge McElhinney at Clayton, Mo., for the Grand View Railroad. This property formerly operated an electric line along Lemay Ferry road in the southern part of the county.

The line extended from Broadway and Mary Avenue, Luxemburg, to Continental, Mo. It was formerly known as the St. Louis, Montesano & Southern Railroad. Even in the pre-bus days the line was not a money maker, but was able to keep going because a large cement company had contributed to its upkeep so as to provide service for its employees.

Operation ceased a year ago with the permission of the Missouri Public Service Commission. The application for the receivership was made by the St. Louis Union Trust Company, trustee for a \$100,000 bond issue of the railroad. Mr. Schwenk will sell the property.

Notes Issued in Minneapolis.—The Yellow Cab Corporation, Minneapolis, Minn., the stock of which is now controlled through recent purchase by the Twin City Rapid Transit Company and is being operated in connection with that company's electric and bus lines subsidiaries, has made a new issue of \$250,000 of 6 per cent serial gold notes to be dated Jan. 1, 1927, and to mature \$50,000 a year beginning Jan. 1, 1928. The first two maturities are priced respectively at 100.96 and 100.93 and the remaining three at 100. The issue is being financed through Lane, Piper & Jaffray, Inc., Twin Cities. The corporation operates taxicabs in the Twin Cities, Duluth and Rochester, Minn.

Financing of Purchased Company Approved.—Permission was granted to the Public Service Rapid Transit Railroad by the Public Utilities Commission on Jan. 8 to issue \$210,000 of common stock. The proceeds will be used for the acquisition of the property of the North Jersey Rapid Transit Company and other capital purposes. The line is to be included in the Public Service Corporation group.

Personal Items

W. H. Taylor a Vice-President of U.G.I.

William H. Taylor, nationally known in public utility circles as an expert in appraisal and rate matters and in general consulting engineering work and vice-president and general manager of the Georgia Railway & Power Company, Atlanta, Ga., since 1923, has been appointed a vice-president of the United Gas Improvement Company, an additional position having been created. He will assume his new duties on Feb. 1.

Mr. Taylor has been connected with the United Gas Improvement properties for more than 23 years. He has been head of its plants in Gloversville, N. Y.; Charleston, S. C., and Omaha, Neb. He is a graduate of Stevens In-

Cedar Rapids, has been promoted to succeed Mr. Gerg.

Louis R. Schichler, a member of the sales force of the Wisconsin Power & Light Company, has been promoted to succeed Mr. Cottrill.

Harry Reid Heads National Electric Power Group

Victor Emanuel, chairman of the board of the National Electric Power Company, New York, has made the following announcement of changes in the personnel of the officers and directors of the company: Samuel Insull is now chairman of the company and Victor Emanuel has resigned as chairman. Albert Emanuel has resigned as president and has been succeeded by Harry Reid, Indianapolis, Ind., formerly president of the Interstate Public Service Company and the Kentucky Utilities Company. Albert Emanuel, Thomas O'Hara, L. E. Yeager and Charles W. Yant have resigned as members of the board of directors and have been succeeded by Samuel Insull, Martin J. Insull, Harry Reid and C. B. Ziegler. Victor Emanuel, A. C. Allyn, Charles D. Makepeace, W. H. Seibert and R. E. T. Riggs will remain as directors of the company.

Included among the properties in the National Electric Power group is the Cumberland County Power & Light Company, Portland, Me., operating the Portland Railroad. It is understood that the change in personnel contemplates the removal of Mr. Reid to New York, his new headquarters.



W. H. Taylor

Promotions by Bylesby

At a meeting of the board of directors of H. M. Bylesby & Company on Dec. 31, A. S. Cummins, assistant manager of the bond department, and O. G. Corns, sales manager of the Western offices, were made vice-presidents.

Mr. Corns' first position, in 1901, was with George D. Cook & Company, after which he joined Mason, Lewis & Company. He later joined E. H. Rollins & Sons. Leaving E. H. Rollins & Sons, Mr. Corns took charge of the sales department of Allerton, Green & King, and in 1915 became associated with H. M. Bylesby & Company.

Mr. Cummins has been connected with the Bylesby organization since 1909. His early experience was in the operating department of the Northern States Power Company at Minneapolis. In 1907 he became vice-president of the Caribbean & Southern Steamship Line, then a subsidiary of H. M. Bylesby.

At the outbreak of war Mr. Cummins joined the military service. He was a captain in the Air Service. At the close of the war he rejoined H. M. Bylesby & Company, in charge of wholesale and syndication work. He has been in direct charge of the sale of securities under the customer-owner-ship plan.

stitute of Technology and an engineer by profession. He began his active career in 1903 as a constructor with the United Gas Improvement forces. He has risen step by step through the engineering, management and construction departments to the position of vice-president and general manager of outlying properties. When in 1923 he became vice-president and general manager of the Georgia Railway & Power Company he took over supervision of the various departments, assisting H. M. Atkinson, chairman of the board, and P. S. Arkwright, president.

Mr. Taylor's offices will be in the central U.G.I. building in Philadelphia.

Changes in Fond Du Lac

Alvin E. Gerg, who has been connected with the Wisconsin Power & Light Company since 1918, has resigned. Mr. Gerg was in charge of the commercial activities of the company in Fond du Lac, Sheboygan and Oshkosh, Wis.

Frank J. Cottrill, district sales manager of the Wisconsin Power & Light Company at Fond du Lac, prior to which he was commercial manager of the Iowa Railway & Light Company at

Tri-Cities Properties to Merge— Changes in Personnel to Be Made

The management of the Tri-City Railway of Iowa and Illinois will be united under one head effective on Feb. 1, according to an announcement made by R. B. McDonald, president of the local companies of the United Light & Power Company.

R. J. Smith, at present general manager of the Tri-City Railway of Iowa, will become manager of both companies, succeeding T. C. Roderick, who has been appointed vice-president and general manager of the Ottumwa Gas Company. Mr. Smith will also continue his duties as general manager Clinton, Davenport & Muscatine Railway.

Mr. Roderick has been with the railway for approximately seven years. He entered the utility service as assistant to J. G. Huntoon, when the latter was general manager of both the Iowa and Illinois properties.

William J. Wuestenfeld, general manager of the Ottumwa utility, will go to Davenport as assistant general manager of the People's Light Company, filling the vacancy created by the appointment of C. R. Stahl, former assistant general manager, to the position of general manager Panhandle Light & Power Company at Borger, Tex.

A few years ago, when J. G. Huntoon retired, the two companies were placed under separate management. This arrangement has been continued until the present.

George C. Towle Will Leave Scranton

George C. Towle, affiliated with the Scranton Railway, Scranton, Pa., since June, 1926, will sever his connections with that property on Feb. 1. His railway service has covered a period of 37 years, during which he was engaged for the greater part of the time on Stone & Webster properties and later on the American Railways properties.

Early in his career he was appointed master mechanic of the Allentown & Bethlehem Rapid Transit Company, Allentown, Pa. He resigned a year later to become superintendent of the Biddeford & Saco Railroad, Biddeford, Me. Here he remained for three years. At this period in his career he engaged for a brief time in the manufacturing end of the business, but returned to the operation end to take charge of the Houghton County Traction Company at Houghton, Mich. Two years later he was transferred to Ponce, Porto Rico, where for two years he had charge of the construction of the Ponce Railway & Light Company.

Nor were his activities to end there. His next move included the management of the Mattoon and Charleston properties of the Central Illinois Traction Company, Mattoon, Ill., and association with the Syracuse & South Bay Electric Railroad, Syracuse, N. Y. In 1906 he was appointed general manager of the People's Railway, Dayton. He withdrew from the management of the People's Railway early in 1920 to take charge of the rehabilitation of the Logansport Utilities Company. In 1920 he joined the forces of the Dayton Pneumatic Tool Company, where he

served until 1926, when he returned to an American Railways property, this time at Scranton as superintendent of transportation.

When they learned of his intention to resign his position at Scranton, the employees of the Scranton Railway, through a committee, expressed their regret that they would no longer be affiliated with him in a business way. Then, as a testimonial of the regard in which he was held, a pocketbook was presented to him containing a substantial sum of money. Mr. Towle has no definite plans for the future.

G. W. James, Jr., with "Journal"

G. W. James, Jr., has joined the staff of the ELECTRIC RAILWAY JOURNAL as assistant editor. He will be located in New York. Mr. James is by profession an engineer, but he was reared in the atmosphere of journalism, his father having been an editor for 50 years and with the exception of the late Colonel Watterson was probably in service longer than any other editor in the South.

Mr. James attended the Virginia Polytechnic Institute, taking civil engineering and later took a course in electrical engineering at the Virginia Mechanics Institute. For seven years thereafter he was in the maintenance of way department of the Virginia Railway & Power Company. He also had much other engineering experience, notably with the Virginian Railway, Turner Construction Company, the Foundation Company and the Chesapeake & Ohio Railroad. During this entire time he was writing special articles for newspapers, contributing book reviews, etc., and more recently was engaged in editorial work for the Western Electric Company and the Chesapeake & Ohio Railroad on their house organs.

In his newspaper work Mr. James was connected with the Richmond *Times-Dispatch*, Richmond *News Leader*, the Norfolk *Virginian Pilot*, the Richmond *Journal* and the Richmond *Evening Journal*. This is only part of the record of the man, but it does indicate the wide experience Mr. James has had as an engineer and a publicist.

Obituary

Alves Dixon

Alves Dixon, general manager of the Baton Rouge Electric Company, Baton Rouge, La., died recently at El Paso, Tex., to which city he had returned to enjoy a vacation with his family, among old friends in familiar scenes. Shortly after his arrival he was taken sick and later he died in a sanatorium where he had been confined a few months.

No one knew El Paso and its immediate surroundings better than Mr. Dixon, who had seen it grow in the 21 years he had known and loved it. To this Empire city located on the border line, with the mountains of New Mexico in the distance, went Alves Dixon in 1904. He became a motorman for the electric company. Quickly did he advance through various posi-

tions in the ranks until he assumed the rôle of general superintendent of railways. In that position he accomplished a great deal for the people of that city. He improved schedules, kept equipment up to date and schooled the operators in the lessons of competence, courtesy and carefulness.

In appreciation of his efforts and successes Stone & Webster proposed to promote him to the managership of the Baton Rouge Electric Company, Baton Rouge, La. Then was the opportunity presented to the residents of El Paso to show Mr. Dixon how much they thought of him. A novel parade was staged on June 20, 1925, in which citizens from all walks of life took part to speed the parting executive on his way to Baton Rouge. Many will never forget an interesting feature of the parade—the first mule car ever operated in El Paso. On this car rode Mr. Dixon and a notable group of El Paso citizens. Forty-three years before the car had made regular trips between El Paso and Juarez. There was also a celebration in honor of the accident record of the company, April, 1925, making the best showing of any month during the past fifteen years. This was due to the efforts of Mr. Dixon himself, with whom safety was a hobby.

The late Alves Dixon was active in public life. At one time he was president of the El Paso Country Club, president of the Rotary and the El Paso Social Club. In addition he was secretary of the Texas Sons of the Revolution, member of the Spanish War Veterans and Veterans of Foreign Wars. He was active also in the affairs of the Southwestern Public Service Association.

In his death the Stone & Webster properties have lost a valuable railway man and the utility industry one of its outstanding personalities.

C. E. A. Carr

C. E. A. Carr, engaged recently in the railway supply business at Toronto, Ont., died on Dec. 30 in that city as a result of complications following an operation for appendicitis. He was born in Thornton, Ont., 56 years ago, and before going into the business in which he was engaged at the time of his death he had been in utility work in the United States and Canada for many years. Mr. Carr was graduated from the high school at Barrie, Ont., in 1883, and then studied at the British-American Commercial School, Toronto, until 1886. He was in the office of the Toronto city engineer from 1888 to 1891, and from 1892 to 1894 was secretary to the general manager of the Toronto Railway, the Montreal Street Railway and the Cleveland Electric Railway. From 1895 to 1905 he was general manager, secretary and treasurer of the London Street Railway, London, Ont. During his connection with the London company Mr. Carr also was general manager and secretary of the Montreal Park & Island Railway. From 1905 to 1908 he was with J. G. White & Company as manager of the Helena Light & Railway Company. He was also at one time manager of the Quebec Railway, Light & Power Company.

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

St. Petersburg Railways Allotted \$400,000 for Improvements

Under the new bond issue approved early this year by the city of St. Petersburg, Fla., \$400,000 has been appropriated for improvements for the municipal street railways system. These improvements include track extensions for three blocks on First Avenue, 21 blocks on Ninth Avenue, and special work in various parts of the city. A new carhouse estimated to cost \$105,000 equipped with all modern facilities, and storage tracks are included in the approved plan. Work will

to do 30 per cent of the business in cedar poles for electric railway lines in the United States.

Record Shipment of Electric Locomotives to Long Island

Fourteen electric locomotives, comprising the largest single shipment of its kind ever made, was delivered to the Long Island Railroad recently.

These locomotives have been stored by the company to await the completion of the Bay Ridge Division, where they will be used in shifting service.

000,000 per year, and passengers carried annually from less than 10,000,000 to 100,000,000.

N.E.M.A Selects Quarters in Graybar Building

Headquarters of the National Electrical Manufacturers' Association will be removed to the new Graybar Building upon its completion April 1, it was announced this week.

This move will place the association in the new business center of New York City and within 200 ft. of the Grand Central Terminal. In addition to its work of collecting and disseminating statistics of the electrical industry the association is continuing the work of its committee on uniform cost accounting, which during the year 1927 will keep in close touch with the various departments of the United States government.

Gerard Swope, president of the General Electric Company, is president of the association, and its vice-presidents are: C. L. Collens, president of the Reliance Electric & Engineering Company, and D. Hayes Murphy, president of the Wire Mold Company. J. M. Perry, general manager of the electrical department of the Johns-Manville



Fourteen Electric Motive Power Units Recently Delivered to the Long Island Railroad to Be Used in Shifting Service on the Bay Ridge Division

be completed by July 1. Combined revenue from the city's four public utilities is reported at more than \$1,000,000. An allotment of \$235,000 has been made for improvements to power plants.

Great Northern to Spend \$12,000,000 for Equipment

Ralph Budd, president of the Great Northern Railway, announces that \$12,000,000 will be spent during 1927 for new equipment, materials and supplies, including rails. Motor-generator types of electric locomotives will be placed in service over the Cascade Mountains during the coming year. In addition, the company is experimenting with a large oil-electric locomotive in its Minneapolis Terminal, with a view of determining whether the extensive use of this type of motive power is practicable.

New Pole Concern Expects 30 Per Cent Cedar Trade

By acquisition of the principal assets of the National Pole Company and the National Pole & Tie Treating Company the National Pole & Treating Company, a newly formed corporation, expects

Each locomotive is rated at 1,000 hp., weighs 75 tons and can be operated at a speed of 25 m.p.h. At a speed of 12.4 m.p.h. the drawbar pull is 44,200 lb. They can be operated individually or for heavy service, two in multiple as a two-cab locomotive. It is claimed that when so operated they constitute the most powerful shifting engines ever built. The mechanical parts were built at the Altoona shops of the Pennsylvania Railroad, from where the record shipment was started. All electrical equipment was supplied by the Westinghouse Electric & Manufacturing Company.

These locomotives represent one more step in the development of the electric service of the Long Island Railroad. They are designed for the purpose of establishing a standard switching locomotive, not only for the Long Island Railroad, but for the Pennsylvania Railroad System in general.

Since 1905, when the first electric lines were placed in operation, the electrified track-miles of the Long Island Railroad have risen from 64 to 300, current consumption from 20,000,000 to nearly 200,000,000 kw.-hr. a year, number of multiple-unit cars from 187 to 904, car-miles from 3,500,000 to 35,-

Manufacturing Company, is treasurer, and the affairs of the association are in charge of Alfred E. Waller, managing director.

General Electric Big Prize Winner at Sesqui Exposition

Of the prizes awarded at the recent Sesqui-Centennial International Exposition at Philadelphia, the highest award given, two grand prizes, three medals of honor and nine gold medals, in addition to a number of lesser awards, were won by the General Electric Company.

One of the grand prizes was awarded for "systems of electric transportation and traffic regulation devices." This recognized the company's endeavors in the field of electric locomotives, street car equipment, automobile motors, Novalux traffic signals and aviation beacons. The other grand prize was given for "excellence of products and service given humanity."

One medal of honor was presented for "gas-electric system of drives for buses," one for "G.E. Mazda lamps" and one for "turbine super-charger."

Gold medals were awarded as follows:

For "automatic induction voltage

regulator as typical of apparatus of this class made by exhibitor," for "a.c. and d.c. motors," for "direct-current generator—marine type—as typical of machines of this class made by exhibitor," for "electric fans of high quality," for "an electric mine locomotive

fitted with automatic cable reels of high efficiency," for "emergency automatic throwover switches mounted on vertical steel panels," for "motor-generator set typical of machines of this class made by exhibitor" and for "type H transformers."

of January. This is attributed to the passing of the inventory date, rather than to any material change in consumptive requirements. The change is sufficient, it is thought, to make it certain that January steel production will materially exceed the December figure, reported as 347,200 tons, which represents an operating rate of about 75 per cent.

Later Predictions Substantiate "Journal's" Prophecies for 1927

Outlook Considered Promising by Business Men and Financiers—Rumors of Labor Trouble in Mining and Railroad Circles Are the Only Dark Clouds on the Horizon

DURING the past two weeks reams of statistics and predictions have substantiated the JOURNAL'S retrospect of 1926 and prophecies for 1927, as published in the statistical number Jan. 1. Confidence is the keynote sounded by business men and financiers in the various reviews that have appeared during the fortnight. Solidity for 1927, both for industries in general and the electrical field in particular, is predicted.

First and foremost, Secretary Mellon reports the financial structure of the federal government in excellent condition. The national debt is below \$19,500,000,000, compared with a peak of \$26,500,000,000 just after the war.

A study of the general business index chart for 1926 reveals that business did not rise more than 10 per cent above computed normal or fall lower than 5 per cent above the same base, which means that there was the most perfect balance in industry that has been achieved, and it is significant to add that the November figures showed business 7 per cent above normal.

KEEN COMPETITION EXPECTED

An outstanding prediction for 1927 is that heavy manufacturing will begin within the next 30 to 60 days, in which there is every reason to believe the manufacturers serving the electrical field will participate. The latest estimate of the three foremost manufacturers of electrical equipment indicates that the traction field will progress consistently. Reports from the Southeastern states are to the effect that there will be increasing demand for electric service. Keen competition is expected during the coming year, but it is thought that lower money rates, cheap, efficient transportation and an abundance of raw material will enable the manufacturers to face the situation.

While there is unrest in railroad and mining labor circles, mediation, it is believed, will prevent any serious conditions. As regards the latter situation, if the coming Miami conference should fail to establish a satisfactory wage, there still will be no chance of a coal shortage, as the extension of the non-union territory has brought about more rail outlets than in 1925, when the carriers estimated they could handle 8,000,000 tons of coal weekly. This figure is raised to 9,000,000 tons for 1927, contingent upon the men staying at work in the non-union territory. In all events, there is 85,000,000 tons above ground.

Turning to prophecies made during the last two weeks, one authority bases his bright outlook for 1927 upon the following factors:

1. The country's undiminished consuming power.
2. Growing evidence of new and highly conservative practices in trade.
3. Great productivity of the soil.
4. No political disturbance.
5. The condition in Europe. Rapid progress toward general restoration of sound character.

This same authority, however, suggests that the existence of prosperity does not prove the improbability of reaction; on the contrary, prosperity long continued may invite it. Experience is wholly against the perpetual continuance of interrupted trade activity.

Reports during the past two weeks reveal some interesting sidelights on raw materials used in the electrical industry. Copper prices, as a result of heavy world production and stock demand, are back to the low level of 1926. Lead and zinc are low, tin is slightly firmer. Rubber has encountered profit taking as the result of increase in stocks and because of small demand by manufacturing interests. Stock in London, as quoted Jan. 7, was 48,745 tons, compared with 43,332 tons in the previous week. President F. R. Henderson of the Rubber Exchange of New York attributes the strength of rubber to the technical position of the market rather than the artificial influence of the \$40,000,000 American pool.

As far as it can be judged at this time, the crude oil situation is very favorable due to Nature having come to the relief of the oil supply last summer, with the result that there is now 765,000,000 barrels or more credited to the total of 1926.

According to W. C. Teagle, president of the Standard Oil Company of New Jersey, "the remarkable gain in production has been due mainly to the development of three major pools in the latter half of the year. These are Panhandle and Spindletop in Texas and Seminole in Oklahoma. How important they have been in effecting a change in the statistical position may be judged from the fact that they were doing 70,000 barrels a day on July 1 and by Thanksgiving were producing more than 367,000 barrels daily."

As far as steel is concerned, there are conflicting predictions for the next twelve months. A distinct increase in buying, however, marked the first week

Additional \$3,000,000 Asked for San Francisco Lines

Extensions of the Municipal Railway line to cost \$3,000,000, in addition to extensions recommended several weeks ago and estimated to cost \$3,500,000, were urged upon the public utility committee of the Board of Supervisors recently by various citizen committees, leagues and individuals.

The extensions requested were:

A crosstown line in the Sunset district; an extension from 24th and Church Streets over 24th, Conrad, Sussex and Elk Streets and along Sunnyside Heights; extension of the Potrero Avenue line over the Ocean Shore right-of-way to the southwestern corner of the city; extension of the Potrero Avenue line to 23d and Wisconsin Streets; extension of the same line through Bayview district; an extension through Moraga Street and also a new line following the general routes of Eureka and Diamond Streets.

International Steel Tie Books 50 Per Cent of Last Year's Orders

With only two weeks of the new year passed, International Steel Tie Company has booked business for 1927 equal to 50 per cent of last year's total, according to William P. Day, president. These bookings include ties for 23 miles of tie laying for the Kansas City Public Service Company. The order represents more than 20,000 ties and is part of the traction company's \$6,600,000 rehabilitation program. President Day reports that orders for last year totaled 80,000 ties.

Rolling Stock

Chicago, Aurora & Elgin Railroad is rumored as about to place a large order for coaches. Since coming under the management of Samuel Insull and associates ten months ago, the company is said to have spent more than \$1,000,000 in improving service.

Brooklyn-Manhattan Transit Corporation is considering the improvement of its rapid transit lines with 50 articulated cars, each of these 50 units to have three sections. The cars will be duplicates of the 67 units now on order, which were described in this paper in the issues from Sept. 19 to Dec. 26, 1925.

Tampa Electric Company, Tampa, Fla., has received ten new street cars from the American Car Company of St. Louis. The new equipment, which is of the Birney safety car type, has been placed in operation on the Belmont Heights line.

Track and Line

Dallas Railway, Dallas, Tex., has started work on the extension of the Oak Lawn line, which comes under Everman plan No. 4. This eight-block extension, which will cost \$40,000, is expected to be in operation in two months.

United Railways, St. Louis, Mo., and the City of Maplewood, Mo., have been authorized by the Missouri Public Service Commission to construct a crossing over the tracks and right-of-way of the railway at Fork Avenue in Maplewood.

Georgia Railway & Power Company, Atlanta, Ga., plans to extend the carline on West Fair Street, a distance of about 1/2 mile. The extension is necessary, the petition sets out, to give service to the residents of a rapidly growing section.

Twin City Rapid Transit Company, Minneapolis, Minn., plans to spend \$600,000 on railway extensions, bus lines and improvements in 1927, according to an estimate recently submitted to the Minneapolis City Council. Petitions and requests from various neighborhoods for street railway improvements have been submitted to the committee on street railways. One of the major projects is the connection of the Franklin Avenue line in Minneapolis with the Rondo-Maria line in St. Paul to provide another interurban line. Last year the company spent \$650,000 on various improvements.

Trade Notes

H. C. Mode has been added to the railway division staff of the American Brown Boveri Electric Corporation at its Camden, N. J., plant. Mr. Mode is a graduate of Cornell and for the past twenty years has been connected with the Westinghouse Electric & Manufacturing Company in Pittsburgh and Philadelphia.

J. R. Thompson, formerly acting works manager of the Trafford Works of the Westinghouse Electric & Manufacturing Company, has been promoted to works manager of the same plant, according to announcement made recently by Vice-President H. C. Davis. The appointment is to take effect immediately.

National Railway Appliance Company of New York City and the Yellow Truck & Coach Manufacturing Company of Chicago announce their sales agreement as terminated effective Jan. 10. H. E. Listman, vice-president of the Yellow Manufacturing Sales Corporation, states that his firm is establishing a district sales organization in New York City, with offices at 33 West 42d Street. R. E. Fielder is being placed in direct charge of sales of what is to be known as the Eastern section, which includes all of New England, New York State, New Jersey and practically all territory east of Pittsburgh. Mr. Fielder is one of the pioneers in the bus field, having been identified with this industry almost twenty years. He first served as a designer for the Lon-

don General Omnibus Company. Following this experience, he was chief designer of the bus division of the Daimler company for two years. He then became an associate of Colonel Greene in the service of the Fifth Avenue Coach Company, where he remained for fifteen years. For four years he was chief engineer for that company. Following this service Mr. Fielder went with the Yellow Coach Company of Chicago, where he had entire charge of the sales engineering division, training district sales representatives in transportation and engineering design. During the past two years Mr. Fielder has spent considerable time in Europe and Porto Rico making traffic surveys and engineering studies.

Archibald H. Ehle, formerly general domestic sales manager of the Baldwin Locomotive Works, Philadelphia, Pa.; has been promoted to vice-president in charge of domestic sales. Mr. Ehle, after graduating from the Massachusetts Institute of Technology, joined the Baldwin forces as an apprentice in 1902, working for some time thereafter in the shops connected with the Highway Department. Later he was put in charge of the power house, from which post he went to the sales department in charge of locomotives. His appointment as general domestic sales manager followed this last period of service.

F. A. Estep has been elected chairman of the board of directors of the R. D. Nuttall Company, a subsidiary of the Westinghouse Electric & Manufacturing Company. Mr. Estep was president and treasurer of the company for years. Coincident with this promotion the duties of treasurer were added to those of Vice-President Ruppert.

Shops and Buildings

Brooklyn City Railroad, Brooklyn, N. Y., has a program for repair shop rehabilitation and re-equipment during 1927 which calls for an expenditure of approximately \$500,000. Most of this sum will be spent at the 52d Street shops. This rehabilitation program for shops begun some year ago, and during 1926 the company renovated its Fresh Pond shops at a cost of about \$100,000. The changes increased the capacity of the shops about 20 per cent, though enabling the company at the same time to reduce its working force by about fifteen men. The result was secured through introducing labor-saving machinery and otherwise improving the facilities for the maintenance of the rolling stock.

Portland Electric Power Company, Portland, Ore., is calling for bids for a garage to be built one block from the company's Hawthorne building on East Water Street. The structure will be of steel frame and will have 26,000 ft. of floor space. The building is for the purpose of storing all the regular equipment of the company's auto supplies in addition to 100 cars and buses. The cost of construction has been estimated by officials of the company at \$45,000.

Toledo Traction Company, Toledo, Ohio, has acquired a new bus storage garage on Tracy Street near Oakdale Avenue. It was formerly the plant of the Automotive Tractor Company. In addition to the storage space for the 30 buses in service at Toledo the new garage has repair and supplies departments.

ELECTRIC RAILWAY MATERIAL PRICES—JAN. 11, 1927

Metals—New York		Paints, Putty and Glass—New York	
Copper, electrolytic, cents per lb.	13.025	Linseed oil (5 bbl. lots), cents per lb.	10.07
Lead, cents per lb.	7.65	White lead in oil (100 lb. keg), cents per lb.	14.50
Nickel, cents per lb.	35.00	Turpentine (bbl. lots), per gal.	\$0.083
Zinc, cents per lb.	7.17	Putty, 100 lb. tins, cents per lb.	5.25-5.50
Tin, Straits, cents per lb.	66.75		
Aluminum, 98 or 99 per cent, cents per lb.	27.00		
Rabbitt metal, warehouse, cents per lb.:			
Commercial grade.	61.50		
General service.	32.50		
Bituminous Coal		Wire—New York	
Smokeless mine run, f.o.b. vessel, Hampton Roads	\$5.275	Copper wire, cents per lb.	15.25
Somerset mine run, Boston	2.575	Rubber-covered wire, No. 14, per 1,000 ft.	\$5.50
Pittsburgh mine run, Pittsburgh	2.125	Weatherproof wire base, cents per lb.	17.00
Franklin, Ill., screenings, Chicago	1.875		
Central, Ill., screenings, Chicago	1.425		
Kansas screenings, Kansas City	2.35		
Track Materials—Pittsburgh		Paving Materials	
Standard steel rails, gross ton.	\$43.00	Paving stone, granite, 5 in.	
Railroad spikes, drive, 1 1/2 in. and larger, cents per lb.	2.90	New York—Grade 1, per thousand.	\$142.40
Tie plates (flat type), cents per lb.	2.35	Wood block paving 3 1/2 x 8 x 4, 16 lb. treatment, N. Y., per sq. yd.	\$2.70
Angle bars, cents per lb.	2.75	Paving brick 3 1/2 x 8 x 4, N. Y., per 1,000 in carload lots.	51.00
Rail bolts and nuts, cents per lb.	4.20	Paving brick 3 1/2 x 8 x 4 N. Y., per 1,000 in carload lots.	45.00
Steel bars, cents per lb.	2.00	Crushed stone, 1-in., carload lots, N. Y., per cu. yd.	1.94
Ties, white oak, Chicago, 6 in. x 8 in. x 8 ft.	\$1.45	Cement, Chicago consumers' net prices, without bags.	2.10
		Gravel, 1-in., cu. yd., f.o.b. N. Y.	1.75
		Sand, cu. yd., f.o.b. N. Y.	1.00
Hardware—Pittsburgh		Old Metals—New York and Chicago	
Wire nails, base per keg	2.65	Heavy copper, cents per lb.	10.375
Sheet iron (24 gage), cents per lb.	2.90	Light copper, cents per lb.	9.00
Sheet iron, galvanized (24 gage), cents per lb.	3.75	Heavy brass, cents per lb.	6.625
Galvanized barbed wire, cents per lb.	3.35	Zinc, old scrap, cents per lb.	4.125
Galvanized wire, ordinary, cents per lb.	2.50	Lead, cents per lb. (heavy)	6.25
		Steel car axles, Chicago, net ton	\$17.75
		Cast iron car wheels, Chicago, gross ton	15.50
		Rails (short), Chicago, gross ton	16.75
		Rails (relaying), Chicago, gross ton (6 lb. and heavier)	28.50
		Machine turnings, Chicago, gross ton	6.75
Waste—New York			
Waste, wool, cents per lb.	12-18		
Waste, cotton (100 lb. bale), cents per lb.:			
White	13-17.50		
Colored	10-14		



What about platform space?

In the preparation of specifications for those new cars have you given just consideration to platform space? The equipment that will occupy a minimum of such valuable space?

If so, then you have included, as have nearly all modern car buyers,

“Peacock” Staffless Brakes

REG. U. S. PAT. OFF.

Modern cars are equipped with these brakes because they occupy less platform space and because of their well known braking power—three times that of the ordinary hand brake. With almost unlimited chain-winding capacity they are a guarantee of safety when emergency stops are necessary.

No matter what condition of brake rigging exists, any length of brake-chain can be handled—even up to 12 feet if necessary.

Write for performance facts and estimates.



National Brake Company, Inc.

890 Ellicott Square

Buffalo, N. Y.

Canadian Representative: Lyman Tube & Supply Co., Ltd., Montreal, Can.

New Cincinnati busses ride on Generals

Tire which delivers the most miles, with the fewest interruptions, at the lowest possible cost per mile, chosen for 65 new busses of The Cincinnati Street Railway

When The Cincinnati Street Railway Company, of Cincinnati, Ohio, decided to operate a fleet of 65 motor coaches at Cincinnati, its officials profited by the experiences of large fleet operators from one end of the country to the other.

As a result, the many costly mistakes usually associated with a new enterprise were eliminated for this Cincinnati Company. On tires alone, for instance, its officials were able to make sure of the lowest possible cost per mile from the very beginning.

The Generals with which all 65 of these busses are equipped are designed and built to stand up and keep going in the steady day-in and day-out service every bus operator requires. They are built to provide maximum protection for the mechanism of the bus. Moreover, the lower rolling-resistance of The General Tire means a

substantial yearly saving in power and gasoline consumption—an important item for the large bus fleet operator.

If these are the things you want on your busses, you want The General Tire. You want Generals because Generals will out-travel all competitors; because Generals bring you the lowest possible tire cost per mile; because when you standardize on Generals you make sure of the lowest possible cost of operation.



The Mark
of Leading
Tire Stores
Everywhere



The

GENERAL TIRE

—goes a long way to make friends

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

Long Life

**An engine is no better
than its crankshaft**

**A stiffer, steadier and
longer-lived crank-
shaft is in the Mack
engine**

Crankshaft durability is more than strength. It calls for a hard bearing surface. It requires large bearing areas.

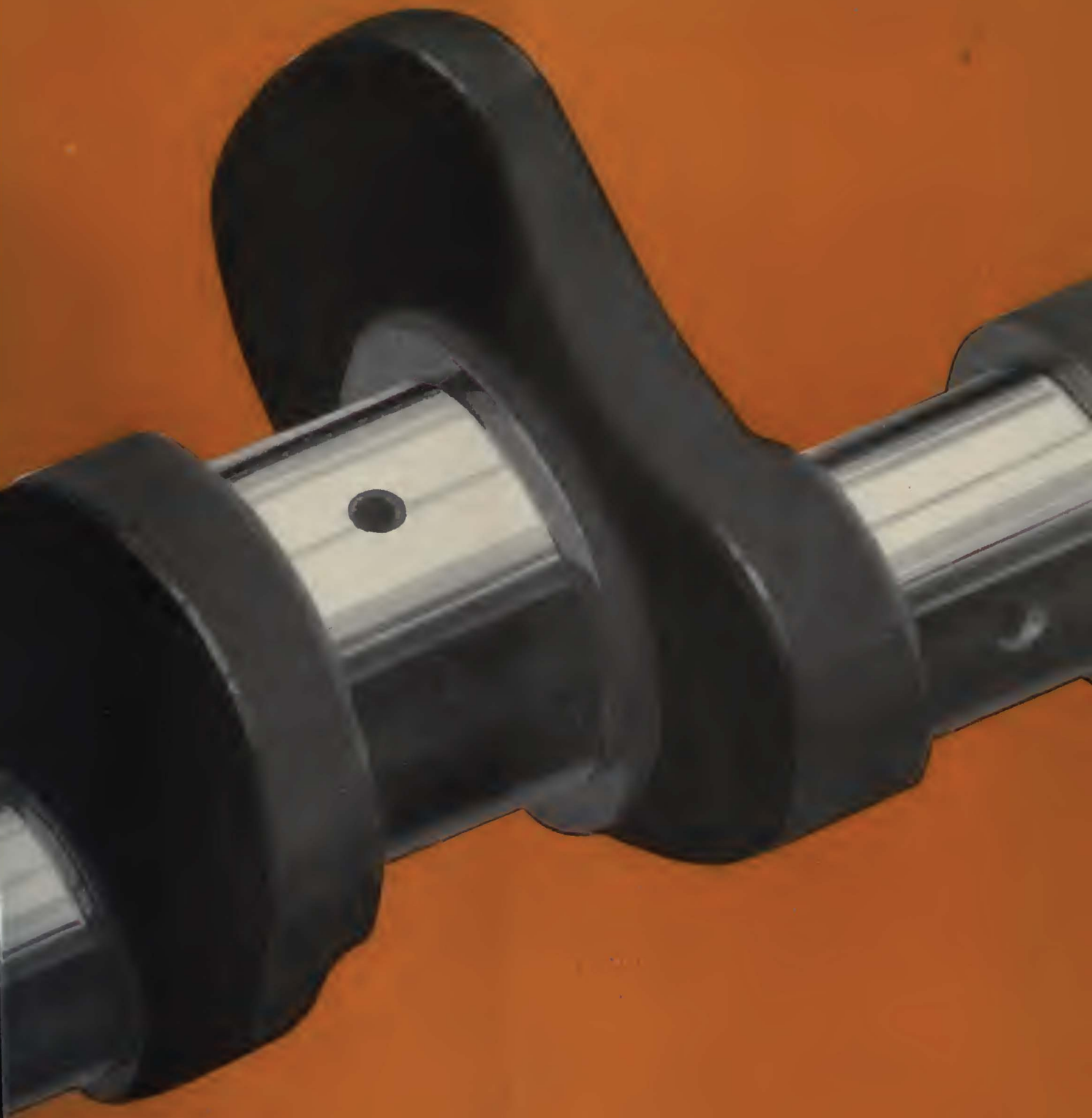
Ordinary heat-treatment makes small shafts strong. That is all. Sufficient case hardening for durability cannot be had without making the entire shaft too brittle to stand the shocks.

Small shafts lack rigidity and bearing area.

Mack shafts are big enough to be stiff as well as strong. Stiffness permits case-hardening. This means glass-hard journals of large area with a soft, tough core.

Integral forged counterweights permit vibrationless dynamic balance.







The Waterloo, Cedar Falls & Northern Railway Company
of Waterloo, Iowa, supplement their traction
service with Mack Buses

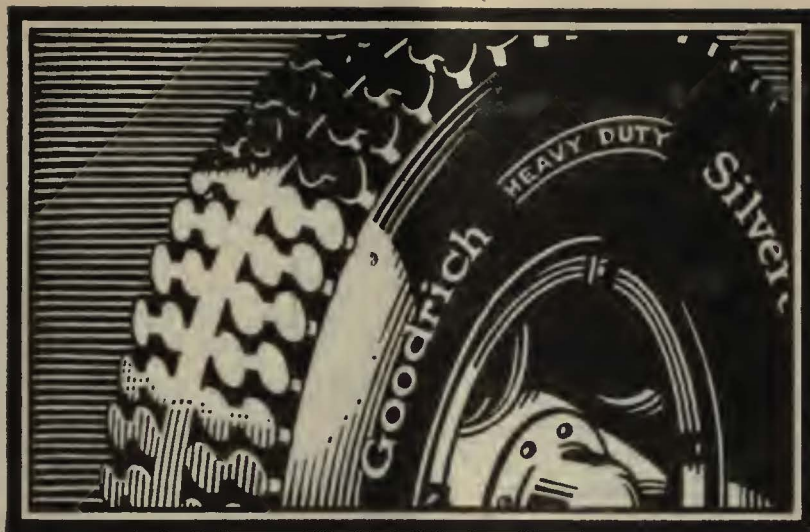
Long Life Pays—

Consistently, The Waterloo, Cedar Falls & Northern Railway Company have purchased Macks because Macks have given them consistent service.

Over four years ago—in 1922—they bought their first Macks—and they have repeated since. They haven't even considered replacements yet. Not only because the Macks are in good condition, but because over this period they have been economical. They have stayed on the road and they are not being everlastingly tinkered with to be kept going.

The Waterloo organization can tell you what it means to use a dependable bus, with long life and freedom from trouble. And they will tell you that you can get it by using Macks.

Mack Trucks, Inc.
International Motor Company
25 Broadway, New York City



Bringing down bus operating costs!

With buses running hundreds of miles per day, a small difference in tire design can quickly grow into a big effect on costs and profits.

In many cases, changing to Goodrich has improved gasoline mileage. Again, Goodrich Silvertown cushioning has made maintenance costs go down. By reducing the number of interruptions to service, Silvertowns have brought tremendous savings to users. And back of it all is the cost per tire mile—on which the Goodrich average is most attractively low.

Goodrich

HEAVY DUTY Silvertowns

Super-dimensions—special rubber compound. Extra tough, heavy duty, anti-skid tread. Sidewalls, same stock as tread and heavily re-inforced. A pneumatic tire especially designed by the makers of the first cord tire in America—for bus, truck and heavy duty service.

THE B. F. GOODRICH RUBBER Co., Akron, Ohio

Keep the wheels turning



Note how the Willard Bus Battery is made with flexible lead-coated connectors between cells. These absorb the vibration and protect you against expense and delay.

WILLARD STORAGE BATTERY COMPANY
CLEVELAND, OHIO

When your buses are making miles they are making money. When vibration and road shock crystallize a battery connector so that it breaks off, it costs you money. We had this in mind when we designed the Willard Bus Battery.

D.A. Willard

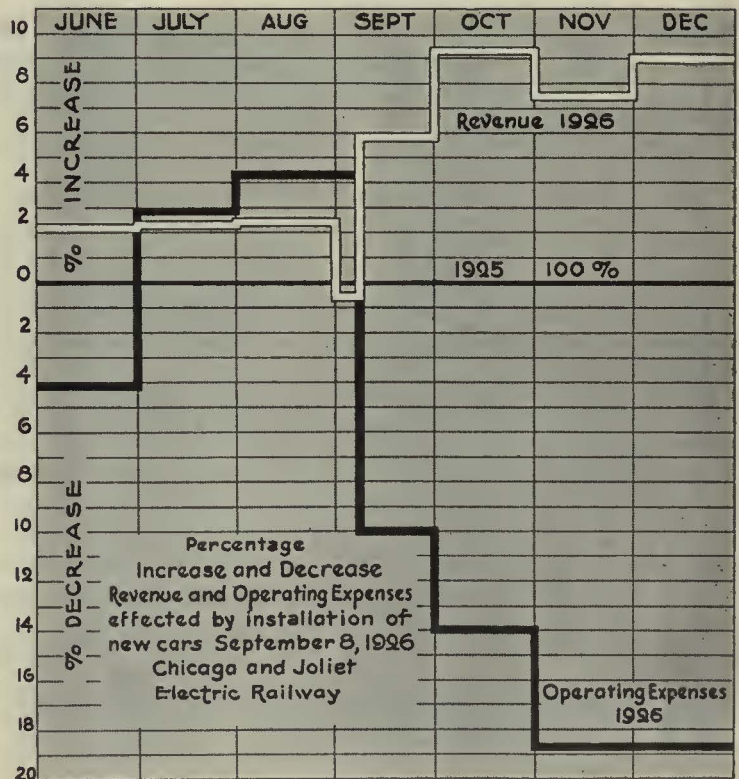
Willard Batteries



Immediate Response to New Type Cars

CHICAGO & JOLIET ELECTRIC RAILWAY COMPANY placed in service last summer 10 modern cars combining in unusual degree, comfort and attractive appearance. The response of the public by increased riding was immediate as shown by the accompanying chart. You will note the chart shows a decided increase in revenue and decrease in operating expenses from the date the new cars were placed in service, September 8th. The actual increase to December 31st has averaged 4.21 cents per car mile. Operating expenses show a gradual decrease due to operating the cars with two men during September and part of October while the men were breaking in for one man operation. The average decrease in expenses for November and December was 5 cents per car mile, due to one man operation and saving in maintenance and power. The net increase in earnings for the last two months therefore amounts to 9.21 cents per car mile.

**UNQUESTIONABLY MODERN
CARS PAY**



We will be glad to furnish specifications and any information desired on these cars

CUMMINGS CAR AND COACH COMPANY

Successor to McGuire Cummings Mfg. Co.

111 W. Monroe Street

CHICAGO



Why we make two grades of Electric Car Oil

WE manufacture two grades of Texaco Electric Car Oil—one for summer and one for winter use. There is a good reason for this.

Temperature statistics in many cities show that the average temperature for the month of January is about 30° F., and for the summer about 74° F.—a difference of about 44°. In some cities the variation is greater.

Consequently we make a summer and a winter grade of car oil. In manufacturing them, this seasonal temperature difference is taken into account and the oils differ from each other in viscosity sufficiently to compensate for this; so that in use outdoors, in season, they will both have approximately the same viscosity.

As both oils are admirably suited for the work from the standpoint of lubricating quality, it is readily seen that by changing seasonally you will come pretty close to getting identical lubricating conditions throughout the year.

Texaco Electric Car Oils are carefully refined pure mineral oils. They do not decompose, become rancid, or give off disagreeable odors under any kind of working conditions. They do not cause a glazing of the waste. Being homogeneous, they feed evenly and steadily. They are being used with great success in various parts of the country.

There is a Texaco Lubricant for Every Purpose



THE TEXAS COMPANY

DEPT. R-J · 17 BATTERY PLACE · NEW YORK CITY
HOUSTON · CHICAGO · NEW YORK
OFFICES IN PRINCIPAL CITIES





In the designing of the St. Louis EIB trucks, small number of parts, concentration on balance, lightness, and quiet, smooth operation with adequate strength has produced a combination of these qualities decidedly in advance of previous attainments in street railway operation, and resulting in improved riding qualities.

**St. Louis built
"Quality Cars"
meet the demands
of a discriminating
Public—for further particulars, write—**

Muskegon's new cars are "Quality Cars" indeed

Unusually Attractive Cars Recently
Shipped to Michigan Railway

THE public of Muskegon, Michigan, will find it hard indeed to resist the appeal of the new cars recently shipped to that city from the "Quality Shops" of the St. Louis Car Co. Built for double end, one-man operation, the smaller doors are arranged as exits, and can be equipped with step treadles if desired. St. Louis Car Co. R50 reversible spring rattan seats, accommodating forty-eight passengers, contribute to an attractive interior.

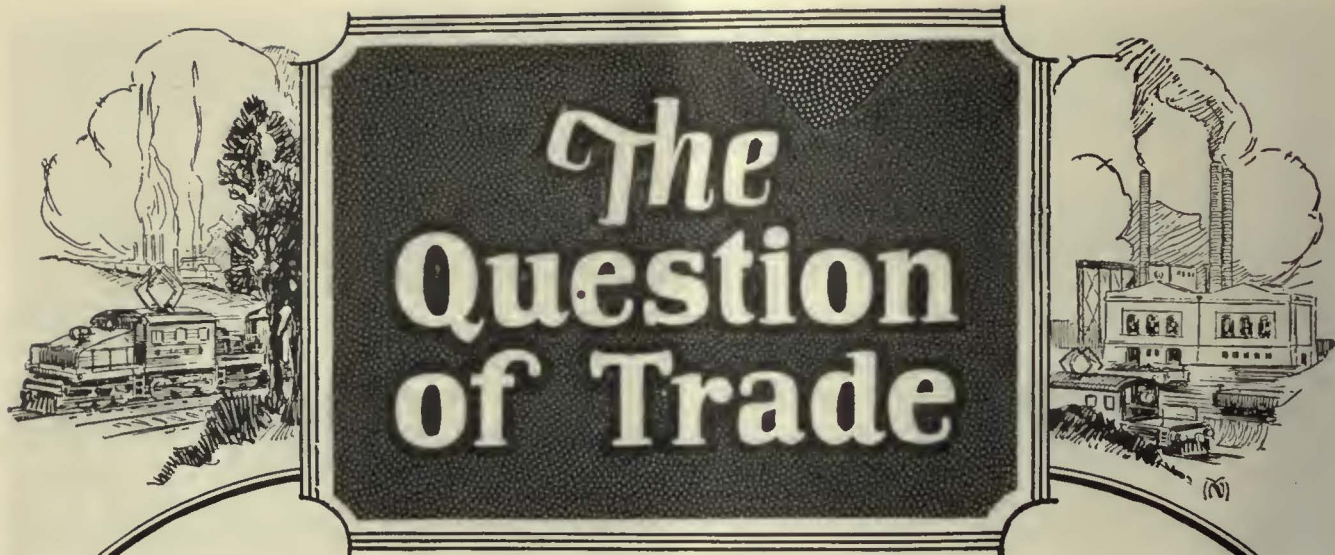
Painting is a feature. Side panels

of fawn grey, trimming in red, with blue upper sash, and white dashes make a strikingly unusual and pleasing appearance. Experience on this line shows the effectiveness of the white dash in attracting attention, and gaining a clear track. Cars are 44 ft. 10 in. long over bumpers, 29 ft. 9 in. over body corner posts, mounted on St. Louis EIB-58 trucks with quadruple 25-hp. motors and weigh, complete, 32,000 lbs. Safety Devices are equipped.

St. Louis Car Company

St. Louis, Mo.

"The Birthplace of the Safety Car"



IN SELECTING oils and greases for your machinery, care should be taken to choose those which are best suited to the machinery in your plant. Lubricants should be selected according to the work they will have to do and the wear they will have to endure, just as the manufacturer of a machine uses steel in one place, cast iron in another and bronze in still another.

Lubricants should not be chosen from the standpoint of viscosity alone. The suitability of the oil or grease to the running speed of the machine, the bearing pressure, and the heat under which the machine operates must also be considered. In some cases, where the lubricants are exposed to acid or salt water, special care must be taken to select oils or greases which will resist the action of these agents.

Standard Oils and Greases

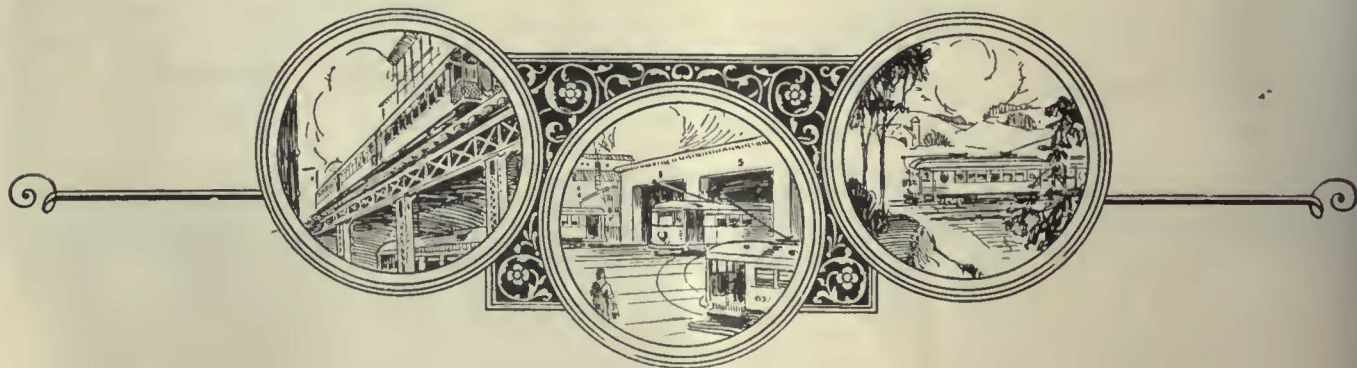
are made in a wide variety of grades to meet the requirements of all machinery now used in the industrial world. For your own protection, it is advisable for you to have the aid of the Standard Oil Company (Indiana) representative, who is competent to tell you which grades will give the best results under the conditions present in your plant.

STANDARD OIL COMPANY

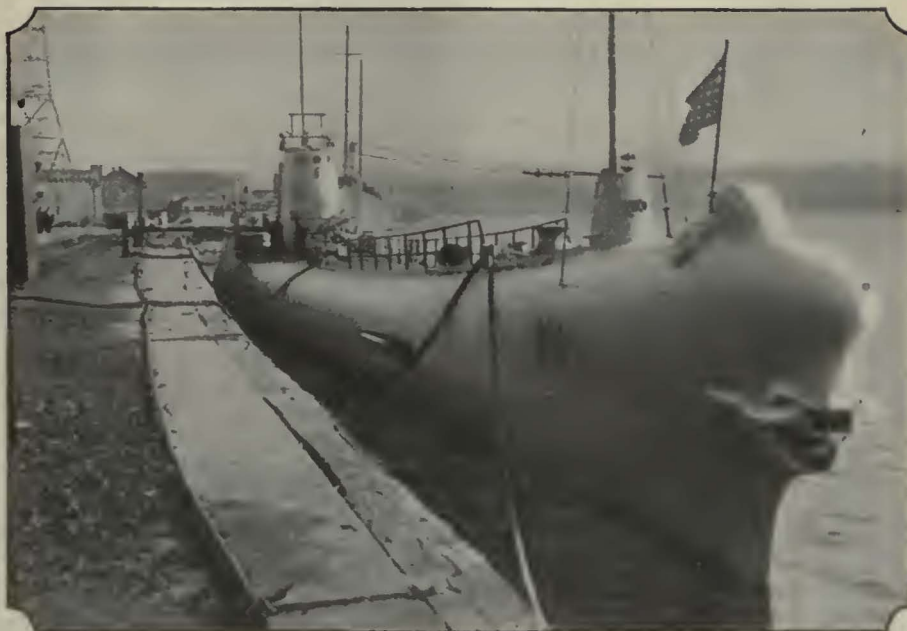
(INDIANA)

510 South Michigan Avenue

Chicago, Illinois



Asbestos Ebony



Down in the sea in ships

WHEN the U. S. Submarine V-1 dives undersea, seven officers and eighty men stake their lives on her equipment.

So the best materials are chosen, including electrical mountings of Johns-Manville Asbestos Ebony.

The choice was the result of exhaustive tests by the Navy Department Bureau of Engineering. Asbestos Ebony

was the only switchboard material of reasonable price that passed the shock tests. And it showed a higher dielectric strength and insulation resistance than quarried materials.

Manufactured, not quarried, Asbestos Ebony has no flaws or metallic veins. It is made in flat sheets and moulded shapes for everything from central station switchboards to fuse blocks.

JOHNS-MANVILLE CORP., 292 Madison Avenue at 41st Street, New York City
Branches in all large cities. For Canada: Canadian Johns-Manville Co., Ltd., Toronto

JOHNS-MANVILLE



An increasingly large portion of the actual income derived from car card advertising service must be devoted to building and maintaining the prestige of car card advertising in the face of the active competition of all other media.

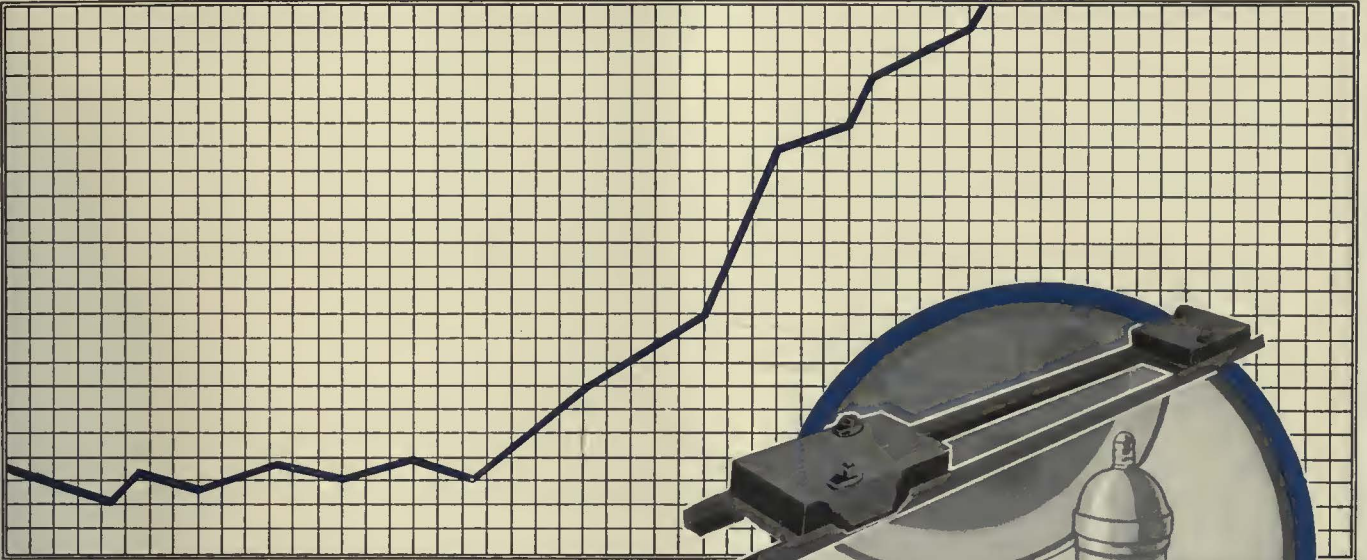
Creating and protecting our mutual interest is a costly item.



Barron G. Collier

INCORPORATED
CANDLER BLDG. NEW YORK

Rolling Stock Repair Cost Graph



*When Rolling Stock
Repairs Jump —*


Dayton Ties

are the Answer

*Dayton Ties
Put Shock
Absorbers
Under Your
Track*



*The Dayton
Mechanical Tie Co.,
DAYTON, OHIO*



*Permanently Smooth Track,
Which Slashes Rolling Stock
Repairs, is Accomplished Fact
Through Dayton Mechanical Ties.*

New—smooth track is easy on rolling stock, and repairs stay down to reasonable levels.

But ordinary track gets old quickly. Concrete ballast, unprotected against vibration, crumbles, joints fail, rails become “humpy.” Then rolling stock maintenance cost shoots up faster and faster until there comes a time when new track is imperative if repair costs are not to eat up the road.

Dayton Mechanical Ties provide a shock, or vibration absorber feature which makes track permanent. Not only permanent, but permanently smooth.

Tracks laid on them fifteen years ago are perfectly smooth today—without a penny of maintenance. Naturally rolling stock repairs are low.

Profitable operation of properties—with all the handicaps the public has given—almost demands Dayton Shock Absorber Track.

**The Dayton Mechanical Tie Co.,
Dayton, Ohio.**

QUALITY

EVERY *International* pole bears the stamp of approval of this company in the form of the *International* dating nail. This nail demonstrates our willingness to stand solidly behind our poles and assures the purchaser that he receives sound timber, careful manufacture, strict inspection, thorough treatment; in other words, an A-1 pole.

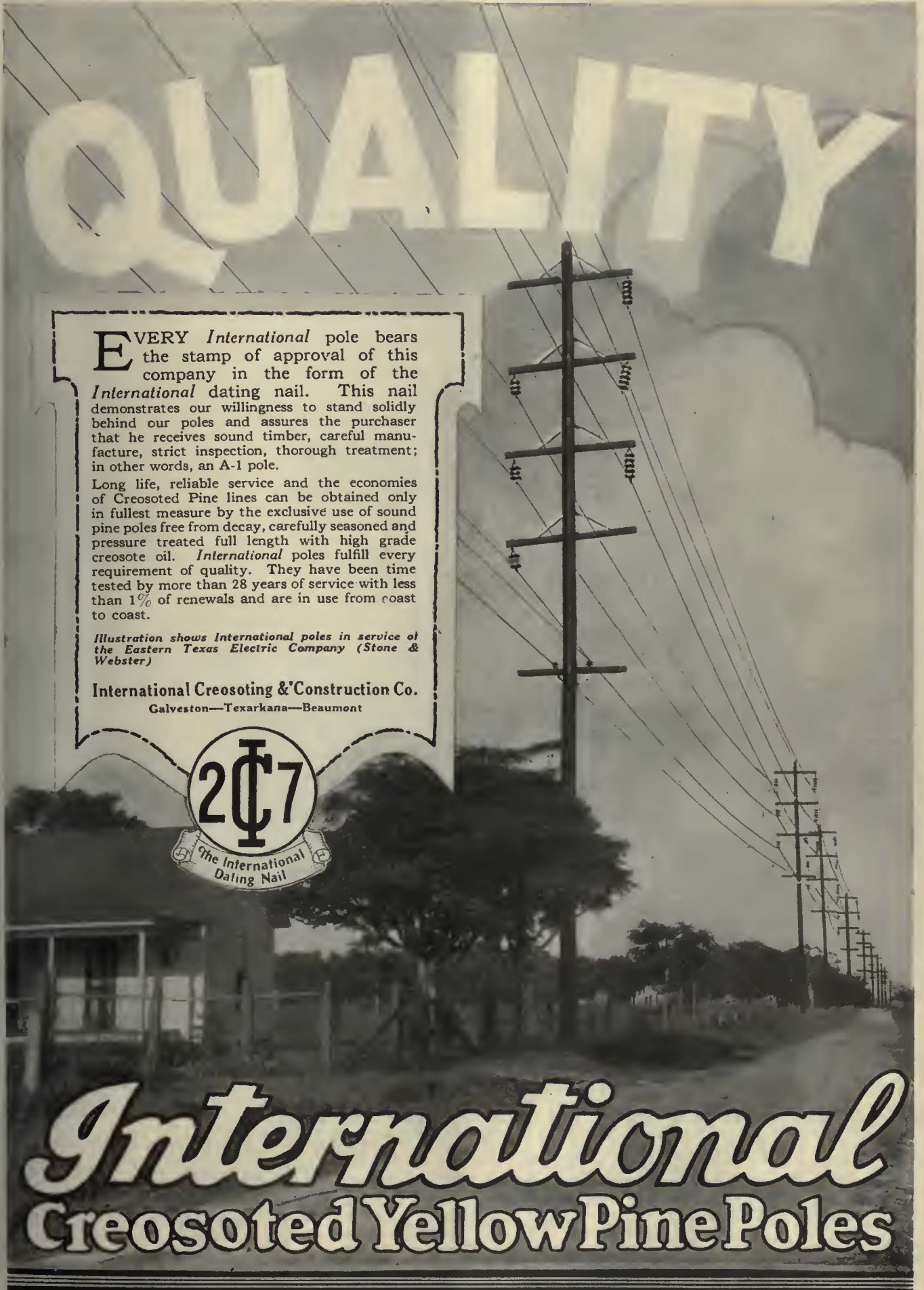
Long life, reliable service and the economies of Creosoted Pine lines can be obtained only in fullest measure by the exclusive use of sound pine poles free from decay, carefully seasoned and pressure treated full length with high grade creosote oil. *International* poles fulfill every requirement of quality. They have been time tested by more than 28 years of service with less than 1% of renewals and are in use from coast to coast.

Illustration shows International poles in service of the Eastern Texas Electric Company (Stone & Webster)

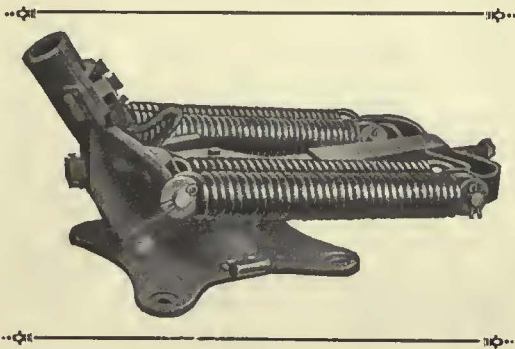
International Creosoting & Construction Co.
Galveston—Texarkana—Beaumont



International Creosoted Yellow Pine Poles



Do You Think You Could Build a Nuttall Trolley?



You doubtless could if you knew what grade of metal to put in the foot, the swivel, the pole socket, etc.—if you knew where they had to be reinforced to withstand strains and where they had to be lightened to keep down weight; if you knew a reliable foundry that could furnish suitable castings; if you had \$60,000 worth of special machinery, tools, jigs, reamers, drills, etc., but even so, if you didn't have 35 years of experience and a crew of skilled mechanics you couldn't equal a Nuttall Trolley. So why should you think anyone else could?

Why should you buy just trolley poles, trolley harps, trolley wheels? If they cost less than Nuttall's its poor economy anyhow because they are worth less. And it is worth something *more* to get with your purchase the feeling of confidence inspired by a product you know is right.

Buy genuine Nuttall Trolley parts, poles, wheels, harps, from Nuttall.

R.D.NUTTALL COMPANY
PITTSBURGH  **PENNSYLVANIA**

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.



For the Best in Track Work

Forty-five years experience and the best of modern facilities.

Send Us Your Inquiries

THE BUDA CO.
 Harvey, Ill.



7 Reasons Why

you will want to see this pay-raising set

New Form

The Library of Electrical Maintenance and Repair—in its new form—contains Annett & Roe's **CONNECTING AND TESTING D.C. MACHINES** and the new second edition of Dudley's **CONNECTING INDUCTION MOTORS**.

1. The five books in this library discuss actual repair jobs and show you step by step what to do when anything goes wrong.
2. They show you how to locate and remedy motor and generator troubles.
3. They show you how to reconnect motors to meet any condition of voltage, phase, frequency and speed.
4. They give you suggestions for preventing electrical machinery troubles.
5. They cover fully the rewinding of motors.
6. They present information that will help you get better service out of your electrical equipment.
7. They give you tables, data, kinks and diagrams that you will find of priceless value every day on every job.

Free examination—no money down—only \$2.00 in ten days and \$2.00 a month until paid.

Fill in and mail the coupon attached and we will send you the entire set of five volumes for ten days' Free Examination. We take all the risk—pay all charges. You assume no obligation—you pay nothing unless you decide to keep the books. Then \$2.00 in ten days and the balance at the rate of \$2.00 a month. Send the coupon NOW and see the books for yourself.

See It Free



McGraw-Hill FREE EXAMINATION COUPON

McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York.

Gentlemen:—Send me the LIBRARY OF ELECTRICAL MAINTENANCE AND REPAIR all charges prepaid for 10 days' Free Examination. If satisfactory I will send \$2.00 in ten days and \$2.00 a month until \$14.00 has been paid. If not wanted I will write for shipping instructions.

Name

Home Address

City and State

Firm or Employer

Occupation E. 1-15-27

HASKELITE



11

electric railway companies ordered HASKELITE and PLYMETL for car repair work in a month

IN ADDITION to their wide application in modern new light weight cars, HASKELITE and PLYMETL are being regularly used to improve old equipment. The current order list shows eleven companies scattered over seven states who bought for repair work in about a month. This is not unusual. There is a constantly increasing volume of such business.

May we send you a list of operators and builders using HASKELITE and PLYMETL to cut weight, increase strength and improve appearance of electric railway equipment, both old and new?

HASKELITE MANUFACTURING CORPORATION

133 West Washington Street, Chicago

CANADIAN REPRESENTATIVES:
Railway and Power Engineering Corporation, Ltd.
Montreal Toronto Winnipeg

PLYMETL

PANTASOTE

Trade Mark

Seat and Curtain Materials
There is no substitute for Pantasote

AGASOTE

Trade Mark


Roofing—Headlining—Wainscoting
The only homogeneous panel board

*standard
 for electric railway cars
 and motor buses*

The PANTASOTE COMPANY Inc.
 At 46th Street 250 Park Avenue Street
 NEW YORK



Pantasote Products
 for Both
 ELECTRIC RAILWAYS
 AND
 BUSES



Tribloc Chain Hoists equipped with our "Ezejoin" Shackle

This improvement ends the possibility of poor welds when renewing the load chains in Ford Triblocs. Any handy man can take out the old load chain and replace it with a new one in a few minutes. The Tribloc Hoist has spur gears; the highest efficiency, which is 80%. Made of malleable iron and drop-forged steel parts throughout.


Send for Bulletin 4G
 FORD CHAIN BLOCK COMPANY
 2nd and Diamond Streets, Philadelphia, Pa

FORD TRIBLOC

2247-D

*Change a wheel? Change a harp?
 Change a pole?*

Simple!




*Base, pole, harp and wheels
 —perfectly co-ordinated*

It's just that easy for any of your men to change trolley wheels on a car fitted with Bayonet Detachable Trolley Harps, or to change poles on a car fitted with Bayonet Trolley Bases and Detachable Pole Clamps. Either operation becomes a matter of seconds only. No tools required. No wasted time or delayed service.

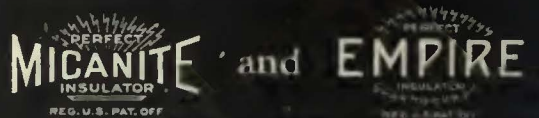
Also Bayonet Special Trolley Wheels and Sleet Cutters.

Write us.

Bayonet Detachable Trolley Equipment

BAYONET TROLLEY HARP CO.
 SPRINGFIELD, OHIO

ELECTRICAL INSULATION



Micanite and Super-Micanite
 Sheets, Commutator Segments,
 and Commutator Rings

Micanite Tubes and Washers

Linotape, Seamless or Sewn Bias
(Yellow or Black Varnished Tapes)

Empire Oiled Cloths and Papers
(Yellow or Black)

Compounds, Varnishes, Etc.

Send for catalog and helpful booklet on Commutator
 Insulation and Assembly

MICA INSULATOR COMPANY

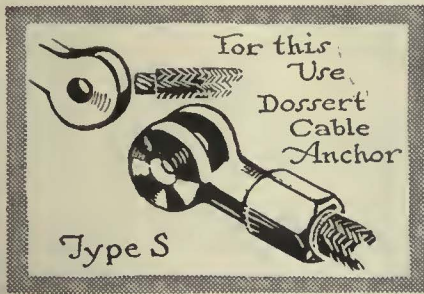
Largest manufacturers in the world of mica insulation.

Established 1893

New York: 68 Church St. Chicago: 542 So. Dearborn St.

Cleveland Pittsburgh Cincinnati
 San Francisco Los Angeles Seattle

Works: Schenectady, New York; Victoriaville, Canada; London, England



DOSSERT Cable Anchor

—another service best made by the Dossert Tapered Sleeve principle of solderless connection.

See the Dossert 20th Year Book for various connectors that save time and improve the job.

Write for Your Copy

GET THIS BOOK



Dossert & Co.
242 West 41st Street
New York, N. Y.

FREE

Where performance counts
use

Le Carbone Carbon Brushes

They talk for themselves

W. J. Jeandron

Hoboken Factory Terminal,
Building F, Fifteenth Street, Hoboken, N. J.

Pittsburgh Office: 634 Wabash Bldg.

Chicago Office: 1657 Monadnock Block

San Francisco Office: 525 Market Street

Canadian Distributors: Lyman Tube & Supply Co., Ltd.
Montreal and Toronto



Cold Dinners

for your passengers?

Not if you use

AJAX

BABBITT for ARMATURES

keeps the rolling stock rolling



The Ajax Metal Company

Established 1880

PHILADELPHIA

NEW YORK

CHICAGO

BOSTON

CLEVELAND



Structural Shapes • Steel Sheet Piling

Plates • Skelp

Bars and Bar Mill Products

Bands • Hoops

Axles • Wrought Steel Wheels

Rails • Rail Joints

Steel Cross Ties

CARNEGIE STEEL COMPANY

General Offices • Carnegie Building • 434 Fifth Avenue

PITTSBURGH

PENNSYLVANIA



B. A. HEGEMAN, Jr., President H. A. HEGEMAN, First Vice-Pres. and Treas.
 F. T. SARGENT, Secretary W. C. PETERS, Vice-Pres. Sales and Engineering

National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York

BRANCH OFFICES

Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
 Hegeman-Castle Corporation, Railway Exchange Building, Chicago, Ill.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions	Ft. Pitt Spring & Mfg. Co., Springs
Anglo-American Varnish Co., Varnishes, Enamels, etc.	Flaxlinum Insulation
National Hand Holds	Anderson Slack Adjusters
Genesco Paint Oils	Economy Electric Devices Co., Power Saving and Inspection Meters
Dunham Hopper Door Device	Yellow Coach Mfg. Company— Single and Double-deck Buses
Garland Ventilators	
Walter Tractor Snow Plows	Feastle Drop Brake Staffe

Tisco Manganese Steel in trackwork, introduced by Wharton in 1894, is still the superior metal for long life under severest railway service.

WILLIAM WHARTON JR. & CO., Inc.
 Easton, Penna.

Bethlehem Products for Electric Railways

Tee and Girder Rails; Machine Fitted Joints; Splice Bars; Hard Center Frogs; Hard Center Mates; Rolled Alloy Steel Crossings; Abbott and Center Rib Base Plates; Rolled Steel Wheels and Forged Axles; Tie Rods; Bolts; Tie Plates and Pole Line Material.

Catalog Sent on Request

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.

BETHLEHEM



REDUCE OVERHEAD BY EQUIPPING WITH THORNTON Side Bearing TROLLEY WHEELS

The practical bearing of long life and endurance.

The longevity of our wheels is not due to hard metal which is destructive to the overhead but rather to the extensive bearing surface and improved method of lubrication. The bearing improves with use and many still in service have covered 100,000 miles.

Write for references

THORNTON TROLLEY WHEEL CO., Inc.
 ASHLAND, KENTUCKY

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY

Johnstown, Pa.

Sales Offices:

Atlanta Chicago Cleveland New York
 Philadelphia Pittsburg Dallas

Pacific Coast Representative:

United States Steel Products Company
 Los Angeles Portland San Francisco Seattle

Export Representative:

United States Steel Products Company, New York, N. Y.

Hubbard and COMPANY

PITTSBURGH • OAKLAND, CAL. • CHICAGO



*{ The Hardware makes the line
 Hubbard makes the Hardware }*

THE WORLD'S STANDARD "IRVINGTON"

Black and Yellow
 Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slott Insulation Flexible Varnished Tubing
 Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
 Irvington, N. J.

Sales Representatives in the Principal Cities

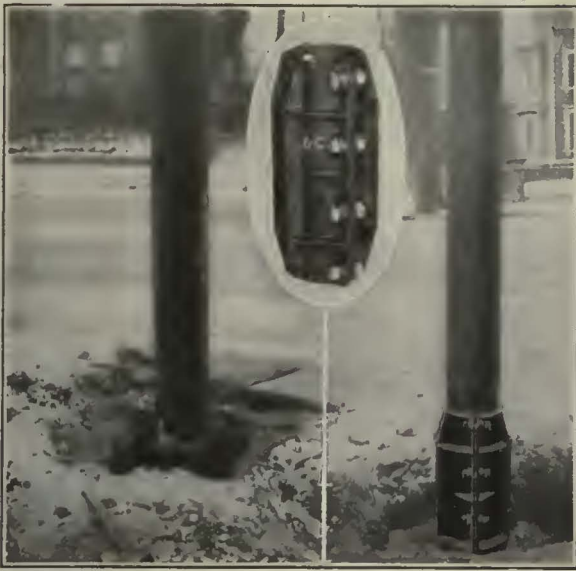
Arc Weld Rail Bonds

AND ALL OTHER TYPES

Descriptive Catalogue Furnished

American Steel & Wire Company

New York Boston Pittsburgh
 Chicago Cleveland Denver
 San Francisco U. S. Steel Products Co.
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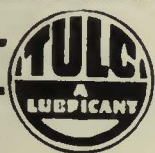
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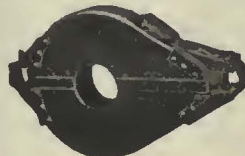
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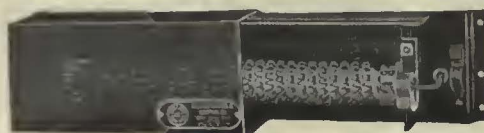
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Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)	Track, Special Work Bethlehem Steel Co. Ramapo Ajax Corp. Wm. Wharton, Jr. & Co. Inc.	Trolley Wheels (See Wheels, Trolley)	Vestibule Linings Haskelite Mfg. Corp.	Wheels, Car Steel & Steel Tire American Steel Foundries Bemis Car Truck Co. Carnegie Steel Co.
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