

ELECTRIC RAILWAY JOURNAL

Graw-Hill Publishing Company, Inc.

JULY, 1931

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the traffic
density of

1931



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ELECTRIC RAILWAY JOURNAL

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ALEX McCALLUM
London, England

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Pages 341-392

Send Them In!

MAINTENANCE MEN—the last period of the Electric Railway Journal Maintenance Contest closes July 31. Only one month—but ample time to enter your descriptions of new devices and methods for the competition. And remember, an individual cash prize of \$100 will be awarded during the year, in addition to the \$25 quarterly prizes for each of the four divisions—rolling stock and shops, way and structures, electric and line, and buses and garages. Have you some “winning” ideas? Then send them in at once!

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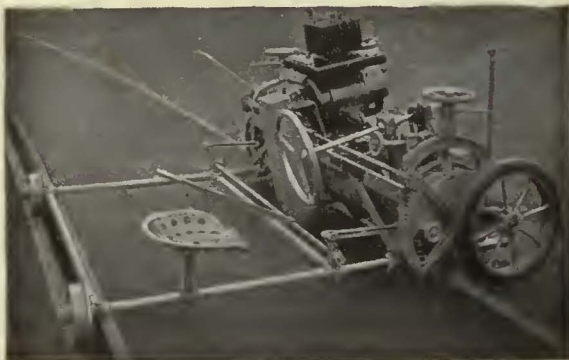
Ajax Electric Arc Welder



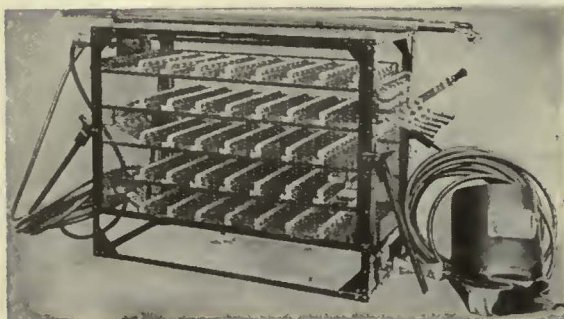
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HOW much will you pay to cut track maintenance costs four thousand dollars?

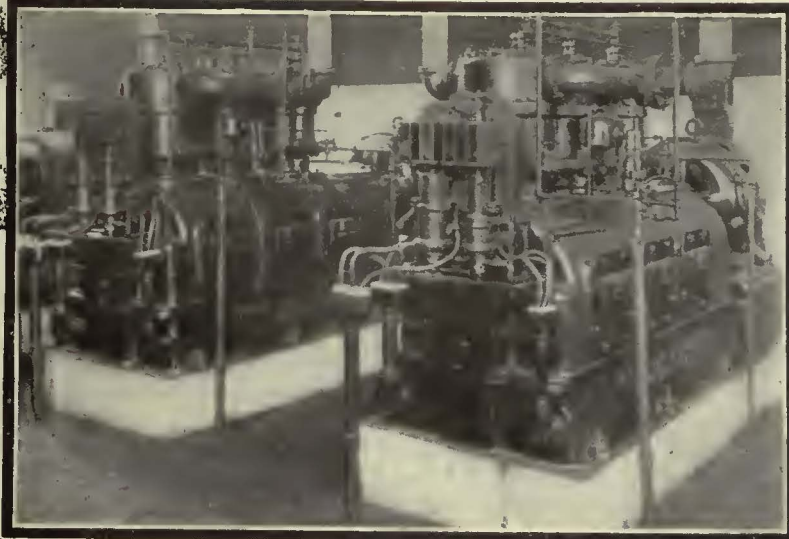
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 in AIR COMPRESSOR VALUE

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WESTINGHOUSE TRACTION BRAKE CO.

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WESTINGHOUSE-
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Cleveland

adopts O-B Trolley Wheels



A Cleveland Railways Company car receives its five-inch O-B Wheel equipment and leaves the barn. This equipment is identical with that which averaged 20,785 miles for twelve wheels.

In a never-ending search for methods and materials which effect reductions in operating costs, Cleveland Railways Company last August started scientific tests on five different makes of trolley wheels. The tests were for the purpose of establishing definitely which would deliver the most mileage per dollar of cost.

Among others, twelve five-inch and twelve six-inch O-B Wheels were installed on cars of approximately 50,000 pounds weight. The St. Clair Ave. line was the proving ground, and it operates with a 600-volt current.

The tests continued through the fall months, into the sleet and and snows of winter, and finally were concluded near the end of March. Accurate records were kept on the performance of each individual wheel. The records for the O-B Wheels were:

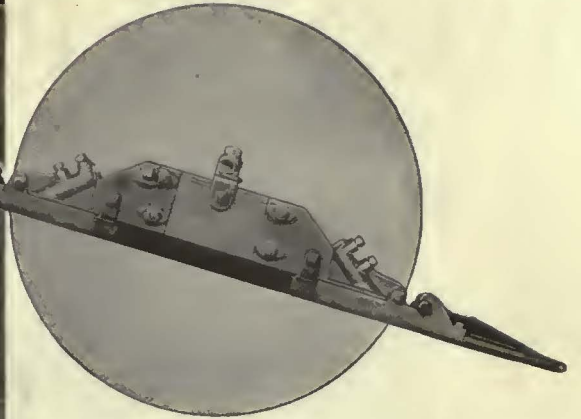
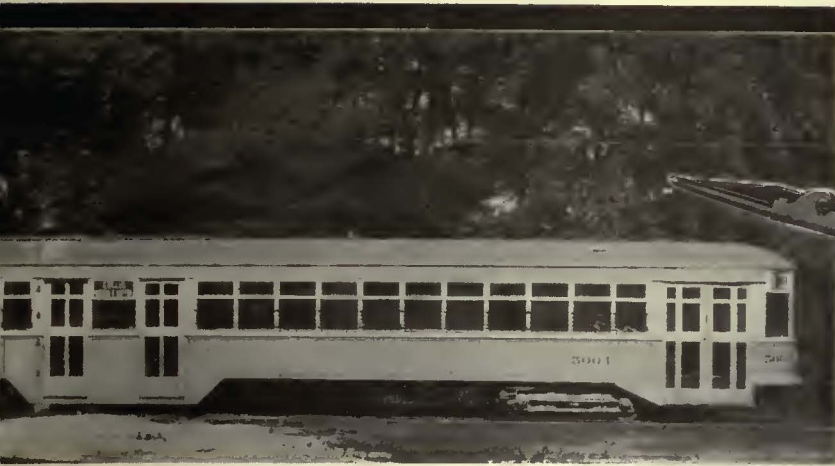
O-B Five-Inch Wheels

Average number of days in service	- - -	162½
Maximum mileage obtained	- - -	27,125
Minimum mileage obtained	- - -	16,711
Average mileage for twelve wheels	- - -	20,785

O-B Six-Inch Wheels

Average number of days in service	- - -	192
Maximum mileage obtained	- - -	28,020
Minimum mileage obtained	- - -	20,841
Average mileage for twelve wheels	- - -	24,407

Cleveland adopted O-B Five-Inch Wheels and more than four hundred cars have already been converted. That the change is made at this time is excellent evidence both of the money-saving performance of O-B Wheels and of the foresightedness of the officials involved in the decision.



Cashing In On Last Years' Foresight

Dozens of overhead superintendents are today congratulating themselves on the foresight which last year prompted them to install section insulators with renewable underruns. The money and the labor they are saving merely by replacing worn units, instead of having to buy and install new insulators, is especially opportune just now.

That's the important advantage of O-B Renewable Underrun, Section-Insulators! After they are installed in the overhead they are permanent. No time-consuming, schedule-interrupting fussing with block-and-tackle is necessary. To be sure, the fibre center runners, the end runners, and the cam and arcing tips wear out. But the beam doesn't wear, and it stays in place year after year without attention.

When the underrun portions wear out it is a simple matter to renew them. By removing two bolts any or all units may be replaced with new parts. The cost of the parts is small, the operation is not difficult, and schedule interruptions are practically negligible.

Officials who plan ahead will recognize the desirability of considering next years' operating costs when specifying the materials to be used this year. Their foresight will tell them that additional profits which accrue from lower costs will be just as welcome at that time as they are now. And further, that a reduction in costs has an even greater influence on net profits than a corresponding increase in revenue.

Among such men, O-B Renewable Underrun, Section-Insulators will be favored because they give the greatest service per dollar of cost.



A large property in a midwestern city has bought and installed more than 1600 of this type of insulator during the past year. Such foresight is invariably reflected in lower operating costs.

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Canadian Ohio Brass Co. Limited  Niagara Falls, Ontario, Canada

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tell them where you're
going...*

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Refer to our catalogs No. 7 and No. 9.

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**RAILWAY, POWER AND INDUSTRIAL
ELECTRICAL MATERIAL**

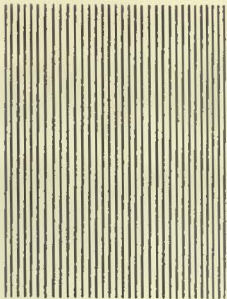
Home office and plant at 17th and Cambria Sts., PHILADELPHIA; District office at 111 N. Canal St., CHICAGO; 50 Church St., NEW YORK; Bessemer Bldg., Pittsburgh; 88 Broad St., Boston; General Motors Bldg., Detroit; Canadian Agents, Lyman Tube and Supply Company, Ltd., Montreal, Toronto, Vancouver.



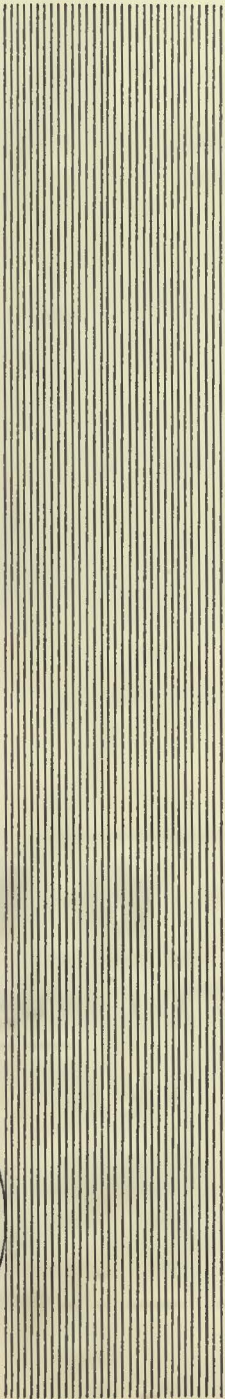
Front of Curtain



Rear of Curtain




**WHY TWO MEN PER CAR, WHEN
ATLANTA'S ONE-MAN CARS ARE
35.7% SAFER
9% FASTER**



WITHIN the past five years, the progressive Georgia Power Company converted 80% of their cars for one-man operation.

This change resulted in a decrease of 35.7% in accidents, a 9% increase in schedule speeds and a reduction in operating costs sufficient to enable this property to provide exemplary service at a low rate of fare.

This is further proof of the economy, speed and safety of the N.P. Automatic Treadle Operated Exit Door. All of Atlanta's one-man cars are equipped with this device.



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PNEUMATIC
COMPANY**

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THEY WILL IF YOUR FARE SYSTEM IS ENGINEERED—

P.M.
NOT GOOD IF DETACHED

00042

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County Transportation Co., Inc.

Good for continuous passage only if presented on date issued and before latest time shown at established transfer point.

Routes 8-9-11

000042

10

Hours	WEST	MANOR	Rockingstone	Mam'k Limit	Larch. Sta.	Rye Limit	RYE BEACH	EAST	Minutes
12									15
1									30
2									45
3									15
4									30
5									45
6									15
7									30
8									45
9									15
10									30
11									45

PRINTED IN PHILADELPHIA

THERE are many ways to build up riding preference and to increase the number of riders. Modern, comfortable cars and buses provide plenty of value for every fare. *But*—do your books show that riding privileges are being used properly—or abused? In other words, do you actually collect a fare for every passenger?

Generally speaking—There is only one way to make sure that each passenger “pays.” Use a protected *numbered* system of fare control. This does not mean a complicated system at all. In fact, even on very extensive properties, it is possible to operate very efficiently on a limited number of ticket and transfer forms.

Perhaps *your* property is one of the efficient ones. And yet, we are constantly showing operating executives how a few simple changes can save thousands of dollars annually.

We shall be glad to send samples of many successful transfers and tickets, or better yet, let us call on you and help you plan a modern ticket system.

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Long Life in a Severe Service



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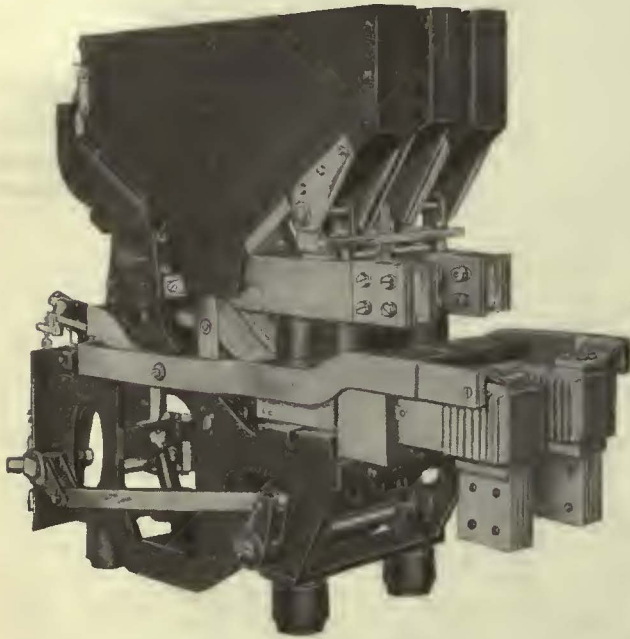
RICHMOND

AKRON

PORTLAND

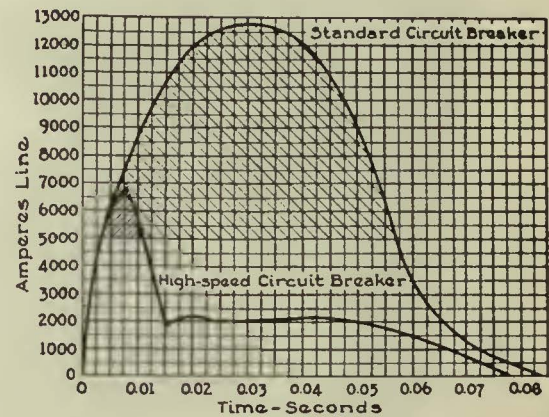
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Good Protection Is Good Economy



Type JR-36, 10,000-amp., 600-volt, high-speed circuit breaker installed in substations of New York Board of Transportation

Type JR circuit breakers have made possible many improvements in substation design and protection



Short-circuit curve of 2200-kw., 3000-volt motor-generator set protected by Type JR circuit breaker compared with curve which would be obtained with standard circuit breaker

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1. Extremely high-speed opening
2. Very effective rupture of arc
3. Electromagnetic tripping without mechanical latches
4. Electromagnetic, pneumatic, or manual closing
5. Trip-free feature for closing under load
6. Discriminating feature permitting selective tripping
7. Self-contained for installation in any convenient location

Approximately 2500 Type JR circuit breakers have been manufactured for the protection of conversion apparatus, feeders, and locomotives. They are available in standard designs for direct current ranging from 625 to 10,000 amperes and from 600 to 3,000 volts. For complete information, address the G-E office nearest you or General Electric Company, Schenectady, N. Y.

130-30

GENERAL ELECTRIC

SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

ELECTRIC RAILWAY JOURNAL

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July, 1931

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Volume 75
Number 7

JOHN A. MILLER, JR., Editor

Enlightened Attitude Toward Labor Shown by Electric Railways

WHILE a majority of the employers of labor have made heroic efforts to protect their employees to the greatest possible extent during the present period of depression, a minority have shown a regrettable inclination to be hardboiled. The latter appear to have forgotten their fine words of a few years ago to the effect that an employee is a human being—something more than a mere cog in the industrial machine. Reduction of operating expenses rather than fair treatment of employees is now in the forefront of their minds, with a cut in the personnel as the easiest way. For example, a large industrial concern, which has not reduced its dividend rate, recently dismissed a substantial part of its force with the idea that the discharged employees probably would not be able to get work elsewhere and could easily be rehired again when conditions improve.

No one can deny that the position of the employer of labor in these times is a difficult one. He cannot find money to meet his payroll by waving a magic wand. Where there is not work enough to keep all the employees busy, however, the work usually can be divided so that each shall have a share of it and so retain a place on the payroll. This practice has been widely followed in the electric railway industry. Considering the seriousness of the general depression, the transportation business has held up well. Its problem of keeping employees at work has not been so acute as it has in most other industries. Nevertheless, revenues have been considerably curtailed, and the industry has had to reduce expenses as much as possible. On many properties the working day has been shortened and fewer days per week are being worked by the individual employee. There has been a slight decline in the total number of persons employed in the industry, but this has been brought about largely by natural causes. Vacancies created through employees leaving the service have not been filled. In only a few instances has it been necessary actually to dismiss any considerable number of employees because of lack of work.

That the good record of the electric railways in retain-

ing their employees has been made at some sacrifice on the part of the companies is indicated by the reduction in net income figures. In the long run, however, this sacrifice will undoubtedly prove to have been well worth while. Good relations between employer and employee cannot be built on a mathematical formula. Mutual understanding of each other's problems is essential, as well as mutual consideration of the difficulties involved in the solution of these problems. By showing such understanding and consideration in these troubled times, the electric railways are building soundly for the future.

Hope Triumphs Over Experience in Oregon Commission's Pronouncement

BASING its action on the theory that a lower fare will attract enough additional patronage to maintain or increase revenue, the Public Service Commission of Oregon has ordered the Pacific Northwest Public Service Company of Portland to reduce its fares. Under the new rate, which among other things reduces the cash fare from 10 to 7 cents, there will have to be a 32 per cent increase in traffic to maintain current levels of revenue. Certainly that is something to ponder. As President Griffith's comment indicates, the theory of the commission is not reasoning in the light of experience, but is rather another instance of the triumph of hope over experience.

The issue, however, goes deeper than rates. Net earnings of only \$59,853 in 1930 testify to something amiss more serious than that. Since the company has not for a long time earned anything like a reasonable return on the investment, the case takes on the aspect of several similar situations in that the matter of valuation is not involved. Whether one accepts the \$20,708,069 value of reproduction cost new as found by Carey & Harlan, or the reproduction cost new of \$11,787,299 fixed by that firm when taking depreciation into account, the order of the commission is out of line with realities.

As a political gesture, the commission's action may be effective but adverse economic conditions are not corrected by political gestures. Portland needs an entirely

new deal—it needs a new deal under franchise terms that will eliminate burdens now unbearable, one that will permit the system to be recast and rebuilt in the light of experience elsewhere. This is a large order, but it is to be hoped that the way out will be found before irreparable damage has been done.



Times—and Automotive Engineers— Do Change

MUCH clamor has been raised from time to time against the street car because of the necessity for running on fixed tracks, its inability to turn out of its path to pass other vehicles, get out of the way of obstructions, or draw up to the curb. It is a matter of some surprise, therefore, to learn that the three new vehicle lanes on the Queensboro Bridge in New York City as well as on other bridges there, have tracks constructed in such a manner as to keep automobiles in line. These tracks consists of grooves 2 in. deep, and look considerably like the old-fashioned tram rail still in use on some trolley track. The engineers state that they are installing these automobile tracks as the best way to control traffic and reduce accidents principally by preventing one car from turning out and passing another. So, after many years spent in deriding the rail-bound vehicle for its lack of flexibility, the automotive engineers now have decided that, in order to prevent accidents, it is desirable to take away from the automobile that once-boasted freedom of movement and run it on tracks. Truly times—and automotive engineers—do change.



Trolley Bus Activity World-Wide

DURING 1930 trolley bus systems in the United States increased in number from six to eleven, and total vehicles from 58 to 159, a remarkable growth. Thus far in 1931, an order for 29 additional vehicles has been placed by one company and an experimental system has been started by another. Several other companies are seriously considering early installations, and at least two of the present operators are planning extensions. This activity during a period of economic depression speaks well for the popularity of the trolley bus in this country.

Recent developments in other countries, moreover, indicate that the interest in the vehicle is world-wide. London recently placed 60 double-deck trolley buses in operation as the first step toward establishing an extensive system. Walsall inaugurated service in April, Wolverhampton, and Bradford each added twelve vehicles recently, and thirteen other cities in England have announced plans for expansion. Outside of England and the United States, too, the expansion of existing systems or installation of new ones is under consideration in numerous cities.

From an odd-looking vehicle built in Germany in 1899, the trolley bus has developed into a form of transportation which now commands widespread attention. According to the most recent information there are altogether 53 systems in operation throughout the world—eleven in the United States; two in South America; six on the continent of Europe, 26 in England and Wales; five in Asia; two in Africa, and one in New Zealand. The available reports on the size of the various systems indicate that Chicago is first with 114 vehicles. Singapore is second with 105 and Shanghai third with 99. These cities are followed by Wolverhampton, 82; Bradford, 70; London, 60; Hastings, 58; Ipswich, 44; Rotherham, 36; Darlington, 32; West Hartlepool, 31; the Mexborough & Swinton, 30, and Salt Lake City, 26. In the comparisons of countries, England leads by a large margin with almost 700 vehicles. The United States is second with approximately 200 trolley buses.

From these figures, it is evident that the trolley bus has been adopted in every part of the world. While it does not yet rival either the street car or the gasoline bus in the scope of its operations, its growth has been remarkable and bids fair to continue at a rapid pace.



Canadian Traffic Situation Encouraging

FOR several years American operators have watched with more than passing interest the reports of Canadian electric railways. While traffic in the United States was falling slowly but steadily, that across the border showed a constant upward trend. The situation continued so long that serious efforts have been made to discover the reason, and, if possible, to adopt methods in this country that will obtain similar results.

Statistics for the Canadian roads for 1930 have now been collected and compiled by the secretary of the Canadian Electric Railway Association. These figures show that the upward trend of the past ten years has now changed and that traffic of the Canadian systems in 1930 was less than in the previous year. This result was not entirely unexpected, for the depression that has affected the United States so severely has been felt in Canada, too. However, the drop in revenues has been somewhat less than it has been in this country. On the other hand, it has not been possible to reduce expenses in Canada to take care of the reduction in receipts.

In looking for the cause of these differences, attention should be called to the different status of the two countries. Canada is industrially much younger than the United States, and is not nearly so far advanced in the exploitation of natural resources. Population has been growing rapidly, and especially in the last few years there has been a steady tide of immigration. There also has been a growing concentration of population in the cities. Competition from private automobiles in Canada has not been lacking, nor has it failed to increase. But in 1930 there was only one motor vehicle registered

to every eight persons in the Dominion as against one to every $4\frac{1}{2}$ in this country. To some extent this is due to smaller individual incomes, particularly in the Eastern provinces. Moreover, the climate, with long winters and much snow, makes all-year operation of motor vehicles exceedingly difficult. A large influx of summer visitors assists the transportation interests at a time when local automobile owners have their own cars in service.

Accordingly, it would appear that the comparatively small recession in traffic of the Canadian systems may be only a passing phase, and that a resumption of normal business activity will see them regain their upward trend.



From Independent Bus Operation to Co-ordinated Service

AWARD of a borough-wide franchise to the subsidiary of the Brooklyn & Queens Transit Corporation assures the outlying sections of Brooklyn efficient and reliable transportation by buses under a capable and experienced management. No longer will former taxicab drivers and ex-garage owners run bus lines on the principle of making the largest profit in the shortest time. In their past operations, little thought was given to the welfare of the community served. The public was inadequately protected by insurance against injuries. The personnel was irresponsible. These lines operated without franchises or certificates of convenience and necessity. They were inaugurated at a time when some form of transportation was urgently needed, and time did not permit the planning of a comprehensive system. And now that the needs of the rapidly growing sections of Brooklyn have made a comprehensive system of bus lines imperative, it has been entrusted to men with a transportation background.

Layout of routes and plans of operation were made after thorough study by engineers and officials of the company. Capital is available for the immediate purchase of 150 new buses and for the necessary storage and repair facilities. Management of the bus subsidiary will be unified with that of the Brooklyn & Queens Transit Corporation. Supervision of operation for both cars and buses will be centralized in a department of traffic and transportation.

The twenty routes granted by the franchise were laid out after careful consideration of the present and future needs of all sections of the borough. Although the bus lines are intended primarily to give convenient cross-town service in the southern part of the borough, they will, to some extent, supplement and feed the surface car lines and the rapid transit lines. Numerous transfer privileges between the bus lines and the surface lines at an additional cost of 2 cents will now permit traveling by direct routes between any two sections. In short, Brooklyn will have a co-ordinated rail and bus system in keeping with its importance as the largest borough of the metropolis.

Co-ordination Under Public Control in Prospect at London

CO-ORDINATION of the various agencies engaged in passenger transport in London has been under discussion in one form or another for several years. The number of competitive agencies has already been reduced substantially from what it was some years ago, but active competition continues between the tramways of the London County Council, the London Underground group and the affiliated London General Omnibus Company. To correct this situation, legislation has recently been sponsored by the Minister of Transport in the form of a bill to create the London Passenger Transport Board, which shall acquire and operate the several agencies now serving this territory.

It is planned to substitute securities of the Transport Board for those of the present companies. Thus the ownership of the property would remain in the hands of private investors. The securities are to have a fixed rate of return. Any surplus is to be used to increase or improve facilities. Rates of fare are to be under the jurisdiction of the Railway Rate Commission. Nothing quite like the proposed arrangement has previously been tried either in England or in America. In some respects it resembles the plan now in effect at Boston where the operation of the Elevated is under control of a Board of Public Trustees. Since the London Transport Board, however, would issue securities in its own name, the British proposal goes somewhat further than the Massachusetts arrangement.

Opinions differ concerning the merits of the plan. Everyone admits that co-ordination is desirable. Lord Ashfield, chairman of the Underground combine, has expressed himself in favor of the new arrangement and it has been indorsed at a meeting of the stockholders of the companies in this group. On the other hand, some opposition has been voiced on the ground that it would be undesirable to hand over to a public authority complete control of all the local transportation agencies of the British metropolis. Fear has been voiced that the board would not be free from political interference. Answer to this argument has been given that the board will be obliged to earn a predetermined rate of return on its securities and that inefficient management could not long endure. It is pointed out that the board can be removed by the Minister of Transport if found to be incompetent or negligent. That this would ever be done seems unlikely, however. Opposition was raised also by the London County Council, but this apparently was in the nature of bargaining for better terms and a satisfactory agreement has now been reached for the participation of this system in the plan.

In theory, at least, the project appears to have certain advantages. Whether or not it proves satisfactory in actual operation remains to be seen. If successful, it may suggest a solution of a problem which has lately been troubling a number of metropolitan centers in this country.



Ewing Gallosay, N. Y.

Public transportation facilities play an important part in bringing thousands of patrons to the New York Theater district every night

BRINGING *the* CROWDS

to the Theater

By

FLORENZ ZIEGFELD

Places of amusement depend upon public transportation to bring the large majority of their patrons to their doors. Developing a mass appeal by offering an attractive product, merchandising and providing the maximum of comfort is an objective common to both the theatrical and the transportation industries

GLARING lights announce to a pleasure-seeking populace a gay musical comedy. An eager crowd threads its way through the entrances and down the aisles to the seats. The orchestra strikes up a lively tune, the curtain rises and the audience is plunged into the romance of a carefully woven plot. The glamor of it all—the costumes, the girls, the scenery and the music

—gives members of the audience a genuine thrill, and drives away dull care. To make this possible a vast organization has been hard at work behind the scenes, unthought of by the general public.

Few of the audience realize the painstaking effort required to prepare and present a theatrical production. Selecting the most appropriate kind of plot, arranging the lines and music, choosing members of the cast, and repeated rehearsals—all are arduous duties that must be performed before a show can be offered to the public.

But worries are cast aside when the show is greeted enthusiastically by a first-night audience.

Another seldom-considered organization which has played an important part in making the first night a success is that of the local transportation service. Although the success of a show depends primarily on its own merits, I do not discount the extremely important influence of public transportation facilities. It is true of all theaters, particularly the movie houses, that the proximity of street car, bus, subway and elevated lines determines to a large extent the amount of patronage that will be received. A certain class of people comes to the theater by private automobile or taxicab, but the greatest number use public transportation. And it is upon this class of patrons that the theaters depend for the bulk of their business.

LOCATION NEAR TRANSIT LINES VITAL

In selecting the location for a theater the availability of transportation facilities is of tremendous importance. The Ziegfeld Theater, scene of many Ziegfeld hits, is close to the heart of the metropolitan transportation system in New York. The location at 54th Street and Sixth Avenue is a short distance away from the most congested part of the theater district, but the site is close to stations of the Seventh Avenue and Broadway Subways, the Sixth Avenue Elevated and the Fifth Avenue Bus lines.

Time is an all-important factor in this age of hurrying about. The public desires a rapid means of traveling between the home and the theater. That is one reason why rapid transit and surface transportation lines are so large a factor in bringing business to us. Because the curtain rises at a specific time, there is another important factor involved, the delivering of a great number of people in a brief period. In the Times Square theater district of New York City, for example, there are 80 theaters and places of amusement, with a total seating capacity of 147,000. Evening performances of musical comedies and revues start at 8:30, while most of the plays and long-run movies begin at 8:40 and 8:50. This means that most of the theater patrons enter the district within a period of 30 minutes. The continuous-run movie houses have patrons arriving at all hours, but the peak of their crowd comes during the same period during which the other theaters experience a rush. From these facts it will be seen that public transportation agencies in New York perform a stupendous job in delivering our patrons at a specific time.

AUTOMOBILES COULD NOT HANDLE ALL PATRONS

An interesting deduction from the above figures is that if all patrons were to come by private automobile, a total of 73,500 vehicles, assuming two persons per vehicle, would attempt to enter the zone within a half hour. It is doubtful whether even 5,000 automobiles would succeed in gaining entrance and finding storage space in garages or on the outskirts of the zone where parking is permitted. In meeting this situation, mass transportation facilities not only make it physically possible to deliver everyone at the proper time, but also eliminate the discomfort of traffic congestion and parking difficulties. While New York has been referred to specifically, the same holds true for every other metropolitan center of the country, for in all cities a majority of the theaters are within a limited central zone.

One of the prime functions of an entertainment is to



Florenz Ziegfeld

FROM an inconspicuous start in the theatrical business in 1892, Florenz Ziegfeld has become one of the most successful and best-known producers of musical shows in America. Always in the first rank of musical entertainments, his shows have set a standard which others have found difficult to approach. Mr. Ziegfeld's first notable efforts were in connection with the World's Fair in 1893, when he brought military bands from Europe and also organized and managed the Trocadero. He produced the famous Ziegfeld Follies, noted for "Glorifying the American Girl," from 1907 to 1927, and at present is introducing another edition. He also has presented many other spectacular musical productions. Through his many years in the industry Mr. Ziegfeld has been keenly aware of the important role public transportation plays in bringing patrons to the theater and the volume of business which each industry stimulates for the other. In this article he emphasizes the need for rapid, dependable transportation service and presents an interesting analogy between the two industries—both of which depend on pleasing the public by providing a maximum in attractiveness, comfort and convenience.

put the patrons in a happy frame of mind. However, I believe firmly in the theory that the collective receptiveness of an audience depends on the disposition of each individual at the start of the show. This means that public transportation facilities are charged with an important responsibility so far as we are concerned, in delivering our patrons in a good mood. Should they be held up by some delay, or should their feelings be

ruffled by discourteous treatment, they will not be in a mood to enjoy the show. It is equally important that they be returned to their homes safely and comfortably, so that they will look upon the entire evening as having been one of real enjoyment.

Theater managers the country over recognize the importance of good transportation to their business. Many co-operate on every possible occasion and even take the initiative in this effort. I know of several movie houses that have joint advertising campaigns with the transit companies, and I have even heard of some theaters refunding the car fares of its patrons. These efforts are highly commendable, since they result in more business for both the theater and the transportation companies.

PLEASING THE PUBLIC A COMMON OBJECTIVE

Fundamentally, both the amusement and transportation industries depend on a mass appeal to secure customers. Both recognize that the public is a discriminating one and that only by creating a definite appeal can the business be secured. First of all, we each must have a product that the people will want to buy. In the theater business we strive for the highest possible standard in show production, and obtain as many "headliners" as can be economically justified. Similarly, you try to keep your equipment in the best possible condition and run the cars as often as is consistent with good operating policy. In other words, we both strive to give the public the very best product that can be offered at the price we expect to get.

Secondly, having produced something in which we believe, we must let the public know about it. Advertising is a vital part of the show business, and probably plays an equally important role for transportation companies. In our business, there is a certain class of people which attends every show of the first rank. But there is a much greater number who are more or less indifferent and who must be sold on a show before they will attend. It is about the same with you. In the busy hours there are a great many people who ride your cars and buses consistently, but during the middle of the day and in the evening there are many who have no particular preference as to transportation means. Advertising brings the casual show attendant to our theater, and it brings to you those riders who might otherwise use a different mode of travel. In either instance, this additional business may mean the difference between profit and loss.

COURTEOUS EMPLOYEES A REAL ASSET

Producing an outstanding show and advertising it effectively serve to bring the prospective patrons to the door of our theater. Once there, it is important to extend them every possible courtesy while they are purchasing their tickets and while they are attending the performance. A box office attendant can ruffle a prospect so that he may not attend any of our productions in the future. On the other hand, courteous treatment often wins permanent friends for the management. But it is not only the ticket seller who is charged with this responsibility; the same holds true also for the ushers, doormen and all other employees. This is a phase of handling the public in which your industry also is vitally interested. Courteous motormen, conductors and bus drivers accomplish a great deal in winning friends for your company. Many deficiencies in a product are over-

looked if a tactful, interested employee impresses upon the patron a sincere desire to accommodate.

Inside the theater we have the same problem of pleasing the patrons by providing comfort and convenience. Restful seats, ample knee room, effective lighting, proper temperature and adequate ventilation all contribute to the comfort of our patrons. These elements are under constant study with a view toward improvement. The wide use of refrigeration for cooling theaters during the warm months is an example of our endeavors to make the customers more comfortable. In your industry you consider spring cushions, leather and plush upholstered seats, ample knee room, good lights and proper heating and ventilation of first importance in making the ride attractive.

Convenience, also, is a factor not to be overlooked. The location and width of aisles, the provision of numerous exits and the arrangement of stairways to the balconies all figure prominently in making the theater convenient for the patrons. In the same way, wide aisles and doors, hand holds and properly located doors aid your passengers in getting into the vehicles and leaving them quickly.

PLEASANT INTERIORS CREATE AN ADDITIONAL APPEAL

Though the major appeal for our patrons is centered in the production itself through the characters, the costumes, lighting effects and staging, they must be supplemented by attractive surroundings within the theater. This is accomplished by the scheme of interior decorating, colored lights in attractive fixtures and numerous ornamentations. It would scarcely be feasible to adopt the same degree of decoration in a public vehicle, because it is intended primarily for utility, but probably some of the ideas could be used. It is an accepted fact that people really do appreciate pleasant surroundings. Undoubtedly this is true even when traveling from one part of the city to another.

From all this it will be seen that the theatrical and transportation industries have certain problems and certain interests in common. Good transportation service promotes theater attendance, and good theater attendance promotes increased use of the transportation service.

This is the fifth of a series of articles by prominent men outside the electric railway industry, expressing their views on transportation subjects. The sixth will appear in the next issue.

In the August Issue

A searching analysis of the financial problems of the local transportation industry

by

Francis H. Sisson

Vice-President
Guaranty Trust Company of New York

Convinced of the vital importance of mass transportation, he has a number of cogent suggestions for placing the service on a firm financial basis

Well-Planned Schedules

Speed SUBWAY TRACK

CONSTRUCTION

By

Robert H. Jacobs

Division Engineer Board of Transportation
New York City



Rails bolted together and laid loosely in the trackway



Jacking up the rails for placing ties and tie plates

tracks. The rails are independently supported on short creosoted ties of long-leaf heart-wood pine, 2 ft. 6 in. long, spaced, 22½ in. apart with an 18-in. spacing at the rail joints. Longer ties are used for the third-rail sup-

Driving screw spikes in prebored holes. Short ties are 2 ft. 6 in., and long ties for third rail support are 3 ft. 10½ in.



STANDARDS of track construction for the new subway lines in New York City represent a normal development based largely on experience of the companies operating existing rapid transit lines. As in the construction of the subway structure, the specifications for all track construction and materials are prepared by engineers of the Board of Transportation. The work itself, however, is done by local contractors who have been awarded contracts for definite sections of the line, depending upon the continuous length of completed structure. In the past, contracts have varied from lengths of 5 to 20 miles of continuous track. Engineers of the Board of Transportation with their inspectors are in the field during the progress of the work to insure that it is done in strict conformity with the specifications, and to give all necessary lines and grades for the work. All track material, except concrete and a few minor items, is purchased by the Board of Transportation and furnished to the contractor.

The most important change from former track construction practice is the adoption of the concreted type of track throughout, except for special work, short sections of track between special work, lay-up tracks and yard

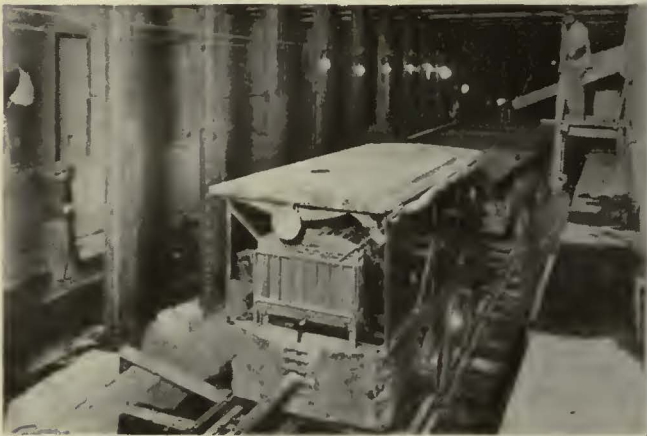
ports. Concrete is poured to the top of the tie with a slight slope toward the center of the track. A trough, 2 ft. 5 in. wide and from 7½ in. to 10½ in. deep at the center, is formed between the ties, with drain boxes at intervals as required to meet local conditions. Screw spikes are used with the tie plates having bosses to support the heads of the spikes so as to leave a space of



Leveling and spacing ties



Concrete mixer obtains batches of sand and coarse aggregate properly proportioned from truck with compartments for each batch



Galvanized iron chute conveys concrete to side-dump cars driven by a gasoline locomotive



Concreting begins at both ends of section and progresses toward the center

$\frac{1}{16}$ in. between the base of the rail and the underside of the head of the spikes.

The subway structure is built to conform to theoretical dimensions within the limits of practical construction practice. The small operating clearances planned require that a detailed survey of the structure be made before installing the tracks, and in some cases alignments and grades must be adjusted to assure proper clearances. Line and grade points are established on the subway walls at 20-ft. intervals, and the location of insulated joints, switch machines, automatic stops, and conduits for feeders, negative returns and other cables are also marked. This work is well advanced before the actual track construction.

METHODS FOR GETTING MATERIALS INTO SUBWAY

Rails, special work and fittings are hauled by trucks of the track contractor from convenient freight stations to the work. Ties are delivered along the site of the work at points convenient for getting them into the subway. Selection of such places is an important factor governing the progress of the work as well as the cost to the contractor. The rails, special work and most of the fittings are usually introduced into the subway through suitable station entrances. A portable power hoist unloads the rails from the trucks after which they are skidded down temporary ramps to the station platform. The rails are then loaded with a block and fall on flat cars driven by a gasoline engine. About 30 rails, with angle bars and track bolts, can be loaded on each flat car. A derrick on the flat car places the rails continuously along the trackways of the subway where they are immediately bolted and gaged loosely, allowing the car to proceed and to lay more rail.

After the rails for a designated section have been placed and bolted, ties and track fittings are distributed along the line at convenient points. The ties and tie plates are set in place by raising the rails with jacks. After the track is raised to the approximate line and grade, precast concrete pedestal blocks, spaced 8 ft. apart, are placed under the base of the rail. These pedestal blocks are made to the same specifications as the concrete in the track and become a part of the track structure. The tops of the pedestal blocks are set about 2 in. below the base of the rail for the insertion of wedges to make the final adjustment. The rails rest on these blocks so that the bottom of the ties hang about $7\frac{1}{2}$ in. above the invert. In general, four line and four gage braces are used for each rail length on tangent tracks, and five on curves to hold the track in place. These braces are cut short to permit final adjustment of the line and grade by wedges. After the track is checked for line, gage and surface, concrete is poured. The only forms necessary are those placed along the ends of the ties to construct the trough. Construction of the concrete track is carried on and completed in sections of 1 mile.

The concrete mixer, having a capacity of 1 cu.yd. is located on the street surface at about the center of the section to be concreted. Concrete is conveyed by chute to side-dump buckets in the subway through a 10-in. galvanized iron pipe chute. The chute is carried from the street surface through a duct manhole or a ventilating chamber to the buckets. The pouring of the concrete is begun at the two extreme ends of the section simultaneously, progressing toward the center. Six buckets, each having a capacity of about 2 yd., are driven by a gasoline locomotive under the chute to receive the concrete. Three

buckets are placed on each side of the locomotive, one set of buckets being filled and driven to the end of the section and dumped, while the other set is left under the chute to be filled with the concrete. The engine then returns to the chute with the empty buckets, hauls the others, which are filled by this time, in the opposite direction. This operation is repeated, finally closing in the works at the chute location. For greater speed two locomotives are sometimes used.

BATCHES OF COARSE AGGREGATE HAULED FROM YARDS

Rigid inspection of the work and frequent checking of the track for line and grade are necessary, as the success of this type of track is largely dependent on its accuracy and the thoroughness with which ties are embedded in the concrete. The proportion of aggregates, the control of water and the thorough mixing of the concrete follow the accepted practice for this class of work. The aggregate is delivered to the mixer in compartment trucks, each compartment carrying the correct proportion of sand and crushed stone for a batch. The aggregate is unloaded directly from the truck to the mixer. Concrete is mixed in the proportion of 1 : 2 : 3.85, $\frac{3}{4}$ -in. crushed stone being used for coarse aggregate.

The concrete is poured for the full depth of the track construction in one operation and thoroughly spaded or tamped under the tie. Depressions in the surface of the concrete are provided for the placing of rail anchors. After the concrete is poured and thoroughly tamped, the surface is finished by troweling. Care is exercised in troweling the surface of the trough in order not to honeycomb the concrete around the ties. Concrete is poured at the rate of 800 to 900 ft. of track per working day, exclusive of the time taken in changing the location of the mixture. About $\frac{1}{3}$ cu.yd. of concrete is poured to a running foot of track.

Prior to pouring the concrete, a full-sized clearance templet is run over the track to insure that proper car clearances have been provided. Concreting is followed up promptly after the track has been finally checked by the track inspector with special gages and templets and necessary adjustments are made to bring the track to accurate line, gage and grade, corresponding with the marks on the walls of the subway. No construction trains are allowed to run over the fresh concrete until after a period of at least 36 hours.

As a measure of economy and in the interest of faster work, the laying and bonding of the contact rail, installation of the insulated joints and of conduits in the track ways are included in the track contract. The contractors' equipment for handling the track material is also suitable for handling the contact rail. In this way, the work can be carried on in connection with the construction of the track itself. A standard section of the contact rail is 150 lb. per yd. The insulators on which the contact rails rest and the brackets for the contact rail protection boards are supported on the longer ties placed for that purpose. Insulated joints are installed in the track at the time of track laying.

The necessity of providing for positive and negative cables, lighting, escalator and circuit breaker connections requires that a large number of conduits be placed in the trackway. These conduits are all placed in advance of the concrete work. In this manner, delays and interference are reduced to a minimum. Provision is also made for the installation of signal and interlocking apparatus to be installed under other contract.



Spading and troweling concrete in the trackways



Checking line, grade and gage of track before the first set in the concrete



Checking for car clearances with full-sized templet

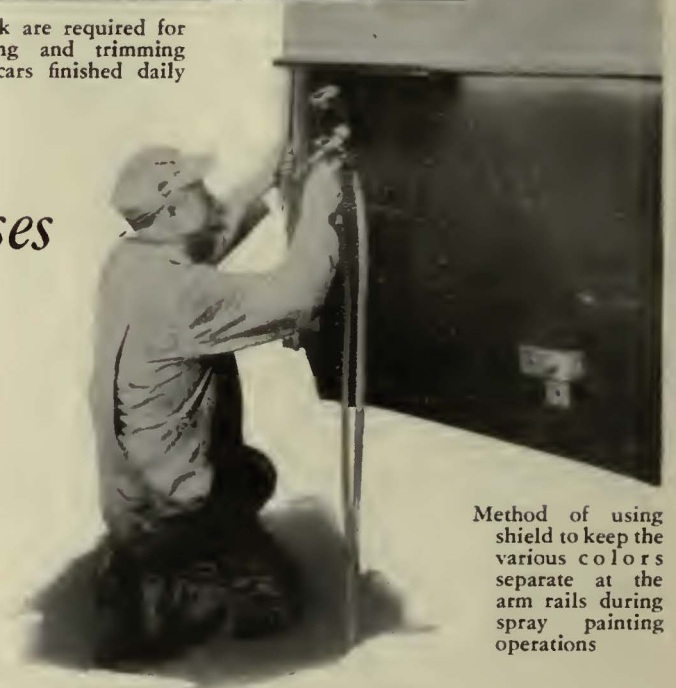


A finished track ready for service



Six tracks with two cars on each track are required for washing, sanding, glazing, painting and trimming operations on a schedule of two cars finished daily

Painting Cars and Buses at Kansas City

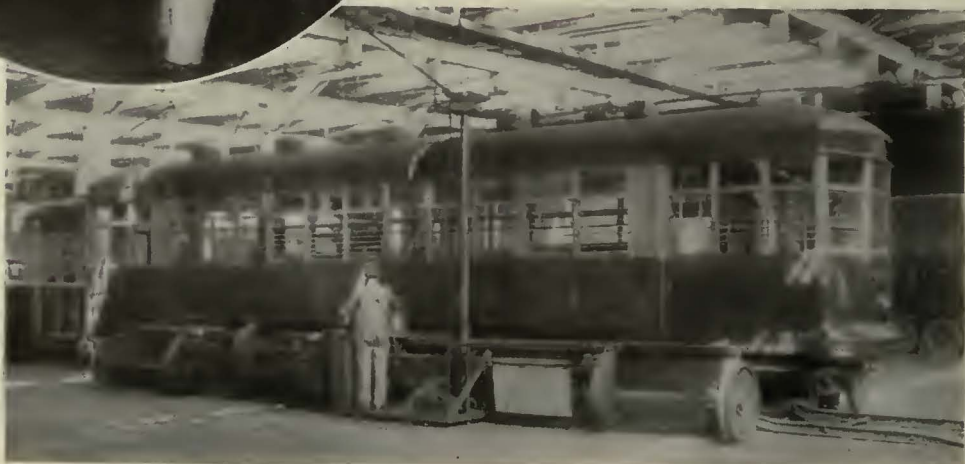


Method of using shield to keep the various colors separate at the arm rails during spray painting operations



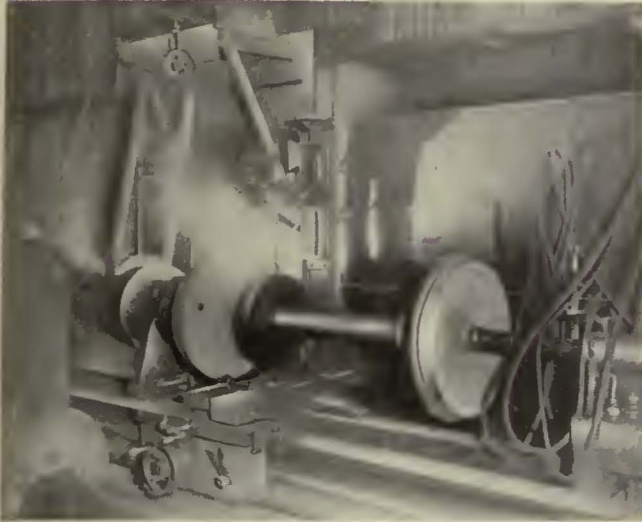
Ready for spray painting

Cars are placed as desired in the paint shop by means of the transfer table

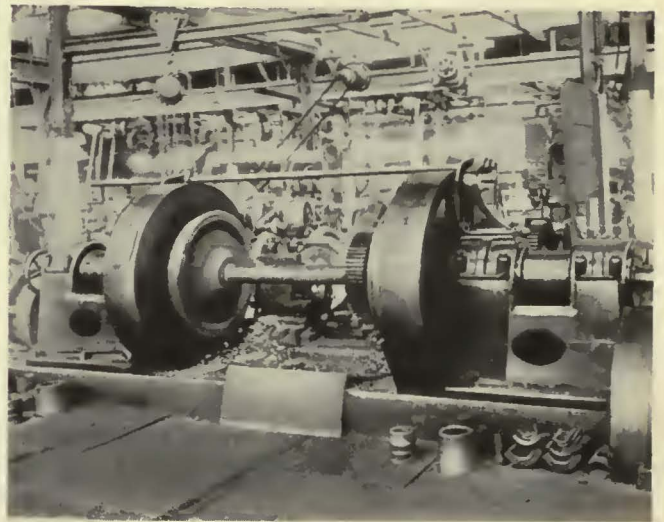


Putting Car Maintenance on a Calendar Basis

Inspection, repair and overhaul programs at Kansas City are based on calendar and car-series schedules. Better planning of budgets, materials and labor, standardization of shop practices and positive control of maintenance costs are advantages of this method



Automatic wheel welding



Wheel flanges and treads are reshaped in this machine after flanges have been built up by welding

SO SUCCESSFUL was the method followed in the rehabilitation program of the Kansas City Public Service Company in 1927 and 1928, when all the rolling stock was put through the shop by type groups, that running inspections, minor repairs and overhaul have now been placed on the calendar car-group basis. Two years' experience with this plan has developed standardized practices, specialized crews, and a system of concentration on equipment by type that gives better results at greatly reduced cost.

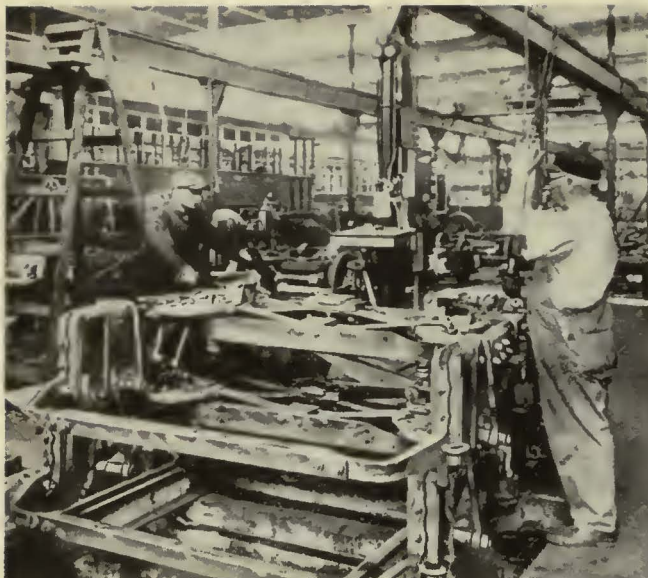
Definite knowledge as to dates for overhaul of any group of cars permits advance planning for materials required for the particular type body, truck and motor. Reduction in storeroom inventory is thus made possible. For example, if a certain group of cars with special types of bodies, trucks and motors are not due into the shop for either heavy or light overhaul during the current year, materials required for these types are stocked only in such quantities as are required for normal replacement. The plan also permits the placing of material orders in larger quantities, since overhaul of like equipment is concentrated.

Shop practice and operations are standardized because the equipment on the cars in each group is the same for the most part. The general condition of a series of cars can be more clearly recognized when they are overhauled as a group. Advance knowledge of the due date of any series of cars allows the shop to accumulate and repair spare parts, and hold them for use on the job when it arrives.

A pre-overhaul examination of an entire group of

cars is made far enough in advance of the due date to permit placing purchase orders outside and store orders with the shop for the quantities of materials required for the job. This permits an estimate of general conditions, and an accurate knowledge as to the number of roofs, floors, sills, curtains, etc., needed.

The calendar-overhaul plan necessitates close co-operation between the operating and maintenance departments. It is necessary to equalize approximately mileage operated by all cars in a series. Previous mileage records and car schedules were carefully studied, and a system of assigning cars to a definite amount and kind of work was put into effect. Maintenance schedules on the calendar basis were then made up by which all cars are now inspected once a week, or, approximately, at the end of every 750 miles run, and are assigned to the shop for overhaul at the end of each fifteen-month period. Because inspections and overhauls are of two distinct kinds, the cycle for a complete inspection covers two weeks, and for a complete overhaul it covers 30 months.



The truck shop, motor floor and wheel floor are equipped with five 24-ft. span overhead traveling cranes

Present inspection practice provides that all cars shall be inspected once each week. One-half of the cars receive a general inspection, done in the daytime, and the other half a "light," or lubrication, inspection, done at night.

The system used for assigning cars to inspection periods is simple and positive. A metal tag is carried in the front vestibule of every car. One-half of the cars are identified with red tags and other half with blue. These tags show the division to which the car belongs, the day of the week upon which the car is to be inspected, and the specific track on which it is to be placed. One-week blue-tag cars receive the general inspection, while red-tag cars receive the light inspection; the next week on the same day the red-tag cars receive the general inspection, while the blue-tag cars receive a light inspection. If a car is to receive the general inspection, it is placed on the inspection track after the morning trip, and if it is to receive a light inspection, it is brought in after the last trip. A sign is placed at the entrance and exit to each yard to indicate which group



Lathe and planer operations are performed in this section of the machine shop. Tool room is at the right

of cars is to receive the general inspection that week, and which the light inspection. The sign is changed every Sunday so as to alternate heavy and light weekly inspections.

Seven double-truck cars is the daily quota for one inspection crew. The crew consists of five men: controller inspector, electrical inspector, truck and brake inspector, car body inspector and lubrication inspector. At four of the division carhouses in Kansas City, one inspection track, manned by a standard crew of five men, is maintained. At the Brighton carhouse, two tracks and two crews are necessary, and at the Harrison carhouse three are required. Inspection crews are under the direct supervision of a chief inspector where there is more than one crew. Where there is only one crew, the electrical inspector is known as the "lead" inspector and he has direct supervision of all work.

The following instructions, issued to the maintenance personnel at the Harrison carhouse, will serve further to explain the operation of this inspection system.

On week days, Monday to Friday, 25 cars will be inspected during the day and 25 at night on the lubrication inspection.

On Saturday, fifteen cars will be inspected during the morning and fifteen at night. This plan will permit the inspection of 280 cars each week, one-half of which will have the general inspection and one-half the night lubrication inspection.

The day inspection will be divided between three crews, and each crew will always inspect the same cars at each inspection. The crews will be designated as crews No. 7, No. 8 and No. 9, and the inspection tracks will be numbered in the same manner. Two crews—for example, Nos. 7 and 8—will inspect eight cars each, and crew No. 9 will inspect nine cars. The cars should be divided so that crew No.

9 will get all the single-truck cars and cars on which the inspection work is lighter. In other words, crew No. 9 should get, if possible, seven double-truck cars and two single-truck cars each day, in order that their inspections may be completed in the same time required for the other crews to work on eight cars each.

In dividing the cars among the three crews, the foreman should use care to see that one crew does not get too many cars of a better condition or more modern type than another, as each crew is rated on failures, and fairness in dividing cars may prevent disagreements later. If possible, it is further recommended that the Saturday morning cars be of a type not requiring excessive inspection work, as only five hours are allowed for the inspection of five cars, or an average of one hour per car instead of the standard time of one hour and ten minutes.

Each carhouse maintains a record of failure and pull-in reports, and posts a weekly report showing each inspector's name and the number and kind of failures that occurred on his particular part of the equipment. The carhouse foreman settles any disputes regarding classification of these failures. The ranking of a crew is based on the total number of failures charged to its members.

Economy meter readings are recorded on both inspections, so that a general check will be obtained on the actual service of the cars between inspections. Although the division supervisors are responsible for the inspec-



Yard entrance sign indicating type of cars due for inspection

tion of cars and seeing that none are missed, the office of the superintendent of equipment, through the mileage clerk, also has a check by the kilowatt-hour readings of any cars missed. In other words, if readings on a car are not reported, it is an indication that an inspection was missed and the division carhouse will be notified immediately.

Written instructions and procedures are placed in the hands of every member of a maintenance crew. Work is so planned that an inspector will not interfere with another member of the crew, but can, at proper times, assist any other inspector. Each makes only such repairs and adjustments as are ordinarily made in connection with regular car inspection.

A standard inspection report has been adopted which shows equipment failures from one general inspection to another. It also lists the repair work to be done by repair crews before the next general inspection. This form is a complete condition record of the car and is kept up to date at all times by either the inspectors or the clerk, in whose keeping it remains between inspections. Inspectors responsible for the condition of the equipment on the cars are required to sign this report at each inspection. This not only directly charges them

with the condition of parts under their care, but puts an expert O.K. on the car as a whole before it is put into service again. This report has proved valuable to the legal department on many occasions in accident cases.



Tag on car shows when and where it is to be placed for inspection

The completeness of this performance record and inspection report is worthy of note. Space is provided for the car number, the inspection day and the meter reading at the last general inspection. Some operations are not performed at every general or two-week inspection. For example, side and center-bearing inspection for lubrication is not required oftener than every four weeks, which is every second inspection; slack adjusters require lubricating only every six weeks, which is every third inspection; therefore, alongside the general inspection number heading, the carhouse clerk marks the number 1, 2, or 3, meaning that the car is having its first, second or third inspection, and the inspector knows just what operations are to be carried out.

Five blank spaces under various mechanical headings are used to record equipment failures since the last general inspection. Information for these spaces is secured by the carhouse clerk from various sources, and he immediately makes notations to guide repairs at that particular car's next inspection. The carhouse clerk also lists any equipment changes. For example, a CT-25 compressor is replaced by a DH-16 type. This information is taken from this form in the equipment office, and records in the files are brought up to date by record clerks. A space is provided and filled in by the supervisor of night, or light, inspection, which consists principally of lubrication, brakes and control equipment. On the reverse side of this form any special repairs to be made at the next general inspection are noted.

For the 30-month complete overhaul, and for the fifteen-month lighter job, sixteen cars of one group are



Armature shafts and commutators are being turned and bearings and pinions fitted in this section

brought in. Three five-day weeks is the period required to overhaul and paint a car. Six tracks with two cars to the track are used in both the overhaul shop and the paint shop. One truck and motor, or light overhaul, and one heavy or complete overhaul are assigned to the same track since both cars are due on the same day. Each day, certain operations are performed. Every car is equipped with a large figure 1, 2, 3, etc., denoting the day of overhaul the car has reached. This also applies to the truck, motor, and electric repair floors. The routine is systematic and reduces supervision, and also reduces the likelihood of delaying a car in a space scheduled for a following car. Operations are so arranged that the minimum amount of interference between door and step man, air man and electrical man will occur.

From more than two years' experience with the plan of overhaul by calendar and series of cars, very satisfactory methods have been evolved, costs have been considerably reduced and a better grade of work resulted. Specialization of workers, standardization of operations and concentration of types of equipment have made possible the smallest shop personnel in the history of the railway company.



Materials and processes are tested in the chemical laboratory before they are adopted as standard

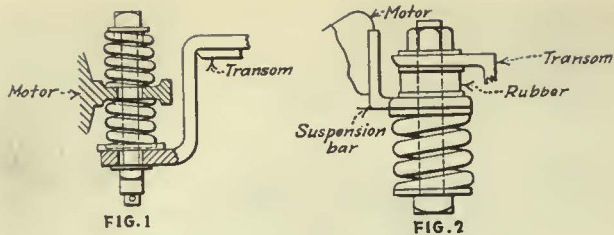


Fig. 1—Suspension with nose at center of motor

Fig. 2—Motor bar suspended. One spring assembly at each end of motor

Making Motor Suspension Springs Adequate

SPRING suspension of the nose of an axle-hung motor may be worse than useless unless the springs are: (1) Strong and stiff enough to take maximum load without going solid or breaking; (2) soft enough to deflect under loads that the motor can impose; (3) so arranged that there is no sideway, restraint on the motor. Many equipments now running fail to meet one or more of these requirements.

It is fairly easy to select a spring of proper dimensions to meet the first two requirements. Most trucks have such springs in them originally. However, the second requirement may be completely defeated by tightening the spring with the suspension bolt until the stress set up is greater than that caused by any load the motor can deliver. There will then be no further spring deflection under load, and the motor might as well be resting on the transom. It is receiving no protection from road shocks.

Springs should have little or no initial compression other than that caused by the motor weight. The spring system should be so designed that there is a definite stop to prevent excessive tightening of the springs. This should not be left to the judgment of the workman, since

the tendency almost always is to pull the bolts up as tightly as possible.

The design should be such that all motions of the axles relative to the truck are unrestrained by the spring system to the limits of wear of the truck parts; but many spring systems are designed with little or no consideration for the effect of wear and variations in the truck and motors.

Wear occurs on the thrust surface of the journal bearing against the axle, on the thrust surfaces of the journal bearing and journal box against each other, and between the journal box and the pedestal guides. This wear plus the initial clearances may total $\frac{1}{2}$ in. to $\frac{3}{4}$ in. unless the same clearance exists in the suspension arrangement between the motor and the transom, the motion between the axle and truck will be restrained by the motor. This will throw loads on the motor axle bearings far beyond what they are designed to carry. Hot bearings will result.

The various spring arrangements in common use are shown in Figs. 1 to 5. The types shown in Figs 1 and 2 apply generally to practically all motors of less than 65-hp. rating. The chief defects in this design as usually built are: First, too little clearance for the bolt, and second, no provision to prevent setting up the spring too tight. The first results in bending or breaking of bolts, and sometimes breaking of springs. The second means little or no spring suspension.

On larger motors the commonest construction is that shown in Fig. 3. Here there is no attempt to get spring suspension. Quite frequently the yoke over the motor nose has too little clearance to the nose, resulting in binding when wear develops in the truck parts. This may cause hot axle bearings. Fig. 4, or some variation of it, is a considerable improvement, but here again provision must be made to prevent overtightening of the bolts.

Fig. 5 shows a construction that is more satisfactory than Fig. 4, and easier to handle. There is no binding in any direction, and the set-up stress is determined by the spring design and the space allowed for the spring. The motor is built with a double nose, and there are four lugs on the transom as shown. The spring nest is held between two wearing plates. It is compressed by the two end bolts sufficiently to allow the assembly to be slipped between the noses, after which the tension is released. Guides bolted to the transom at the ends of the nest keep it centered and vertical.

With increased speed of equipment the order of the day, serious attention should be given to the provision of adequate spring suspension for the motors. It will pay in reduced maintenance, less flashing, less noise, and generally better all-around performance.

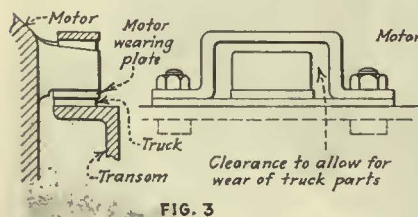


FIG. 3

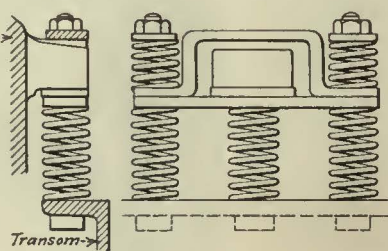


FIG. 4

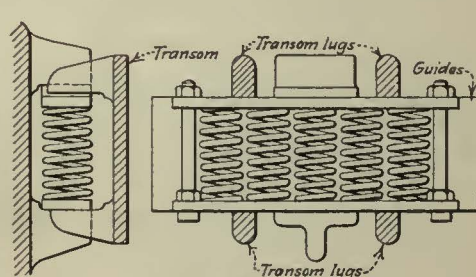


FIG. 5

Fig. 3—Suspension for large motors without spring support

Fig. 5—Flexible spring suspension for large motors with double nose and lugs on transom



Sixty double-deck vehicles of this type are being placed in service by the London United Tramways

London Inaugurates Extensive Trolley Bus System

Sixty double-deck trolley buses in original order to serve about 17 miles of route. Advanced ideas in construction and equipment embodied in design of vehicles

TROLLEY buses were introduced to London on May 16, with the starting of service on the Twickenham Junction-Teddington section of the London United Tramways. Before the end of summer, about 17 miles of the system will have been converted to trolley bus operation and 60 vehicles will be in use. With a system of this magnitude and plans for expansion in the near future, London assumes a position of prominence among the cities with trolley bus service.

As shown on the accompanying map, the lines comprise the entire routes operated by the L. U. T. in the Kingston, Surbiton, Malden and Wimbledon areas, as well as the Teddington-Hampton Wick section of the Hampton Court loop. At Wimbledon and Kingston certain short lengths of car routes, dead ends, will lapse from service. In the Kingston area the operation will be facilitated by stringing overhead along Park Road, a byway that connects the Richmond Park and Kingston Hill terminals. This will form a loop around which the vehicles from Dittons and Tolworth will operate in opposite directions. The two longest routes extend from Wimbledon Town Hall to Hampton Court, via Raynes Park, New Malden, Norbiton, Kingston and Hampton



A large area of London will be served by trolley buses when all of the lines have been converted

Wick, and from Twickenham Junction to Tolworth, via Teddington, Hampton Wick, Kingston and Surbiton.

A large proportion of the car track on the lines being converted is approaching the stage when renewal would be necessary. Also new rolling stock would be required soon. Traffic on these lines is not very dense, so that peak loads can be handled satisfactorily by the trolley bus. In determining the best plan of improvement, therefore, the Underground Company, which controls the L. U. T., decided that a conversion to trolley buses was the most advantageous proposition, from the viewpoints of economy and traffic efficiency.

The existing overhead construction is being modernized and supplemented by the necessary return wire on the Nottingham suspension principle, which comprises a system of span wires with central support. To insure a steady line voltage, an automatic mercury vapor sub-station is being installed at Malden. A constant voltage is important, as the electric motor, although nominally of 80 hp., develops 150 hp. at starting.

The 60 vehicles being built are the double-deck type and seat 56 passengers. Chassis are the model 663-T of the Associated Equipment Company, bodies are by the Union Construction and Finance Company, and the electrical equipment is by the English Electric Company and the British Thomson-Houston Company, the former furnishing 35 buses and the latter 25. Completely equipped, the new vehicle weighs 16,400 lb. Its over-all length is 27 ft. 7½ in.; its maximum width 7 ft. 5½ in.; the height from ground over roof sheets 14 ft. 3¼ in., and the wheelbase, 16 ft. 6 in.

Incorporated in the design of these vehicles are many new features. Fifty-four of the vehicles will be fitted with a special form of hood, designed to give improved balance and proportion to the lines of the front. This hood will have a headlight of the tilting type. A further departure is a new type of spring bumper for the left rear corner, designed so that it does not increase the over-all length.

Fully loaded the trolley bus is capable of a speed of 29.4 m.p.h. on the level and 18 m.p.h. on a 5 per cent grade. Acceleration is up to 2 m.p.h.p.s. Deceleration can be effected at approximately 5½ m.p.h.p.s. for ordinary stops and at more than 8 m.p.h.p.s. for emergency stops, these rates being uniformly continued until the vehicle comes to rest. The emergency deceleration enables a trolley bus that is running at 30 m.p.h. to be brought to a standstill in about 80 ft. The average scheduled speed, including stops, is from 10 to 12 m.p.h.

Built of nickel steel channel-shaped pressings, with a maximum depth of 11½ in., the chassis frame is exceptionally rigid, and the large over-all width makes for great stability. It is downswept over the front and the rear axles, which permits a body with a low floor level to be mounted. The cross-members are of tubular section.

The front axle is of substantial design and has extra large roller bearings. The kingpin, fitted with a special roller thrust bearing to eliminate friction, is so designed as to reduce steering effort to a minimum. Easy control is effected further by a light type of steering gear. A special type of front wheel brake, operated through a

push rod in the kingpin, prevents the brake adjustment being disturbed by the steering lock. Hydraulic shock absorbers are supplied.

Simplicity of the rear truck design is promoted by the adoption of a single road spring on each side, instead of the usual four-spring arrangement. The two rear axles are one-piece nickel steel forgings, and the worm casing provides a large oil capacity. Worm gearing and bevel type differentials can be quickly detached from the casings. A third differential is fitted to the intermediate axle, thus assuring the equal division of power between the two axles. Another noteworthy feature is the torque blade, of chrome vanadium spring steel, which permits complete freedom of motion of each axle and obviates extreme angles on intermediate propeller shaft couplings.

With the exception of the resistances, all of the single motor equipment is mounted at the front. The DK-130 English Electric and the 110-DL British Thomson-Houston box frame self-ventilating motors have normal ratings of 80 and 82 hp., respectively. In each type the armature is mounted on roller bearings and is easy to remove, while the motor as a unit can be lifted out through the front of the hood.

Movement of the master controller is effected by a pedal. The six-notch English Electric controller is of drum type and works the contactors in conjunction with a current limit relay, which is automatic after the first two notches.

The fifth and sixth notches are "running" notches, the fifth giving full field and the sixth a weakened field. The nine-notch Thomson-Houston controller is of a new type, the spring contact fingers, of silver, being mounted on an insulated bar and the contacts on an insulated base. It is under the control of the driver throughout the entire range of operation. The eighth and ninth notches are "running" notches. A special device necessitates the direct action of the driver to use field shunting.

Current collection is through two 20-ft. trolley poles, allowing the vehicle a maximum deviation of 13 ft. from the center line. A bamboo trolley retriever is carried in a sheath under the body. Attached to the chassis is a skate, operated by a change-over switch. Through contact with the track rail this enables the trolley bus to be maneuvered on car track where there is no overhead return wire.

Internal expanding brakes, with detachable liners working on pressed-steel drums, are fitted to all six wheels. Brakes of the four rear wheels can be set by means of a hand lever, this method being used chiefly



A special form of hood gives improved balance and proportion. These vehicles seat a total of 56 passengers

for parking. Application of the brakes to all six wheels is by pedal, amplified by the Dewandre Servo vacuum system. The vacuum is obtained by a Reavell rotary exhauster. Rheostatic braking also is used on the vehicles. The reverse impulse from this method causes sufficient retardation to reduce the speed from 20 m.p.h. to about 8 m.p.h. or less, without wear on the brake drums. All forms of braking are controlled by the same pedal, the four depressions being as follows: (1) The current is cut off from the motor; (2) the rheostatic brake is applied; (3) the rheostatic brake is further applied, and (4) the wheel brakes are actuated with Servo amplification.

Floor bearers of the lower deck form a framework made up of strong aluminum alloy sections over the rear axles and of teak elsewhere. Framings of the two saloons are independent units bolted together, the joints at pillars being reinforced by aluminum alloy gussets screwed to the framing. The staircase is built into this framing. Upper floor bearers, which form the carlines of the lower deck ceilings, are specially shaped steel pressings. The roof is of 18-gage aluminum sheet, screwed to the wood carlines, except at the trolley base, where it is 14-gage strong aluminum alloy sheet, riveted to the steel carlines. The sheets are doped and covered with cotton duck. All siding and end sheeting is of 16-gage aluminum, screwed to the framework.

Accommodations for 24 passengers are provided in the lower deck, with eight two-person cross seats, one two-person longitudinal seat under the staircase and a six-passenger longitudinal seat facing the staircase. In the upper deck are seats for 32 passengers, thirteen two-person cross seats and a six-person seat across the rear end.

American Executive Committee Meets at Quebec

COINCIDENT with the convention of the Canadian Electric Railway Association, a meeting of the American Executive Committee was held at Quebec on June 11. Satisfactory progress with plans for the various phases of the convention to be held at Atlantic City in September was reported by the chairmen of several committees. Brief reports concerning other current activities of the Association were presented. Full authority was given to the Engineering Association to act in connection with the proposed revision of the constitution of the American Standards Association. Resolutions were passed expressing the regret of the Association at the death of Joseph R. Ellicott, Fred Green and Harlow Clark. To fill the vacancy in the position of National Counsellor of the United States Chamber of Commerce created by the election of J. N. Shannahan to be a director, the committee appointed Lucius S. Storrs. It was decided to hold the next meeting of the Executive Committee on July 24 at New York City.

On the day following the meeting of the Executive Committee, conferences were held both morning and afternoon under the auspices of the Advisory Council. These meetings were attended by electric railway executives of the New England States, as well as representatives of a number of Canadian properties. No fixed program was followed, the discussion being entirely informal concerning various problems now facing the industry.

Reading Heats Control Building with Off-Peak Energy

ELECTRIFICATION of railroad lines around and between metropolitan centers demands electricity in large quantities for motive power. The energy for the railroads is, in some instances, generated in independent plants, but in most large projects now under way, it is supplied by the electric light and power companies. This supply of large quantities of electric energy is bought quite generally, under contracts having certain demand charges, coupled with a reasonable charge for energy. The load demands are, of course, established by the traction necessities. There becomes available, therefore, electricity which can be used for various purposes, provided its use is confined to the off-peak or off-demand hours. This has led to the installation of automatic thermal storage off-peak heating systems for various purposes along the right-of-way. The usage of electrical energy can automatically be so confined to certain hours that the load is not superimposed upon the traction peaks.

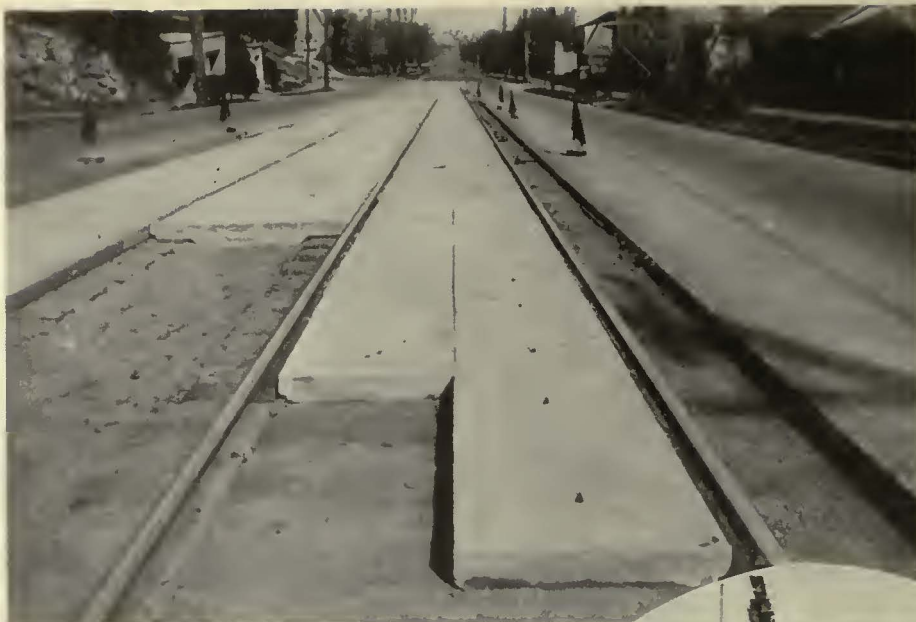
Among the first railroads to realize the merits of this form of heating is the Reading Company. This company has installed in its main control building, just outside the Philadelphia Terminal, an "off-peak" or "off-demand" electric heating plant which uses electricity at a low energy cost free from demand charges.

The building, approximately 30x30x25 ft., consists of two floors, the upper one containing the main control table and the lower floor being used as one of the automatic substations for the local division. The railway equipment occupies the remaining space, so that the automatic electric heating plant and an automatic electric water heater for utility purposes made by the Hall Electric Company of Philadelphia were installed in a waterproof pit alongside the building. A duct is run into the main building carrying the two heating lines, the water supply lines and the necessary cable. The space heated is approximately 17,500 cu.ft. The automatic substation on the lower floor is heated to a temperature of 50 deg., whereas the operating room is maintained at 70 deg. With the "off-peak" automatic heating plant the temperatures required on the two floors were obtained more readily than could have been done with other forms of heating.

The building is uninsulated except for 1-in. Celotex in the ceiling. The walls are of 13-in. brick, with the first and second floors and ceiling of concrete. One item which somewhat influences the consumption is the large amount of exposed glass installed so that the operator can see the surrounding trackage from the windows of the tower.

The heat loss from the control building, based on the temperatures given, was found to be 17,000 B.t.u. per degree-hour. To store sufficient heat units, it was found that a 500-gal. storage tank, equipped with 40 kw. of heaters, when controlled by an electric time switch to prevent using energy during the peak periods, would deliver the desired capacity under the most exacting conditions. Based on the radiation factor of the building, for a normal heating season the total consumption of electrical energy will amount to 49,950 kw.-hr.

The heating system, being entirely automatic, imposes no burden for its operation on the power dispatcher, whose normal responsibilities require his constant and undivided attention.



Precast concrete slabs of this type have proved to be an economical way of paving the street railway track area at Seattle

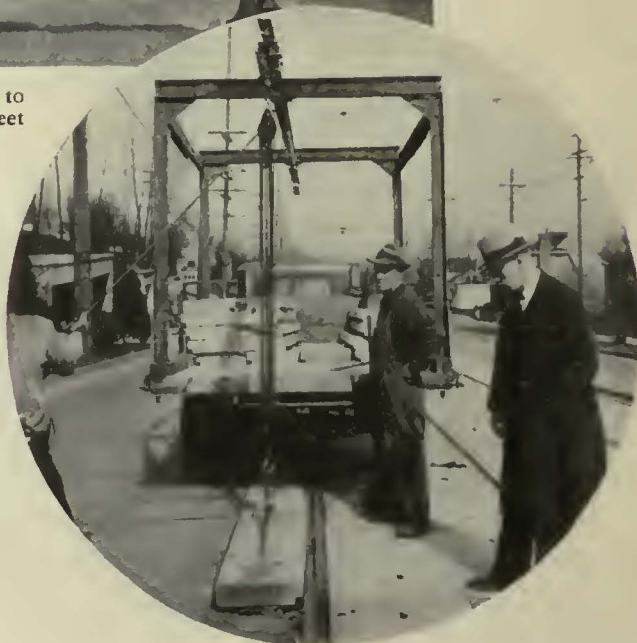
Precast Concrete Slabs for Temporary Paving

By A. E. PIERCE
*Assistant Superintendent
 Seattle Municipal Street Railway
 Seattle, Wash.*

DEVELOPMENT by the Seattle Municipal Street Railway of a precast reinforced-concrete paving slab for unpaved track has solved a difficult problem. Extensive installations of these slabs are being made at the present time. They were first designed in 1926 for use at a street intersection where heavy automobile, truck and bus traffic was causing frequent demands for the replacement of the wooden planking being used. A local concrete company furnished slabs for experimental purposes. They are still in service giving entire satisfaction.

The city's policy for a number of years has been to relieve the street railway of the original surface paving cost, except the additional expense due to the presence of tracks. The financial condition of the railway in recent years has prevented its paying even this small extra cost and several miles of track have remained unpaved. If precast reinforced-concrete slabs could be manufactured and installed at approximately the same price as plain concrete of from 7 in. to 8 in. in depth, it was thought that it would allow the abutting property owners and the city to install the slabs in the street railway tracks without involving the street railway department in any expense other than a slight surfacing cost.

The cost is approximately \$6 per lineal foot for the



Slabs are delivered and placed in position by a small motor truck with derrick equipment

area 18 ft. wide occupied by the double-track car line. The slabs are of reinforced concrete, $4\frac{1}{4}$ in. thick and of varying lengths and widths, resting upon the ties. The slabs between the rails and between the rail and concrete paving are placed parallel with the rails, while the slab for the "dummy" is of a heavier design and is placed at right angles to the track and rests on the projecting ties from either track. The slabs are manufactured and cured in the yards of a local concrete products firm and are transported to the job and placed by a derrick, as shown in the accompanying illustration. A wooden filler along the inside of the rail is used to space the slabs in the track and to allow for wheel flanges.

There is some rocking movement in the slabs, but a fine sand is being swept into the joints which stops this. Slabs are built in units of a weight which allows their removal by men in the maintenance crew whenever repairs to the track or roadbed may be necessary. In case the street railway later may be in a financial condition to install standard paving, the slabs can be removed and installed in another location.

Faster, Better Service Needed

NEEDED for the adoption of a new viewpoint was the message the delegates heard at the 27th annual convention of the Canadian Electric Railway Association, held at the Chateau Frontenac, Quebec, on June 10-12. Speakers, committee reports and discussions from the floor all stressed the fact that the industry no longer can dictate to the public what service it will deliver, but must now take orders from the same public as to what service will be acceptable.

Since there were no exhibits, sessions were held both morning and afternoon. The usual custom of having addresses by prominent speakers at luncheons on each day, however, was retained.

Entertainment features included a dinner at the Chateau Frontenac, a golf tournament and an informal dinner at Kent House, and various trips to points of interest in and around Quebec.

In his presidential address, Mr. Tait called attention to the substantial manner in which revenues of Canadian electric railways have held up in view of the business situation. The year 1930 was the second highest in history, being exceeded only by the preceding year.

On each of the three days of the convention a luncheon was held at the Chateau Frontenac, at which President Tait was toastmaster. On Tuesday, following a welcome to the city of Quebec by Mayor H. E. Lavigneur, Carl W. Stocks, editor *Bus Transportation*, spoke of the development of unified control of urban and interurban bus lines radiating from a central city. One management should control all operations, although separate companies may be formed for the city and interurban services, on account of the non-interchangeability of equipment and drivers. Maintenance, however, should be consolidated. Mr. Stocks concluded with sixteen recommendations for improving bus service and increasing profits.

Lucius S. Storrs, Baltimore, speaker at the luncheon on Thursday, laid particular stress on the necessity for getting away from the old ideas of publicity. It may be summed up in two propositions, he said: whether we are doing things *for* the public or doing things *to* the public. He believes that we must forget the time-honored term "good public relations," and instead cultivate a friendly public interest.

J. H. Hanna, Washington, D. C., president American Electric Railway Association, speaking at the Friday luncheon, stressed the necessity for improved service in view of the intense competition of today. Apart from this, it is the duty of the industry to furnish the highest possible form of transportation service. The presence of many private automobiles in the streets means more than keen competition; the traffic congestion created by them surpasses in importance any other public problem. The arteries of travel must be cleared of obstruction; to do this, public vehicles must be given such preference in the handling of traffic as is justified by their much higher

Plans for improvement of transportation methods were discussed at the Quebec convention of the Canadian Electric Railway Association. Improvement in schedule speeds and methods of bus maintenance were topics of principal papers

efficiency in the use of streets. But managements must realize that their service is not now satisfactory and they must bring about such improvements as will remove the prejudice which now undoubtedly exists against the use of their vehicles. These things accomplished, there will be a greater demand than ever for public transportation.

The Tuesday morning session was devoted to reports of committees. The Bus and Coach Committee report, presented by its chairman, D. E. Blair, of Montreal, gave a résumé of progress with the Diesel engine for motor buses. Development of this engine has been so rapid, during the past year of two, that it is reasonably certain that highly satisfactory units will be available in a competitive market and in a relatively short time. The committee also called attention to the merits of the trolley bus, especially for smaller cities.

W. F. Irvin, Toronto, presented the report of the Committee on Traffic Control. A summary was given of results with traffic signals. From this the inference was drawn that signals are of greatest utility where traffic is very heavy. For lighter traffic, stop signs, slow signs, flashing beacons, and other devices of a permanent nature are to be preferred.

In the discussion, Mr. Blair pointed out the difficulty of timing signals so as to obviate delay where streets are uneven or block lengths not uniform. W. R. Robertson, Hydro-Electric Railways, believes in manual control in such instances or where there are varying amounts of traffic on intersecting thoroughfares. H. C. Patten, Toronto, holds that street railway men have been too content to leave traffic control to city governments, which are interested chiefly in facilitating automobile movements, whereas the street car carries perhaps 80 per cent of the people on street car streets. E. C. Schoales, Fort William, believes that in small cities there is a tendency to install too many signals.

C. H. Clancy, Toronto, reporting for the Committee on Merchandising Transportation, in the absence of the chairman, J. Lightbody, pointed out that the public must be informed of the facts relative to the merits of various transportation methods. Street railways should indicate to the public their willingness to adopt new forms, such as the motor bus, as quickly as they are proved suitable, and can be worked into the transportation system. The committee suggests that the designation "street railway system" should be discarded gradually in favor of a

broader term which would include motor bus and perhaps taxicab operation. The need for sales methods, and the possibilities of employing a sales manager, particularly in the larger companies, also was considered.

K. B. Thornton, Montreal, discussing the report, stated that there is no question in the mind of any transportation man that it is best to co-ordinate the various methods where there is a demand, else there will be competition. J. B. Hayes, Halifax, feels that the benefit of giving various types of transportation is that it makes the public realize that the company is doing its best to furnish service. Mr. Robertson has made use of various unusual means of publicity. As a result, the public is becoming more interested in transportation systems. C. H. Dahl, Winnipeg, has obtained good results from a company paper, published twice a month.

H. E. Weyman, Levis, presented the report of the Committee on Safety and Accident Prevention in the absence of A. E. Parker, Winnipeg. The committee notes that the Canadian companies continue to show improvement in results of accident prevention.

Two principal papers were presented at the regular sessions of the convention. The first was by Joe R. Ong, director of research Cincinnati Street Railway, whose subject was the improvement of schedule speeds. Speed, he held, is the keynote of success of a transportation system. The former claim that the street car is the fastest vehicle on the street has been challenged everywhere. Accordingly, the highest possible speed consistent with safety is necessary if the street railways are to regain the business which they have lost, or to hold and add to the business which they now enjoy. Whatever the physical conditions which it would be difficult to change, it would appear the reasonable and clear duty of the schedule department to put into effect and operate schedules for the highest possible speed consistent with them. Besides the actual speed, an element of appeal necessary to hold the business and to increase it is to create the impression of speed. In detail, Mr. Ong listed many methods by means of which these results may be attained.

Following Mr. Ong's paper, additional emphasis was laid on several of the points stressed by him. J. Metcalf, Toronto, believed that speed is uppermost in our business, but that it has been given serious consideration only in the last two or three years. Charles Gordon, managing director A.E.R.A., held that speed, frequency and regularity are essentials of successful service. Morris Buck, *ELECTRIC RAILWAY JOURNAL*, pointed out that many of Mr. Ong's recommendations can be carried out without any major expenditure, and that the improvement in operations obtainable in that manner may so benefit the property that money for major projects will be forthcoming. C. H. Dahl, Winnipeg, agreed that while a reduction made in running time may be very small, the riders get the impression that a far greater time has been saved. R. M. Reade, Quebec, believes that the personal element on the part of the men is essential to making improvements in speed. Mr. Schoales concurred in this, and also pointed out that the men have more at stake than anyone else connected with the organization.

Motor bus servicing and maintenance was the subject of the second paper, presented by C. O. Sparhawk, superintendent bus mechanical department United Electric Railways, Providence, R. I. Methods employed in modernizing and expanding the bus repair work of his property resulted in an improvement of the morale, clean

and well-painted buses on the highway, less need for spare bus equipment, more miles per pull-in, and reduction in maintenance costs amounting to 23 per cent. The discussion following Mr. Sparhawk's paper centered on the desirability of continuing buses with the design as received from the manufacturer or changing them to meet certain needs. P. H. Reid, Montreal, believes that changes should be made when necessary, and that maintenance costs will be reduced thereby. Mr. Blair held that defective design should be gone into carefully with the idea of improvement. Mr. Tait stated that he has found the manufacturers liberal in replacing parts that do not meet the requirements.

Besides the principal papers, a considerable part of the program was devoted to the consideration of topics of interest to operating men. These included a wide range of subjects. Comparison of sliding collectors and trolley wheels attracted considerable attention. L. R. Wagner, Detroit, stated that after extensive tests, the Detroit Department of Street Railways has adopted sliding collectors for use throughout on its system. There has been a reduction of 50 per cent in trolley wire wear and a net saving of about \$20,000 a year. L. E. Gould, Economy Electric Devices Company, also pointed out the advantages of shoes over wheels. E. B. Walker, Canadian National Railways, thinks that improvements in wheels may come.

Relations between trolley wheel or shoe pressure, friction, and current capacity at various speeds were discussed by L. W. Birch, Ohio Brass Company. He pointed out the need of maintaining the correct proportions between the various elements in order to get satisfactory performance. He also indicated that by increasing the diameter of the trolley wheel axle, properly lubricated, the life can be increased materially.

Results of wood preservation was another topic considered. H. Wykes, Hydro-Electric Railways, believes that there is no excuse for the use of any untreated ties today. With creosote, the life can be extended so greatly, even with soft wood, that it does not pay to install untreated ties. G. A. Berry, Canada Creosoting Company, followed with additional evidence as to the value of treatment. Mr. Robertson referred to the use of wood shims laid between the tie and the rail to take the mechanical wear and so increase the life of the tie. A. V. Linnell, Montreal, told of untreated ties which have had a life of 25 years, outwearing the rail. These were swamp cedar, which is the best rot-resisting wood grown in Canada. Don M. Campbell, Preston, pointed out that the quality of the tie depends as much on the soil and the climate as it does on the variety of wood.

Methods of car and bus painting were discussed under the leadership of W. R. Robertson, Hydro-Electric Railways, and F. S. Beattie, Ottawa Car Manufacturing Company. Others taking part in the discussion were W. R. McRae, Toronto, and Don M. Campbell, Preston.

D. E. Blair, Montreal, and J. Metcalf, Toronto, discussed methods of minimizing turnbacks, while W. C. Monk, Winnipeg, and A. S. McArthur, Toronto, told of the advantages and functions of road instructors.

Labert St. Clair of the American Electric Railway Association told the delegates that they should use the car or bus where each fits best.

Following the presentation of the report of the nominating committee by W. S. Hart, Three Rivers, officers for the ensuing year were elected unanimously, as follows:

Honorary president, J. E. Tanguay, general manager Quebec Railway, Light & Power Company.

Honorary vice-president, Acton Burrows, proprietor *Canadian Railway & Marine World*.

Honorary advisory council: T. Ahearn, Ottawa; E. Anderson, Winnipeg; J. E. Hutcheson, Montreal; W. A. Kingsland, Canadian National Railway; W. G. Murrin, Vancouver, and J. F. Saint-Cyr, Montreal Tramways Commission.

President, K. B. Thornton, general manager Montreal Tramways.

Vice-President, George E. Waller, manager Hamilton division Ontario Hydro-Electric Railways.

Treasurer, H. C. Patten, comptroller Toronto Transportation Commission.

Auditor, J. E. Richards, manager London & Port Stanley Railway.

Executive Committee: The president, the vice-president, the treasurer, the junior past president (L. Tait, London) and D. E. Blair, Montreal; F. D. Burpee, Ottawa; C. H. Dahl, Winnipeg; W. S. Hart, Three Rivers; D. W. Harvey, Toronto; J. B. Hayes, Halifax; W. J. Lynch, Quebec; H. R. Mallison, Montreal; W. R. Robertson, Windsor, and H. E. Weyman, Levis.

Canadian Electric Railways Made Good Showing in 1930

ELECTRIC railway systems in Canada had their second most prosperous year in 1930, according to the yearbook of statistics of the Canadian association, prepared by the secretary, Eustace Smith, Jr., and distributed at the Quebec convention.

Due to industrial conditions passenger revenue fell off somewhat last year from the high mark of 1929. This loss in revenue varied, being more marked on the smaller properties. As to employment, the electric railway industry has proved during this period of depression to be one of the most stable industries in the Dominion. While reductions have been made in operating expenses there have been comparatively few reductions in staff.

Passenger revenue is given in the accompanying table, both total and per miles of single track, and the ratio of operating expenses to passenger revenue per mile of single track. The trend is set out by index numbers, with 1900 taken as 100. Passenger revenue per mile of single track is now 2.55 times as great as it was in 1900, but operating expenses per track-mile are 3.15 times as great. Despite the general depression, the passenger earnings in 1930 per mile of single track were the second highest in the history of the Canadian electric railway industry. This was offset to some extent by the highest operating expense per mile of track of any year to date, although the ratio of operating expenses to passenger revenue was lower than in 1928.

On a car-mile basis, there has been a general decline in operating expenses since 1921. The use of one-man cars and modernized equipment have been important factors in that movement.

Considering the distribution of the revenues, a chart shows that in 1929 operating expenses took 61.93 per cent of the revenue. The remainder was distributed as follows: Taxes, 3.54 per cent; deductions from income, 27.51 per cent, and net income, 7.02 per cent. In 1929, 34.53 per cent of the total revenue was available for capital reserves and to pay investors, as against 33.33 per cent in 1928 and 32.96 per cent in 1927.

Since 1922 fares and wages have continued to increase slightly, the major change occurring prior to that year. In 1928 and 1929 wages took a distinct upward trend, and in 1930 reached the highest point so far, being 99.4 per cent above 1913. There have been few changes

Revenues and Expenses of Canadian Electric Railways per Mile of Track, 1900-1930

Year	Passenger Revenue			Operating Expenses		Operating Ratio Per Cent
	Total	Per Mile Single Track	Trend	Per Mile Single Track	Trend	
1900	\$5,529,687	\$8,192	100	\$5,237	100	63.93
1905	8,932,914	11,265	138	7,463	141	66.25
1910	16,125,994	11,660	143	7,319	140	62.77
1915	25,579,689	12,211	150	8,622	165	70.61
1920	43,279,009	17,832	218	15,757	300	88.36
1925	45,185,402	17,616	216	13,811	264	78.40
1926	46,810,403	18,516	227	14,414	275	77.07
1927	48,289,774	19,521	239	15,046	286	77.07
1928	50,164,164	20,050	244	16,438	314	81.98
1929	52,302,474	21,107	258	16,102	307	76.29
1930	49,194,375	20,827	255	16,516	315	79.19

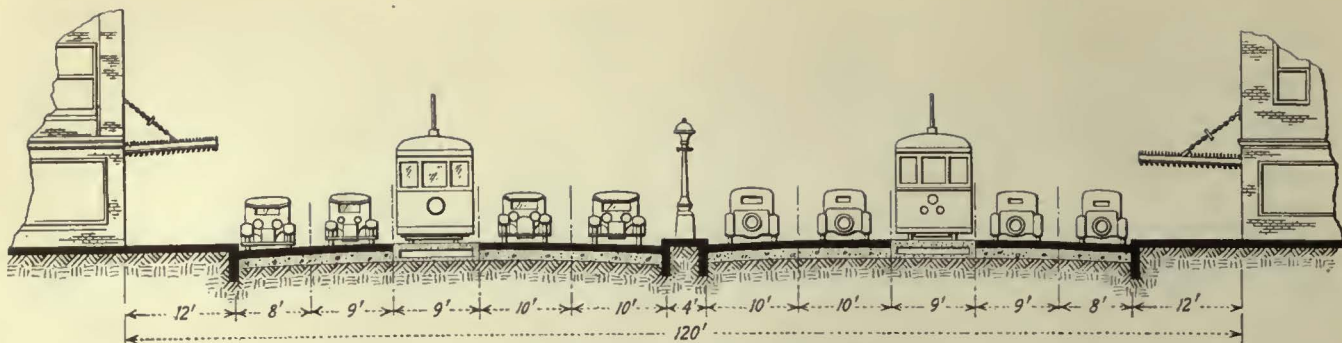
in city fare since 1925. The cost of living outran wages until 1920, when the former reached its peak at 83.1 per cent higher than in 1913. In 1921 the cost of living dropped back to 53.3 per cent over 1913 and continued at much the same level until 1930, when it experienced a very pronounced drop to the lowest point since the war, at 45.9 per cent above 1913. In 1930, fares were still only 51 per cent higher than 1913, whereas cost of living shown on the chart was 45.9 higher. Wages in 1930 were 99.4 per cent higher than 1913, or nearly 1 per cent higher than 1929. On the 1913 base, wages have increased 11.6 per cent in the last five years, or a straight increase of over 6 per cent when the last five years are compared separately. Living costs in the same five years have decreased a straight 5 per cent.

The number of revenue passengers continued approximately the same from 1913 to 1918, averaging 595,000,000. From that date the number increased until a peak was reached in 1920, when 804,711,333 passengers were carried, or 35.2 per cent over 1918. In 1921 there was a decrease of 10.6 per cent. From 1921 to 1925 the number of revenue passengers carried showed little if any change. In 1926 an improvement was shown, with 748,710,836, an increase of 3.2 per cent. In 1927 a still greater improvement was shown, 781,398,194 revenue passengers being carried, an increase of 4.5 per cent. In 1928 revenue passengers reached 808,023,615, or slightly in excess of the peak of 1920. In 1929, however, 836,729,851 revenue passengers were carried, an increase of 4 per cent over the 1920 peak, and greatest number carried in the history of the industry in Canada. In 1930 there was a decrease of 6.1 per cent to 785,897,801 revenue passengers.

Another chart shows the steady increase in the investment in electric railways in Canada which has taken place since 1901. In that year, only \$40,553,170 was invested, which grew to \$240,110,655 in 1929, an increase of \$9,416,397 over 1928. In 1930, the total invested was \$247,761,974, an increase of \$7,651,319 over 1929. Receiverships or supersession of electric railway services by motor bus service are comparatively rare.

The most recent figures available show the net income as reported by companies in 1929 of \$4,541,376 as against \$2,920,124 in 1928; \$3,229,943 in 1927, and \$2,361,750 in 1926.

Remarkable development of the motor bus and coach industry in Canadian transportation is shown on another chart. From thirteen buses operated by electric railways in Canada in 1913, the total has grown to 616 in 1930. The growth is particularly marked during the past five years. In 1930, the number of coaches increased 12 per cent, and the number of feeder buses 16 per cent. During the past three years electric railways have purchased the larger and more important independent bus lines, directly or indirectly in competition.



Proposed redistribution of street space on 120-ft. street in Detroit to permit easy access to street cars, and give through traffic an opportunity to move without interruption in the center of the roadway

Redistribution of Street Space Proposed at Detroit

FOR the past six years, the process of revising the street system of the city of Detroit to bring it up to modern requirements has been under way in accordance with a master plan. Some 25 miles of major thoroughfares, 120 ft. wide, have been created within the city limits. Where these streets are occupied by main routes of the Department of Street Railways, it was necessary to readjust the tracks, and a question arose whether they should be placed in the center of the street in accordance with traditional practice, or in some other location.

Prior to final action affecting the widened section of Gratiot Avenue, a diagonal thoroughfare of great traffic importance, a study of methods of utilizing the wider street space was made by representatives of the Street Railway Commission, the Rapid Transit Commission, the Department of Public Works, the Police Department and the City Plan Commission.

In their report to the Council these representatives recommended that the street car tracks be placed in the third lane from each curb, with two lanes of traffic moving in the same direction as the street cars on each side of the track. Between the street car and the curb, one lane would be for loading and unloading, and the other for local traffic. Between the car track and the center of the street there would be two lanes for fast moving through traffic. A safety island in the center of the roadway would offer a midstreet refuge, and also serve to separate traffic moving in opposite directions. The division of street space for the various uses is shown in detail in the accompanying illustration.

The committee expressed the opinion that this arrangement preserves all the rights now possessed by persons and property in the use of the street surface and adds materially to the safety and convenience of pedestrians and car riders.

The project was discussed at three public hearings. The recommendation of the five city departments was opposed by representatives of the Gratiot Avenue Improvement Association, and the Council finally directed the Department of Street Railways to put the tracks in the center of the street. The defeat of this project, however, is not regarded by the city departments supporting it, as affecting its intrinsic merits. They argue that the increased safety to pedestrian and car rider, and the greater fluidity offered to motor traffic are advantages that will become increasingly more necessary with the increase in density of traffic. In their opinion, the arrangement offers the best and most economical means for reducing the hazard to the car rider whose position is daily becoming more precarious and will become even more dangerous with the car tracks in the center of the wider street.

Lackawanna Railroad Electric Equipment Gives Excellent Performance

DURING the month of May, 1931, motor cars operating the electrified suburban service of the Lackawanna & Western Railroad out of the terminal at Hoboken, N. J., ran a total of 358,196 miles. During this time, there was one failure which resulted in a pull-in. This gives a record of 358,196 motor car-miles per pull-in, which is remarkable even in these days of excellent maintenance.

Frankfort Experimenting with Diesel Buses



Street railways in Frankfort-on-the-Main, Germany, are carrying on experiments on Diesel buses with trailers. Fuel cost has been reduced from 0.75 to 0.12 pfenning per seat-kilometer through trailer use. Without trailer, the cost of fuel is 0.22 pfenning



Conference Instruction

Successful in St. Louis

Courses in accident prevention, salesmanship and equipment covered by 25.2 per cent of trainmen in six-month period. Attendance is voluntary. Location and time of holding classes important factors

THREE courses of instruction for the trainmen of the St. Louis Public Service Company, dealing with the subjects of accident prevention, salesmanship and equipment, were inaugurated on Nov. 3, 1930. Each course is given in six regularly scheduled weekly periods, is elective and voluntary on the part of the employees, and classes are held at convenient points and hours to foster regular attendance. The courses in accident prevention and salesmanship are conducted largely on the conference basis with the idea of drawing on the experience of the group of men for the content. The equipment course is designed to give the men more thorough knowledge and practical acquaintance with their equipment, particularly the controller, brakes, air valves and electric circuits.

The accident-prevention conferences are conducted by selecting a number of typical accidents, analyzing them and breaking them down so as to bring out the faulty points in the elements of alertness, judgment, and operating practices which caused them. Conversely, discussions of what should have been done to prevent them are carefully directed by the instructors. Examples selected include car collisions, motor vehicle collisions, pedestrian collisions, falls and door accidents. The final conference is devoted to a summing up of the discussions held during the previous classes together with a complete outline of the requirements for safe and efficient operation under the general headings of alertness, judgment, skill, co-operation with conductor, sound attitude of mind and physical health.

The salesmanship conferences, outlined principally for the instruction of conductors, bring out the following pertinent factors:

1. Introduction and analysis of the conductor's job.
2. The importance and methods of giving proper and adequate information to passengers.
3. The importance of courtesy, even voice and proper language in dealing with patrons.
4. The importance of taking a real interest in the patron.
5. The importance of personal appearance.
6. Teamwork between members of a crew.
7. Sales resistance to be overcome.
8. General summing up—What is a good conductor? Cases of poor handling of passengers in different situations are used largely as a basis for this discussion.

Because of the nature of the equipment course, it is carried on by the lecture and demonstration method. Equipment is studied in the following order:

1. Main circuit of power, from substation through feeder, trolley, main motor circuit, rail and return feeder to substation.
2. Main pieces of apparatus of the car, their purpose, their operation and their fundamental construction.
3. The air brake, its purpose, action and fundamental construction.
4. The line switch, door circuit control, train operation, etc.
5. Motor control circuits and the differences between various types of control.
6. The electric track switch, its principal parts and principles of operation.
7. Discussion on the abuse of equipment.

CAR EQUIPPED WITH TABLE AND BLACKBOARD USED AS CLASSROOM

It was realized from the beginning that the success of the courses, from the standpoint of attendance, depended largely on the location and time at which the classes were held. Consequently, a car was remodeled for the specific purpose of having a place to conduct the meetings. Several seats were removed in the front of the car and a table and blackboard were installed. The car was well painted, and additional lighting circuits and electric heaters were installed. This car is taken to a car station the same day each week for a period of six weeks. For the first series of classes, the men were asked to register for the course they would like to take and also for the hour that would be most convenient for them to attend. Classes were then arranged to suit the convenience of the greatest number. Experience during the first series of meetings, however, showed what time of day was the most convenient for the greatest number and subsequent series were scheduled for definite hours and only men who could attend at the time set were registered for the courses.

Attendance in any of these courses is entirely voluntary and on the trainman's own time. During the first series only the best men attended. In the subsequent series of meetings, however, a special effort was made to get those men out whose records were poor, or who seemed to need some additional instruction and suggestions for improving their work. As the accompanying table indicates, the attendance during the second series of conferences was better than at the first. This was due to the interest displayed by the superintendents at the various car stations in getting the men interested and reminding them of the day and time of their meeting.

Since a series of meetings lasts six weeks, the company considers a man as having a good record if he attends four of the six meetings in any one course. At the conclusion of each series the general manager sends a commendatory letter to each man who attends four meetings. This is the only thing that is done that can be

Attendance Data for Trainmen's Conferences, St. Louis Public Service Company

Series... Meeting	Sales- manship		Accident Prevention		Equipment		Total	
	1st	2nd	1st	2nd	1st	2nd	1st	2nd
1.....	172	120	122	79	231	145	525	344
2.....	94	102	89	80	180	121	363	303
3.....	113	85	91	69	152	121	356	275
4.....	28*	83	42*	78	71*	137	141	298
5.....	71	73	69	61	117	136	257	270
6.....	52	107	61	90	108	139	221	336
	530	570	474	457	859	799	1,863	1,826
Average per Meeting	13.2	17	12.2	15	15.4	17	14	16.3

Note—First and second series only are included.

*Thanksgiving holiday, pay days and run picking all fell in this week, causing attendance to fall.

considered in any way as an inducement to increase attendance. It will be noted that the attendance was much better sustained in the second series than in the first, the average in the first series being 14 men per meeting and in the second series 16.3. There were less meetings per day in the second series and the hours were more conveniently arranged. During the first series the company tried to have five or six classes a day, but found that at certain hours the meetings were poorly attended, so that now only four classes a day are held.

In the first series 978 different men attended, of whom 159 were present for at least four meetings in one course. In the second series a total of 794 different men attended of whom 197 went to four meetings or more. A third series of classes has just been completed, in which 771 took part, bringing the total attendance for the three groups up to 2,567. Of the men taking the third series, 364 were present at four or more meetings. Therefore, in the three series, covering an elapsed time of more than six months, 720 men were considered to have completed one of the courses. The company has somewhat less than 3,000 trainmen, so that in fact 25.2 per cent of all these men attended the courses. A very large proportion of the men attended one or more meetings. Details of the third series of conferences are not yet completed, although it may be said that the results were even more satisfactory than those of the first two.

In addition to the instruction courses being given to the trainmen, which will be carried on in the fall, it is planned to institute similar courses to cover nearly all transportation department employees. Conferences with supervisory forces have already been held. Small groups meet once a week to discuss their jobs and the various problems connected with them. It is expected to get similar meetings under way with dispatchers and clerks within the very near future.

AWARDS FOR REDUCTION OF ACCIDENTS

As an additional incentive for safety and careful operation on Jan. 1, 1930, the company put into effect a new system of awarding prizes to car stations. The year was divided into six two-month periods and an average number of accidents which each station had for each period in the last two years was taken. This average figure minus 10 per cent was set up as a bogey for each station. Any station which has a number of accidents equal to or less than the bogey wins a prize for that period. The amounts of the prizes vary according to size of stations, ranging from \$225 down to \$50. A no-report case counts as three accidents against the station. In making up the bogies the company included no-report claims on a three-for-one basis also. This

system has each car station competing against its previous records, and not stations against each other. This arrangement makes it possible for any station to win six prizes in a year. The stations use their prize money for various purposes, most of them leaving it in a fund from which they make donations to employees at that station who have been sick and unable to work for some time.

Probably the most important feature of this prize system is the delivery of prizes to those stations winning them. An open meeting is held at the station and the general manager delivers the check. The directors of transportation and of safety usually make short talks. This gives the management an excellent opportunity for contact with the trainmen and also gives the officials a chance to explain company policies and problems.

Electrification at 1,500 Volts D. C. in England

SPECIAL interest attaches to the electrification of the railway from Manchester (England) to Altrincham, because of the use of 1,500 volts direct current. The line, which is about 9 miles long, is owned jointly by the London, Midland & Scottish and the London & Northeastern railway companies, and has hitherto been operated with steam locomotives. It is the first passenger railway in England to be operated by direct current at this voltage. Other electric railways in England use 600 volts. As far back as 1915, however, operation at 1,500 volts was begun on the Shildon-Newport section of the London & Northeastern Railway in the north of England, a line used for the conveyance of coal from the mines to the seaports. Some time after that, a government-appointed committee recommended that future railway electrification should be carried out with the 1,500-volt d.c. system. In the recently published Weir Committee report, recommending the electrification of all the railways in Great Britain, the 1,500-volt d.c. system with overhead conductors is recommended. The Manchester-Altrincham line is the first British example of the method.

The power is supplied from two substations, one at Old Trafford and the other at Timperley. These get 11,000-volt three-phase current from the national "grid" system through the Stratford Electricity Board. A novelty about the Old Trafford substation is that in addition to rotary converters, one-third of the load is taken by a mercury-arc rectifier of 1,500-kw. capacity. This is the first mercury-arc rectifier to be installed for British railway service. The substation is manually operated and controls the Timperley substation with three rotary converters. The Midworth distant-repeater control is used, which is another novelty. Thus Timperley requires no direct manual operation.

Multiple-unit rolling stock is employed, with a motor coach and two trailers acting as a group. The cars are of the usual compartment type, first and third class. Each motor car has four series-wound motors, with each pair of the four permanently connected in series, so that each motor works on 750 volts. The design contemplates a train speed up to 70 m.p.h. The seating accommodation of a three-car train is for 228 third-class and 40 first-class passengers.

Ottawa Railway Illuminates Fare Boxes



The fare box on cars of the Ottawa Electric Railway is illuminated by a lamp placed in a housing on the supporting stanchion

HAVING experienced some trouble from passengers depositing improper tickets in the fare boxes at night, the Ottawa Electric Railway has developed a simple and effective means of illuminating the inspection plates to facilitate the examination of fares. On the cars of this company, the fare box is supported on a stanchion alongside of the operator. A lamp housing in the form of a T conduit was introduced at the junction of this stanchion and a horizontal hand rail. On one side, the housing has an opening through which the light shines into the fare box. The back of the housing is removable to permit convenient replacement of the lamp inside. Similarly, the top of the housing can be removed to permit replacement of the lamp socket. The lamp is connected in series with the lamps for the destination signs, the wiring extending through the hand rail. The lamp housing is entirely separate from the fare box and does not interfere with its removal whenever desired. All cars of the Ottawa Electric Railway are being equipped with this device.

Award of BUS FRANCHISE

Adds to Brooklyn's

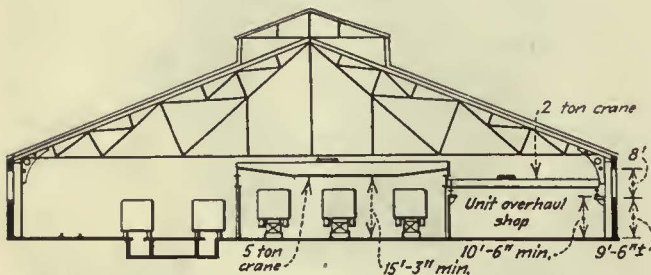
COMPREHENSIVE intraborough transportation service will soon become a reality in Brooklyn as a result of the award of a franchise by the City of New York to the Brooklyn Bus Corporation for the operation of buses along twenty routes. For more than a decade Brooklyn, now the largest borough of New York in population as well as in area, has lacked adequate and convenient crosstown service in the southern part of the borough. The rapid transit systems and the surface car lines have served the community effectively in the mass movement of passengers to and from Manhattan and the downtown section of Brooklyn; but the transportation facilities between the outlying sections, urgently needed for their growth and development, have not existed.

When people wished to travel from the eastern part of the borough to the western part they were compelled to go by a circuitous route. In every instance it was necessary to make several changes. Although a number of independent bus lines were operated under emergency permits from the city, they were inadequate and were

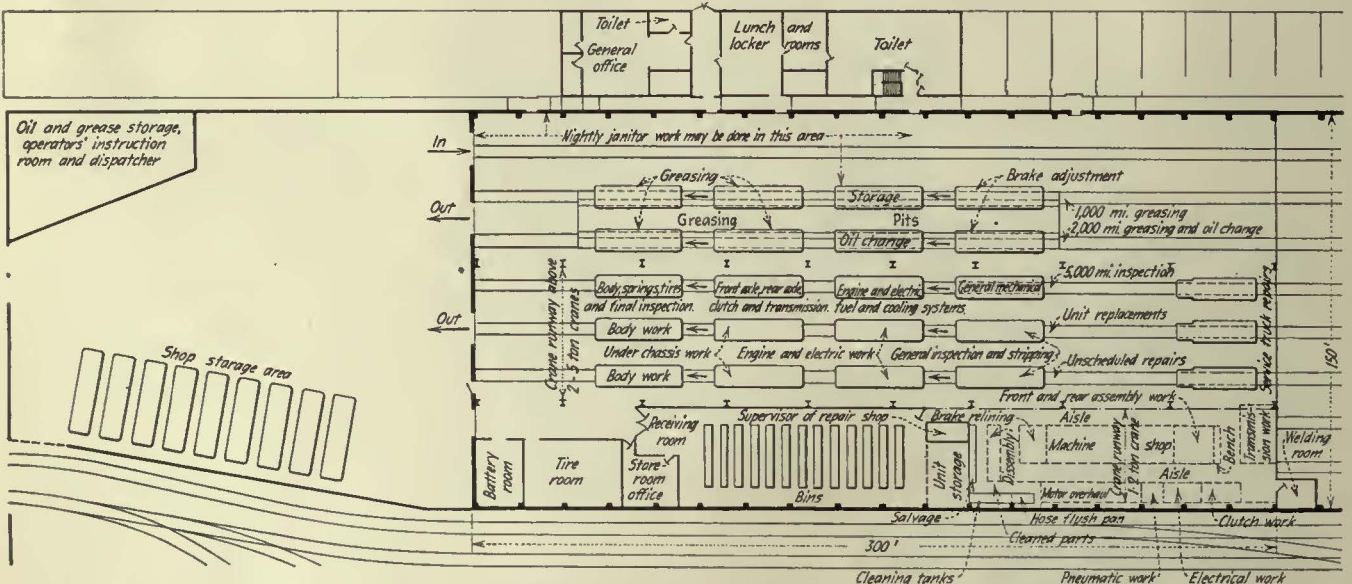
Brooklyn Bus Corporation, a subsidiary of the B.-M.T., has been granted the right to operate on twenty routes totaling 73.85 miles. Management, operation and maintenance will be co-ordinated with the surface car lines. Maintenance plans outlined

laid out with little thought to their relation to the existing facilities. By granting the franchise to a subsidiary of the Brooklyn-Manhattan Transit Corporation, which operates 400 miles of rapid transit track and controls the 475 miles of surface line track of the Brooklyn & Queens Transit Corporation, the city is assured that dependable local transportation will be given, permitting travel from one section of Brooklyn to another by direct routes, and co-ordination with other forms of transportation. Adequate financial ability, operating experience and a guarantee of a fair return to the city were other important requirements that were satisfactorily met by the Brooklyn Bus Corporation.

The routes covered in the franchise were laid out after a careful study made by the Brooklyn Bus Corporation in co-operation with the Board of Transportation and municipal engineers. Several determining factors governed the final selection. These were: population, the



Five production lines will run the length of the shop



Proposed layout of new repair shop, designed for maintenance on a line production basis

Transportation Facilities

type of neighborhood to be served; the trend of traffic, and possible connections with the surface lines. Of the twenty routes sixteen are entirely in Brooklyn, three are partly in Brooklyn and partly in Queens, and one route extends across the Manhattan Bridge and into Manhattan for a short distance. The three extensions into Queens were included because they are parts of important routes in Brooklyn that connect with surface lines of the Brooklyn & Queens Transit System.

As laid out the bus routes will permit numerous and convenient connections with surface lines, and a limited number with the rapid transit lines. An accompanying map shows this clearly. Between bus lines and surface lines there exist 52 transfer points and a total of 282 transfer privileges. Between individual bus lines there are sixteen transfer points and 76 transfer privileges. This close network of lines will serve the needs for direct route traveling between the outlying sections wherever such needs exist. In signifying their approval of the routes at the public hearings of the Transit Commission, engineers of the city stated that the routes were the best that could be obtained.

After all the bus routes have been in operation for a time sufficient for the public to become acquainted with them, it is believed that a certain amount of traffic will be found to have shifted from the surface lines to the bus lines. However, this decrease on the surface lines is not expected to be permanent, for the attractive service that can be rendered by the co-ordination of the two systems will undoubtedly increase riding, aid in the growth of the borough, and eventually lead to greater revenue for both the bus lines and the surface lines.

The franchise awarded to the Brooklyn Bus Corporation is for a period of ten years, and is non-renewable. At the expiration of the ten-year period, it will be necessary for the company to obtain a new franchise from the city if it wishes to continue operating along the routes.

Soon after the award of the franchise the Transit Commission held public hearings, at which it gave care-



A new picture of Brooklyn's transportation facilities augmented with bus routes

ful consideration to the objections advanced by two independent bus operators. But as no adequate reasons were offered to show that operation along the routes specified in the franchise would not serve the public, the Transit Commission issued three certificates of convenience and necessity to the Brooklyn Bus Corporation.

One of the certificates of convenience and necessity covers eighteen of the twenty routes. A separate certificate was issued for each of the two routes that were contested by independent operators. This was done to preclude the possibility of a delay in the inauguration of service over the eighteen routes should the independent bus operators secure a stay from the courts.

FIVE-CENT FARES SPECIFIED

The contract with the city provides for a 5-cent fare, with numerous transfer privileges to the surface lines at an additional cost of 2 cents. No transfer privileges exist to the rapid transit lines. The city will receive 5 per cent of the gross earnings with a minimum annual guarantee of \$100,000. The contract is so drawn as to terminate automatically if the company, by legislation or recourse to the courts, moves to obtain a higher fare.

Prior to the award of the franchise, the Brooklyn Bus Corporation operated on 10.45 miles of route under special permission from the city. The Brooklyn & Queens Transit Corporation operates buses along 4

miles of route. The two companies together operate a total of 50 buses. These buses will be available for immediate operation on the routes specified in the new franchise. All facilities and equipment of the Brooklyn & Queens Transit Corporation will be made available to the bus company to enable it to begin operation on all the routes as soon as possible. The company is planning to commence operation on July 1 with the 50 buses now available on a number of important routes, and to extend operation to all routes as soon as it can obtain additional equipment and increase its operating force.

According to the plans of operation made by the company, a minimum of 200 buses will be needed for operation along the twenty routes in the franchise. This will necessitate the immediate purchase of 150 new buses. Plans for the increased capitalization of the Brooklyn Bus Corporation necessary to provide for the new equipment, the increased storage and maintenance facilities, and to meet the costs incurred by the legal and engineering services rendered to obtain the franchise, were submitted to the Transit Commission and quickly approved. The capitalization of the Brooklyn Bus Corporation will be increased to 40,000 shares of stock of no par value, of which 20,000 shares will be purchased at \$25 per share by the Brooklyn & Queens Transit Corporation and the other 20,000 shares will be held by the bus company, to be sold if and when necessary.

From the \$500,000 obtained from the sale of stock, \$100,000 will be deposited with the city as a guarantee that the company will comply with all the terms of the contract. The company will forfeit this money should it be guilty of a breach of contract. This amount will also serve as a fund securing the payment to the city of 5 per cent of the gross revenue. Payments will be made to the city after each month of operation.

Of the \$400,000 remaining, \$100,000 will be used to meet the cost of the legal and engineering services that entered into the preparation of the petition and the securing of the franchise, \$200,000 for the purchase of new buses, and \$100,000 for increase in the storage and maintenance facilities.

POLICIES OF COMPANIES ARE CO-ORDINATED

As president of the Brooklyn-Manhattan Transit Corporation, the Brooklyn & Queens Transit Corporation and the Brooklyn Bus Corporation, W. S. Menden will control the policies of the three companies. Other officials of the surface lines will also hold supervisory positions in the bus company. It is planned to unify the management and the supervision of operation of the bus company as completely as possible with that of the surface lines, without making the organization unwieldy and inefficient. The maintenance department of the bus company also will be under the supervision of an official of the Brooklyn & Queens Transit Corporation, but it will function as a unit separate from the maintenance departments of the other two companies.

Supervision of transportation for both the bus company and the surface lines will be centered in a new department to be known as the traffic and transportation department. This department will supervise the operation of all buses and street cars of the Brooklyn & Queens Transit Corporation, the buses of the Brooklyn Bus Corporation and the passenger service of the South Brooklyn Railway, another subsidiary of the Brooklyn & Queens. William Siebert, now superintendent of trans-

portation, will be in charge of this department with the title of general superintendent of traffic and transportation. The work of the department will be divided into three divisions: administration, operation and traffic.

Complete Maintenance Schedule Planned for Brooklyn Bus Corporation

MAINTENANCE of buses will be carried out in accordance with the unit replacement and line production systems. It is believed that the periodic

overhaul of parts, rather than overhauling the bus as a unit, will give better maintenance and lower cost. After study of the systems of several properties, a system to fit the needs of the Brooklyn Bus Corporation has been outlined. Details have been made flexible so that future changes can be made when operating conditions demand.

Specialization of labor and shop facilities underlie all the plans. Inspection and overhaul periods for all major parts of the bus have been decided on. With accurate and complete records all work will be scheduled as far ahead as possible to reduce peaks in shop work and minimize idle stocks.

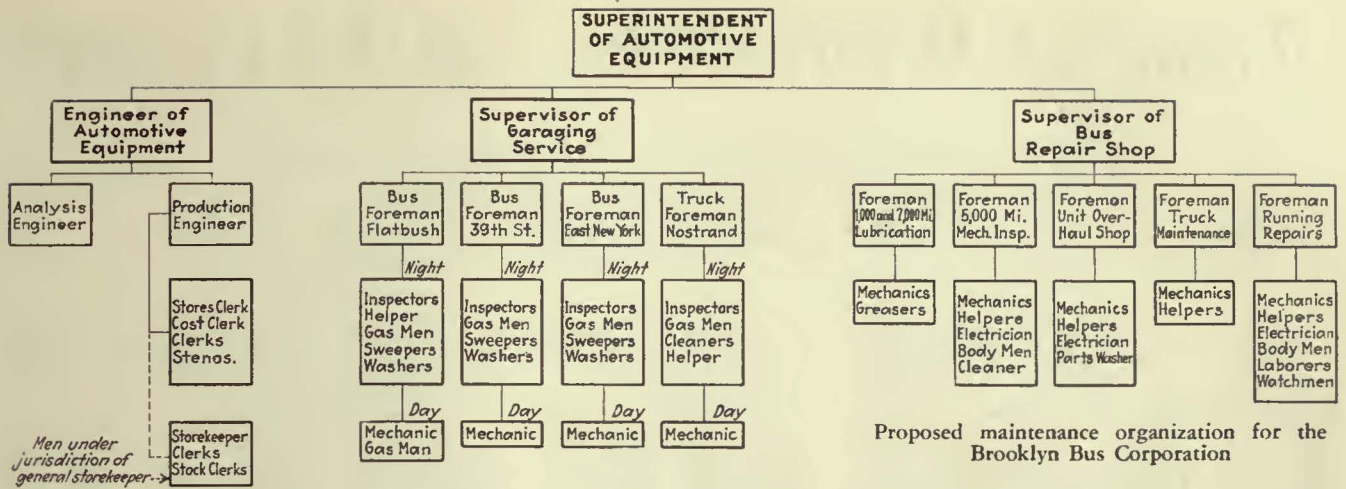
In order to carry out the unit replacement idea effectively all bus maintenance will be segregated into two general classifications: (1) lubrication, and (2) mechanical inspection and overhaul. The classification follows the recommendation of manufacturers, in which it is held that most of the short-interval work, with the exception of some few adjustments, consists of lubrication, while most of the thorough mechanical inspections are of comparatively longer periods. Following these recommendations, separate schedules will be adopted for greasing, oiling, mechanical inspection and overhaul. These schedules will be made flexible so that if there are any improvements in design or maintenance work, the periodicities of the various units may be lengthened.

The storage and repair facilities have been planned for 250 buses and 110 miscellaneous trucks, passenger cars and tractors. Estimates of service and repair work have been based on a daily average of 110 miles for the buses and 60 miles for trucks and miscellaneous vehicles. All scheduled inspection, unit replacement and overhaul work will be done at the 39th Street shop, which was formerly used as a car repair shop. This shop is now being rebuilt and equipped with new tools and machinery for bus maintenance and repair. Heavy body repairs and painting will be done at the car repair shops of the Brooklyn & Queens. The buses will be stored out of doors at three operating centers. These storage points will be equipped with sheds for nightly janitor service and visual inspection.

The proposed inspection schedules have been segregated as shown below. These schedules are only tentative and will be increased as soon as improvements in bus design and inspection methods permit.

1. Nightly service and visual inspection.
2. 1,000-mile greasing schedule.
3. 2,000-mile oil change schedule.
4. 5,000-mile mechanical inspection schedule.

At the end of each daily run buses are to be given a regular service and visual running inspection at the operating centers. All operating and mechanical information concerning a particular bus will be reported on the daily record card, which will be kept in a rack in the bus. During the day each operator using the bus



will record all defects as they develop during his run.

In addition, tires of all buses will be visually checked for inflation every night and actually gaged and inflated every other night. Windows and the outside of the bus will be washed twice per week. Floors will be swept every night. A general inspection of each bus will be made by an inspector every night. He will be held responsible for the condition of all buses at the morning pull-out which he has passed on as being O.K. A few mechanics on the night force will only handle minor defects. All major defects or adjustments must be held over for the running repair crew at the repair shop on the following day.

The lubrication schedule at 1,000 miles includes the greasing of all fittings and grease cups and the oiling of joints as required. The schedule for oil changing includes the entire 1,000 mile schedule and additional items of work, such as engine oil change and the replenishing of the transmission and differential oil when necessary.

A period of 5,000 miles for mechanical inspection has been arbitrarily chosen and may be changed as experience will be obtained with the system. All work to be done on this inspection is listed on an inspection guide and record, with a set of detailed instructions for the maintenance men. Inspectors performing this work are charged with the responsibility of the performance of all parts of this bus until the next inspection.

An inspection guide and record will be posted adjacent to each bus every time it is inspected, and the man responsible must initial each item or each group of items of work he has performed. These records will be filed and any unit failure or defect between inspection periods will be charged against the individual who performed the inspection. The instructions for the 5,000-mile inspection period are intended to cover systematic inspection of bus equipment for the fixed period.

The segregation of the overhaul schedule to be carried out at the repair shop is shown in the accompanying table.

Overhaul Engine	Semi-Overhaul 50,000 and 100,000 miles	Complete Overhaul 150,000 miles
Transmission (gearset and clutch)	75,000 miles	150,000 miles
Steering gear		100,000 miles
Front axle		100,000 miles
Differential (rear axle)	50,000 and 100,000 miles	150,000 miles
Air compressor		60,000 miles
Generator		50,000 miles
New springs		50,000 to 75,000 miles

The repair shop is centrally located and has been designed to handle all bus work from ordinary greasing

to complete unit overhaul necessary to maintain a fleet of 250 buses and 125 trucks. With slight extensions the layout can easily handle a fleet of 500 buses. All automotive work, except nightly janitor service and heavy body work will be done at this shop. An attempt will be made completely to specialize the use of all shop space. Two lines, over a depressed floor, will be reserved for all lubrication work, and three other lines over which crane service is to be provided have been reserved for the 5,000-mile inspections, unit change and unscheduled running repairs. These five production lines run the length of the shop, each line having working positions which are reserved for specific parts of the maintenance work.

The entire shop has been confined to a section 300 ft. long by the full width of the building. The unit overhaul shop, salvage area, storeroom, battery room, tire room and offices have been placed at strategic locations with respect to the working positions in the shop area, so that a natural flow of material and work can be developed throughout the entire shop.

When a thorough mechanical inspection is being performed or when a unit is being replaced, the bus will be supported in such a way that all units are readily accessible or removable. The bus will be placed on dollies so that it can readily be moved along the production lines. These dollies operate on the existing standard gage track. The buses will be mounted on them at the beginning of any position along the line by means of two 5-ton overhead cranes.

The organization of the repair shop is broken into three groups; namely, engineering, garage servicing and repair. All these groups are controlled by the superintendent of bus maintenance, whose function is to guide and co-ordinate their activities.

The engineer of automotive equipment will be the officer for liaison between the two operating groups and will digest all records which are kept under his jurisdiction so that improvements in methods, cost and operating results can always be planned and developed. Under his control will be the analysis engineer, who is not connected with any of the daily operations of the department but is free to work on innumerable problems awaiting analysis such as outdoor bus heating, improvements in fuel consumption and other similar problems.

The supervisor of the garage services has charge of the foreman of the various truck and bus operating garages. The supervisor of the repair shop has charge of the foreman of all scheduled inspections and major repair and overhaul work on both buses and trucks.

Trend of REVENUES and EXPENSES

Latest monthly figures indicate little change in situation from last report. Most of the companies show net surplus

	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$*	Increase or Decrease Per Cent*	
Boston Elevated Railway, Boston, Mass.						Eastern Massachusetts Street Railway, Boston, Mass.							
May, 1930.....	2,824,945	5.17	2,084,708	2.60	302,590	25.51	May, 1930.....	663,941	7.87	451,941	8.04	53,076	34.20
June.....	2,550,775	3.93	1,937,134	3.05	143,016	36.53	June.....	619,456	9.64	435,292	6.43	28,672	68.48
July.....	2,371,152	5.04	2,108,071	0.61	167,522	489.94	July.....	617,220	10.11	461,048	7.27	3,926	91.22
Aug.....	2,280,322	7.81	2,113,183	1.55	274,728	163.79	Aug.....	624,332	9.42	444,429	10.33	28,399	58.01
Sept.....	2,470,918	3.78	2,091,718	0.52	69,888	200.31	Sept.....	612,237	7.12	448,470	0.88	21,771	70.76
Oct.....	2,811,399	4.04	2,157,474	1.29	221,188	31.30	Oct.....	623,872	8.48	467,773	4.92	15,811	76.73
Nov.....	2,579,899	10.34	2,066,206	2.66	71,150	77.85	Nov.....	590,856	10.90	449,032	1.60	205	97.62
Dec.....	2,850,330	8.20	2,178,896	2.24	235,950	66.62	Dec.....	670,964	11.93	516,913	1.71	20,841	84.02
Jan., 1931.....	2,840,159	8.43	2,082,456	6.23	314,067	30.66	Jan., 1931.....	700,961	7.63	472,079	2.82	36,145	56.18
Feb.....	2,534,828	8.33	1,952,032	5.23	142,339	48.27	Feb.....	639,344	6.62	434,904	2.83	33,058	50.86
Mar.....	2,769,564	7.30	2,019,081	4.92	309,212	29.08	Mar.....	685,614	3.63	472,317	1.53	28,982	81.83
Apr.....	2,616,188	7.00	1,909,176	7.93	275,740	11.45	Apr.....	617,705	6.21	434,716	2.69	9,906	78.96
May.....	2,579,265	8.70	1,993,753	4.36	143,604	52.47	May.....	.....	.....	.....	.....	.....	.....
Brooklyn-Manhattan Transit System, New York, N. Y.						Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.							
May, 1930.....	5,229,829	21.65	3,600,727	22.46	929,201	35.36	May, 1930.....	79,126	6.80	65,512	0.00	13,182	32.16
June.....	5,070,028	21.64	3,591,743	21.59	776,745	28.77	June.....	72,865	15.19	65,324	25.80	12,940	172.80
July.....	5,003,577	2.86	3,608,741	6.06	720,302	18.55	July.....	60,907	21.02	64,134	11.68	24,217	110.22
Aug.....	4,727,623	4.39	3,558,841	6.64	465,144	14.91	Aug.....	64,592	18.82	62,484	8.19	12,690	36.45
Sept.....	4,834,251	2.49	3,453,431	4.52	667,323	6.20	Sept.....	72,267	11.61	63,549	6.42	8,497	436.09
Oct.....	5,036,775	2.68	3,572,553	4.22	758,817	2.78	Oct.....	75,708	17.80	66,353	0.69	18,447	226.80
Nov.....	4,769,083	4.37	3,366,923	6.98	689,470	2.34	Nov.....	72,024	13.82	66,314	0.23	21,171	168.25
Dec.....	5,065,484	2.66	3,546,963	4.26	814,788	2.04	Dec.....	.....	.....	.....	.....	.....	.....
Jan., 1931.....	4,852,706	5.48	3,475,330	7.01	674,029	5.80	Jan., 1931.....	79,764	15.78	67,438	7.33	13,133	236.77
Feb.....	4,453,655	3.79	3,159,903	6.96	583,468	2.40	Feb.....	74,018	13.38	62,239	7.93	13,694	75.36
Mar.....	5,028,562	2.66	3,475,847	3.37	814,360	4.13	Mar.....	75,201	7.83	64,051	7.61	13,965	6.28
Apr.....	4,969,481	2.09	3,458,940	3.35	804,235	0.25	Apr.....	70,660	0.48	62,685	4.90	16,298	23.64
May.....	5,056,779	3.31	3,438,037	4.51	913,677	1.64	May.....	.....	.....	.....	.....	.....	.....
Brooklyn & Queens Transit System, New York, N. Y.						Galveston-Houston Electric Railway, Houston, Tex.							
May, 1930.....	2,030,966	4.65	1,615,294	7.31	310,865	9.11	May, 1930.....	41,686	15.21	27,945	12.21	65,653	101.96
June.....	1,968,238	2.41	1,603,996	8.02	257,482	18.78	June.....	45,659	20.34	28,273	10.93	74,054	114.30
July.....	1,917,118	6.16	1,603,893	7.10	203,433	4.15	July.....	46,757	9.65	29,248	3.62	78,139	123.50
Aug.....	1,827,238	6.45	1,595,256	7.11	120,864	8.15	Aug.....	47,425	11.42	28,402	8.12	89,135	146.25
Sept.....	1,887,499	4.66	1,564,271	5.66	213,728	2.66	Sept.....	42,823	16.49	28,052	14.83	84,893	144.43
Oct.....	1,922,388	5.20	1,597,166	5.60	214,924	7.74	Oct.....	38,032	11.66	27,266	6.85	.....	.....
Nov.....	1,820,498	6.65	1,522,735	7.58	187,822	5.20	Nov.....	36,974	12.49	44,183	9.68	93,685	127.12
Dec.....	1,920,463	4.40	1,560,950	6.11	250,893	6.06	Dec.....	36,166	15.00	27,949	1.79	99,343	112.93
Jan., 1931.....	1,849,644	6.18	1,541,235	7.58	197,355	3.02	Jan., 1931.....	33,291	20.16	25,057	9.18	105,000	110.59
Feb.....	1,704,677	3.98	1,416,192	5.40	176,217	2.58	Feb.....	32,281	19.80	22,990	9.64	111,369	110.17
Mar.....	1,941,078	1.98	1,602,862	2.66	227,472	1.21	Mar.....	32,904	22.38	24,732	14.69	114,459	93.49
Apr.....	1,911,878	1.29	1,592,919	3.11	208,514	6.86	Apr.....	34,729	15.98	24,132	11.98	117,394	189.69
May.....	1,980,118	2.60	1,585,293	1.85	286,334	7.89	May.....	.....	.....	.....	.....	.....	.....
Capital Traction Company, Washington, D. C.						Houston Electric Company, Houston, Tex.							
May, 1930.....	369,413	6.21	285,970	3.10	53,985	16.72	May, 1930.....	262,653	8.60	194,968	1.94	597,837	4.56
June.....	340,623	5.25	271,761	3.80	40,884	16.70	June.....	247,461	11.67	179,084	10.27	589,240	6.38
July.....	306,527	9.02	272,490	4.65	4,935	78.13	July.....	247,070	10.86	176,909	11.82	584,163	1.24
Aug.....	314,513	3.48	266,561	4.09	16,103	2.62	Aug.....	244,033	12.41	177,452	10.89	573,872	4.18
Sept.....	327,713	7.06	268,066	1.61	30,259	6.78	Sept.....	251,919	9.00	175,905	10.42	571,857	5.84
Oct.....	374,646	1.22	288,351	1.48	58,638	17.56	Oct.....	267,306	7.57	181,499	10.67	573,425	4.16
Nov.....	346,054	2.70	273,481	1.54	42,659	11.05	Nov.....	247,210	10.00	176,739	1.96	550,635	9.66
Dec.....	369,885	1.77	274,221	3.21	67,651	0.61	Dec.....	258,219	9.84	180,678	0.68	524,458	16.54
Jan., 1931.....	347,491	3.06	280,514	3.30	37,705	5.11	Jan., 1931.....	242,554	10.52	176,792	11.08	518,843	17.70
Feb.....	312,815	3.47	252,080	5.82	30,521	1.87	Feb.....	223,256	14.11	163,249	12.96	507,328	20.19
Mar.....	344,191	2.65	270,962	3.86	43,847	4.03	Mar.....	244,396	10.97	170,067	12.70	502,405	19.39
Apr.....	366,276	2.39	273,436	5.89	65,123	12.93	Apr.....	.....	.....	.....	.....	.....	.....
May.....	362,502	1.87	281,344	1.61	50,959	5.60	May.....	.....	.....	.....	.....	.....	.....
Chicago Surface Lines, Chicago, Ill.						Hudson & Manhattan Railroad, New York, N. Y.							
May, 1930.....	5,012,190	6.39	3,986,513	4.11	831,499	7.91	May, 1930.....	1,039,637	2.79	509,707	3.06	194,759	2.49
June.....	4,766,687	6.89	3,835,838	4.49	776,880	7.48	June.....	989,627	1.69	499,396	1.74	154,985	4.49
July.....	4,535,460	10.05	3,807,075	7.10	649,307	19.05	July.....	954,538	3.12	502,515	1.61	116,747	17.77
Aug.....	4,488,146	12.20	3,796,705	8.06	680,219	15.82	Aug.....	934,204	5.65	499,806	3.98	98,977	26.27
Sept.....	4,568,564	9.50	3,789,472	4.40	713,323	12.94	Sept.....	974,433	2.80	506,845	0.23	132,332	18.68
Oct.....	4,879,570	10.79	3,933,416	7.35	799,118	11.89	Oct.....	1,033,584	4.33	521,325	1.97	176,999	17.79
Nov.....	4,537,647	13.48	3,769,538	6.86	712,177	20.77	Nov.....	994,735	6.18	489,761	4.08	169,465	21.42
Dec.....	4,846,000	8.09	3,984,572	9.89	767,348	15.67	Dec.....	1,060,614	4.66	419,109	17.40	306,321	12.49
Jan., 1931.....	4,576,133	12.65	3,825,964	5.37	718,129	21.00	Jan., 1931.....	1,005,022	7.62	512,350	7.23	157,098	21.78
Feb.....	4,234,704	10.90	3,665,038	6.04	601,726	15.44	Feb.....	936,542	6.67	467,137	6.09	134,717	16.34
Mar.....	4,584,224	4.35	4,287,237	6.34	557,167	15.05	Mar.....	1,013,577	6.05	497,695	6.34	180,554	15.13
Apr.....	4,759,624	4.46	4,092,407	0.36	675,629	11.66	Apr.....	1,002,265	6.78	485,938	5.73	181,182	15.09
May.....	4,541,847	9.38	3,802,582	4.61	724,514	12.88	May.....	974,737	6.24	461,504	5.53	158,191	18.77
Department of Street Railways, Detroit, Mich.						Illinois Terminal Company, Springfield, Ill.							
May, 1930.....	1,974,359	16.21	1,608,353	17.80	243,875	10.54	May, 1930.....	608,403	4.65	427,471	2.78	142,226	10.42
June.....	1,787,953	18.50	1,511,572	14.43	159,027	46.43	June.....	566,548	8.98	444,638	0.00	86,421	35.96
July.....	1,549,503	27.41	1,452,871	14.20	41,888	113.55	July.....	601,515	11.03	475,856	3.24	87,602	35.74
Aug.....	1,516,209	29.02	1,426,941	16.67	52,778	119.46	Aug.....	661,520	7.65	466,816	12.07	152,827	12.15
Sept.....	1,510,161	26.36	1,436,175	12.59	51,711	115.40	Sept.....	654,477	5.26	454,818	9.66	160,897	14.62
Oct.....	1,579,476	25.84	1,458,238	14.91	22,933	91.71	Oct.....	691,672	2.54	506,107	2.41	168,701	11.61
Nov.....	1,481,136	23.35	1,333,571</										

Trend of Revenues and Expenses by Months (Concluded)

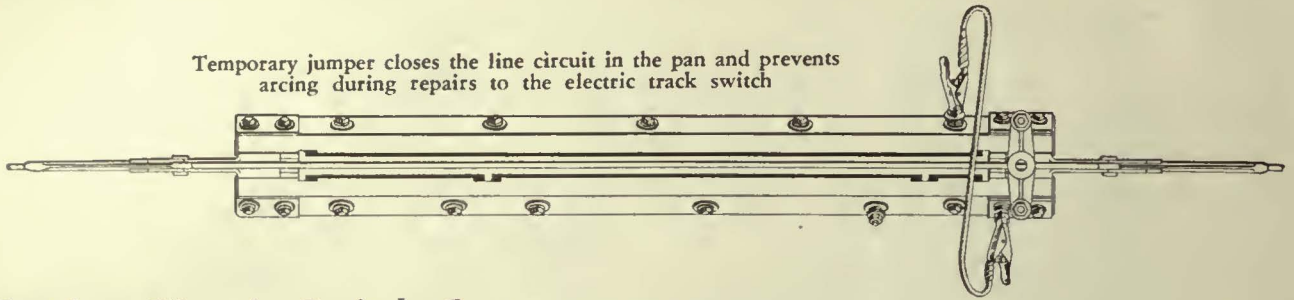
	Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$†	Increase or Decrease Per Cent*		Operating Revenue \$	Increase or Decrease Per Cent*	Operating Expenses and Taxes \$	Increase or Decrease Per Cent*	Net Income \$†	Increase or Decrease Per Cent*
Interborough Rapid Transit Company, New York, N. Y.							Staten Island Rapid Transit Company, New York, N. Y.						
May, 1930	6,287,149	0.41	4,095,439	9.22	144,798	122.44	May, 1930	214,848	20.61	126,605	9.84	25,183	0.00
June	5,832,071	1.85	4,027,730	10.58	218,727	348.57	June	224,980	18.31	128,999	10.17	30,052	30.63
July	5,382,547	1.53	4,078,983	2.52	521,582	73.64	July	243,991	9.78	189,173	39.19	41,021	34.99
Aug.	5,183,166	4.59	4,121,083	5.06	763,482	172.17	Aug.	233,371	13.92	168,110	11.19	49,486	33.97
Sept.	5,684,267	0.17	3,983,368	7.28	131,270	206.26	Sept.	206,908	15.93	165,525	4.87	26,127	60.73
Oct.	6,315,629	1.13	4,162,660	0.83	161,417	207.14	Oct.	205,631	10.58	167,586	6.49	29,723	26.11
Nov.	5,965,365	4.96	3,869,340	0.00	272,021	121.79	Nov.	178,652	17.42	161,608	0.68	10,788	80.37
Dec.	6,477,864	0.52	4,194,315	3.96	293,152	47.40	Dec.	178,474	9.08	160,715	47.29	5,997	92.23
Jan., 1931	6,123,645	4.42	4,538,833	10.83	348,972	65.92	Jan., 1931	170,387	9.58	158,982	6.35	1,448	114.6
Feb.	5,570,354	3.27	3,653,798	2.10	321,587	10.86	Feb.	161,415	13.58	142,565	9.20	2,151	93.49
Mar.	6,293,013	2.24	3,973,704	4.61	212,644	6.65	Mar.	173,723	7.98	159,035	7.78	1,164	81.24
Apr.	6,127,713	2.38	3,993,181	2.83	189,134	17.33	Apr.	176,863	10.76	147,210	13.23	23,169	31.91
May	6,006,223	4.47	3,932,452	5.98	207,096	36.12	May						
Jacksonville Traction Company, Jacksonville, Fla.							Third Avenue Railway System, New York, N. Y.						
May, 1930	89,731	9.29	80,106	7.92	66,663	39.81	May, 1930	1,291,409	6.92	1,043,554	7.63	58,138	84.27
June	29,087	12.73	77,848	7.08	71,399	41.50	June	1,244,961	6.73	1,018,619	7.64	45,078	1,056.24
July	28,772	11.02	77,787	11.27	70,688	35.34	July	1,429,730	5.18	1,212,311	8.54	2,066	106.36
Aug.	27,441	12.10	78,177	13.22	68,188	19.92	Aug.	1,350,064	5.88	1,180,853	8.08	46,540	28.34
Sept.	28,529	9.54	75,012	11.15	66,355	8.16	Sept.	1,428,136	3.48	1,167,528	8.36	45,636	277.91
Oct.	84,424	12.50	76,374	13.72	55,585	2.18	Oct.	1,456,688	4.03	1,205,455	9.73	36,257	317.06
Nov.	81,250	12.24	69,437	16.02	62,599	0.15	Nov.	1,323,335	5.37	1,146,168	10.17	12,079	130.15
Dec.	89,903	11.47	74,836	11.49	63,204	4.62	Dec.	1,438,752	3.49	1,192,249	8.51	26,250	186.44
Jan., 1931	87,160	8.08	72,998	13.67	58,133	11.98	Jan., 1931	1,393,054	5.10	1,178,792	9.14	1,594	96.33
Feb.	76,205	15.60	75,462	23.14	77,874	23.42	Feb.	1,274,832	4.27	1,020,307	8.56	11,143	126.49
Mar.	84,018	12.36	72,758	4.09	87,048	31.90	Mar.	1,418,429	3.38	1,174,984	6.86	27,364	430.88
Apr.	81,695	11.48	74,847	6.57	92,573	142.13	Apr.	1,408,235	3.25	1,155,880	5.98	44,331	250.25
May							May						
Kansas City Public Service Company, Kansas City, Mo.							United Electric Railways, Providence, R. I.						
May, 1930	719,205	5.03	594,064	1.49	45,132	41.06	May, 1930	569,925	7.18	514,320	1.38	5,602	88.80
June	656,292	8.03	562,308	4.19	6,396	34.76	June	532,283	13.87	478,197	5.39	4,583	85.66
July	635,205	11.09	573,990	2.92	21,365	144.42	July	513,367	11.04	458,817	8.90	5,480	77.94
Aug.	622,554	13.17	530,094	11.41	15,479	64.11	Aug.	495,223		442,076		3,643	
Sept.	650,114	9.99	524,324	12.12	50,261	1.32	Sept.	493,296	12.72	434,036	10.39	8,376	72.04
Oct.	725,428	4.89	700,311	12.90	60,435	190.35	Oct.	531,803	13.76			41,223	53.80
Nov.	706,577	5.29	522,066	7.04	58,994	5.69	Nov.	506,318	14.53	439,930	12.83	16,958	54.37
Dec.	758,045	1.73	570,065	14.58	108,444	284.88	Dec.	559,363	13.02	460,420	21.92	51,623	889.51
Jan., 1931							Jan., 1931	493,940	13.39	493,596	12.94	372	95.68
Feb.							Feb.	482,566	14.30	437,444	13.02	4,503	150.71
Mar.							Mar.	524,299	10.44	480,958	9.38	6,233	265.73
Apr.	710,719	0.69	565,328	6.09	71,298	82.34	Apr.	510,645	9.39	470,964	7.60	9,392	455.60
May	702,760	2.35	562,482	5.31	64,474	42.86	May	509,278	10.64	474,803	7.52	15,021	168.13
Long Island Railroad, New York, N. Y.							United Railways & Electric Company, Baltimore, Md.						
May, 1930	3,346,650	6.25	2,542,463	3.10	632,246	18.11	May, 1930	1,457,181	0.42	1,125,365	0.62	23,214	13.05
June	3,662,765	4.22	2,512,947	3.06	994,868	4.62	June	1,332,275	2.63	1,043,008	2.92	35,318	4.76
July	4,018,939	5.76	2,668,042	3.56	1,180,528	11.19	July	1,236,414	6.91	964,582	6.24	14,358	59.85
Aug.	3,968,936	5.21	2,635,376	5.06	1,152,651	6.59	Aug.	1,198,180	8.34	831,241	18.41	6,119	71.42
Sept.	3,589,671	7.33	2,462,056	7.07	928,655	6.58	Sept.	1,261,734	6.71	995,805	5.02	10,050	75.81
Oct.	3,371,761	5.80	2,446,346	8.97	729,067	1.77	Oct.	1,354,086	7.28	1,049,306	4.84	25,163	71.16
Nov.	2,954,624	4.80	2,249,258	14.56	483,180	89.15	Nov.	1,263,811	10.26	983,047	7.40	9,200	87.30
Dec.	2,905,045	6.60	2,130,182	16.27	596,812	42.11	Dec.	1,350,553	8.19	1,043,315	7.25	36,700	54.54
Jan., 1931	2,763,421	5.65	2,210,263	9.85	321,141	6.00	Jan., 1931	1,268,536	10.90	994,411	11.89	7,388	69.22
Feb.	2,561,169	7.43	2,074,216	9.13	332,002	3.86	Feb.	1,136,604	15.78	891,421	15.97	24,988	231.15
Mar.	2,841,915	3.09	2,234,418	9.00	449,501	24.64	Mar.	1,262,429	14.90	981,026	14.76	12,212	84.94
Apr.	2,976,402	4.69	2,269,029	7.37	533,425	1.97	Apr.	1,253,764	13.50	966,424	13.56	11,440	82.93
May							May	1,256,334	13.78	991,107	11.93	2,206	96.99
Market Street Railway, San Francisco, Cal.							New York, Westchester & Boston Railway, New York, N. Y.						
May, 1930	292,536	3.28	625,407	1.18	61,527	20.20	May, 1930	230,281	3.44	149,901	3.66	148,173	7.86
June	743,277	4.64	646,615	1.84	42,297	31.01	June	227,026	1.80	147,692	4.06	147,821	2.82
July	735,453	6.87	649,901	1.68	32,534	46.39	July	224,469	5.89	146,233	6.00	152,633	5.38
Aug.	270,284	6.69	643,287	5.66	72,923	16.36	Aug.	196,405	10.53	152,180	0.41	184,922	22.45
Sept.	245,298	5.35	626,770	3.74	64,731	18.38	Sept.	203,617	8.18	165,256	6.57	192,861	29.53
Oct.	286,012	6.73	675,908	6.49	52,384	45.58	Oct.	202,046	7.52	138,192	14.09	190,748	20.81
Nov.	229,407	8.81	615,613	6.18	60,452	22.25	Nov.	184,690	8.74	170,542	2.52	216,451	19.75
Dec.	275,508	5.12	639,249	5.52	83,460	0.03	Dec.	190,136	12.51	138,592	17.80	205,029	16.75
Jan., 1931	238,092	5.55	641,519	4.33	45,011	12.31	Jan., 1931	182,249	13.76	160,800	9.44	220,394	32.37
Feb.	668,931	8.17	526,661	8.22	41,002	7.29	Feb.	161,311	15.02	149,571	11.18	222,308	29.42
Mar.	257,960	6.40	633,346	6.81	72,828	0.05	Mar.	181,729	12.80	144,442	3.54	195,802	24.31
Apr.	245,252	6.72	620,106	7.06	73,837	3.46	Apr.	186,708	13.03	142,832	0.31	189,142	19.00
May	733,105	7.50	619,934	8.21	62,805	2.08	May						
Northwestern Pacific Railroad, Sausalito, Cal.							York Railways, York, Pa.						
May, 1930	485,027	9.33	482,698	5.49	2,800	103.81	3 mo. end. Mar., 1931	753,927		399,251a		354,676	265,492b
June	504,138	4.31	448,510	3.76	42,824	29.33	3 mo. end. Mar., 1930	805,906		418,949a		386,957	300,980b
July	597,419	2.54	392,575	13.52	195,195	55.38	9 mo. end. Mar., 1931	2,889,374		1,624,945a		1,264,429	942,434b
Aug.	638,476	11.43	415,502	3.84	210,115	4.03	9 mo. end. Mar., 1930	2,883,040		1,621,403a		1,261,637	950,162b
Sept.	548,282	8.68	471,657	3.73	16,421	87.57	<i>Italic figures indicate deficits. a Includes taxes. b Before depreciation.</i>						
Oct.	555,867	18.49	534,858	4.44	7,447	95.22	<i>c After dividends.</i>						
Nov.	333,193	27.74	421,717	18.33	97,567	120.85							
Dec.	312,319	20.77	465,220	8.46	158,491	74.63							
Jan., 1931	283,852	21.78	401,656	14.41	123,928	14.76							
Feb.	273,818	27.40	387,512	12.92	122,531	68.87							
Mar.	308,466	24.17	408,068	14.43	109,855	48.81							
Apr.	322,742	25.66	402,400	16.55	88,300	58.51							
May													

Monthly and Other Financial Reports

	Operating Revenue \$	Operating Expenses \$	Taxes \$	Gross Income \$	Net Income \$
Boston Elevated Railway, Boston, Mass.					
3 mo. end. Mar., 1931	8,144,551	5,641,148	417,432	2,102,968	3,782c
3 mo. end. Mar., 1930	8,853,590	5,999,903	414,014	2,477,913	392,203c
Cincinnati Street Railway, Cincinnati, Ohio					
May, 1931	653,309	424,875	59,488	205,040	11,200
Honolulu Rapid Transit Co., Honolulu, Hawaii					
April, 1931	83,280	51,294	2,744	14,749c	14,749
April, 1930	85,065	46,272	8,819	20,363c	18,295
4 mo					

Practical MAINTENANCE Ideas

Temporary jumper closes the line circuit in the pan and prevents arcing during repairs to the electric track switch



Keeping Electric Switch Contactors Alive During Repairs*

By H. A. BROWN
Return Circuit Switch and Signal Division
Cleveland Railway

TEMPORARY jumpers are attached to overhead electric switch contactors to keep them energized when renewals or repairs to the electric track switch are being made. This eliminates the necessity of holding up cars or permitting them to pass under the dead pan. In passing under a dead pan the trolley wire or the contactor may be burned by the arc caused by breaking the load current. The jumper is a piece of No. 8 wire, about 3 ft. long, with a battery clip at each end. It is attached to the running iron contacts ahead of the relay wire connections, as shown in the illustration.

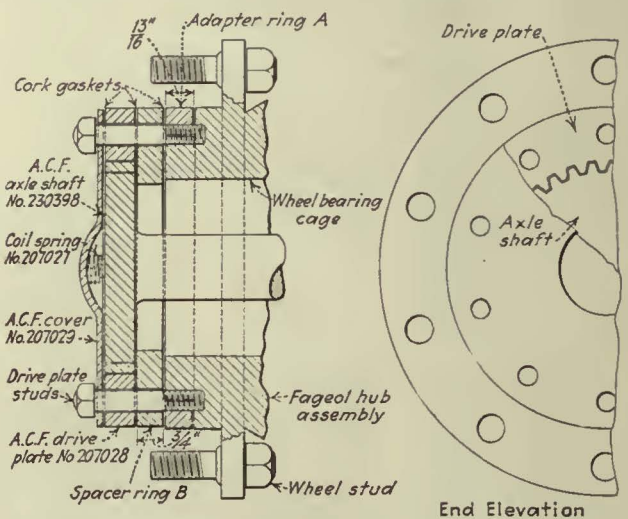
adjusting screws placed on the other side. By this means the motor position can be adjusted to the proper alignment and height in little time. The chain slack can be taken up to the correct tension by moving the motor on the hinges as the center.

Formerly, these grinding machines were adjusted by placing shims between the motor suspension lugs and the frame. In making these adjustments in the field it was found that much time was needed, and very often the motor was soon after thrown out of alignment.

Motor Mounting for Track Grinders*

By B. C. DAWSON
Mechanic
Toronto Transportation Commission

MOTORS of track grinders must be kept in alignment with the grinding wheel if undue wear on the gears and chain belt is to be avoided. When grinding high or low spots, the motor is raised or lowered to maintain the proper tension in the chain belt, and, in doing this, adjustments are made to keep the motor in alignment with the grinding wheel. To facilitate this task and to assure proper alignment at all times, the motor has been hinged on one side to the frame and



How the rear hubs of buses on the San Diego Electric Railway have been remodeled to accommodate full-floating axle shafts

Rear Hubs Remodeled for Full-Floating Axle Shafts*

By CHARLES HERMS
General Foreman
San Diego Electric Railway

SHAFTS for axles of the semi-floating type are rigidly connected to the hubs and as a result they are severely stressed when any slight motion of the axle housing occurs. The inability of the axle shafts to align themselves properly out of stress under these conditions is the cause of numerous axle failures on buses.

To overcome these difficulties, the San Diego Electric Railway has made a number of experimental axles of the full-floating type. These were placed in service, and after a satisfactory trial of twelve months manufacturers were asked to build them for us. However, to obtain the full benefits of the full-floating type of axle



Attachment by hinges facilitates grinding motor alignment

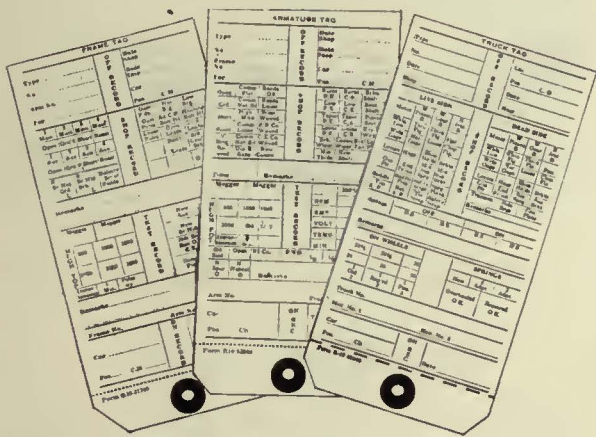
*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

it was necessary to have special rear hubs to accommodate the shafts. It was found too expensive to purchase new hubs, so we proceeded to remodel our own. The old hubs were turned down at *A*, shown in the illustration, leaving a square space into which was shrunk an adapter ring with $8\frac{1}{8}$ in. outside diameter and $7\frac{1}{8}$ in. inside diameter. A drive plate was then clamped against the ring, centrally locating it with the base of the hub. The holes in the drive plate were used as a jig to drill the hub for the drive-plate studs. The studs penetrate into the adapter ring and into the hub, acting as a dowel. As an extra measure of safety a $\frac{1}{4}$ -in. hole is drilled and tapped into the hub below the adapter ring. The spacer ring *B*, $8\frac{1}{4}$ in. outside diameter and $4\frac{1}{2}$ in. inside diameter, is cut with a torch from a $\frac{3}{4}$ -in. plate and machined to size.

The new type of axle costs 8 per cent less than the old type, and by remodeling our old hubs we saved 60 per cent of the cost of purchasing the entire rear axle assembly. Service comparisons with the old type of axles were excellent. Axle shafts on the old buses had been breaking at the rate of six per year. One of the new type has been in service for 23 months without failure. We have had similar gratifying results with later installations of this type. We are firmly convinced of the advantages of the full-floating axle shaft, and we are planning to install them as the old types fail.

Tag System Gives Complete Record of Inspection and Repair*

By JOHN W. GRUBER
Design and Estimating Engineer
Pittsburgh Railways



Tags for each class of equipment are punched by inspectors to indicate repairs to be made

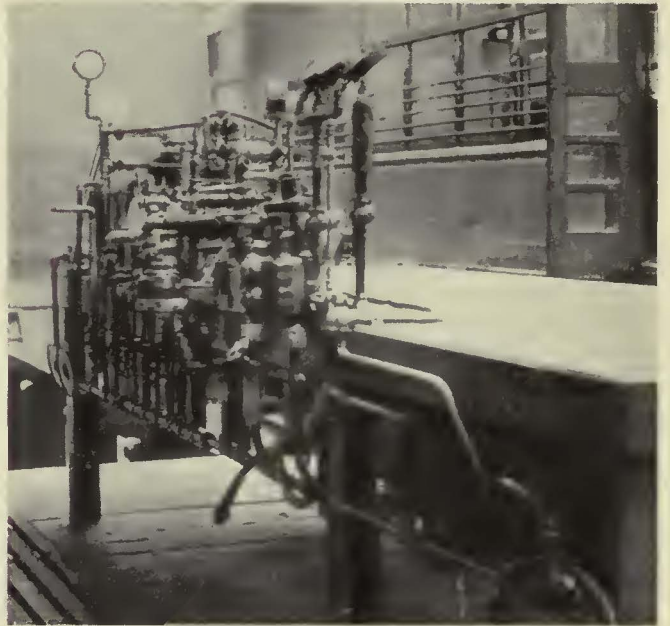
RECORDS of inspection and repairs of motors and trucks at the Pittsburgh Railways are entered on tags, which relieves the inspectors of nearly all writing. For each truck, motor frame and armature repaired a separate tag, $3 \times 5\frac{1}{2}$ in., is used, as shown in the illustration. On the top of the tag is indicated the type and number of the part under repair, date, car number, position and carhouse. This information is filled in by the clerk when the car is taken to the shops. The clerk also indicates on the reverse side of the tag any unusual past record of the equipment.

The tags are sent to the inspectors, who attach them

to the equipment. Each inspector has an identifying ticket punch for indicating the necessary repairs. The tag remains on the equipment until it is repaired and put back on the car, at which time the inspector fills in the date, car number and name of carhouse, and then returns it to the clerk. When the clerk receives the tag from the inspector, he enters all the information and files the card for future analysis and reference.

Compressed Air Test Rack*

By C. B. HALL
Virginia Electric & Power Company
Norfolk, Va.



Many pneumatic valves are tested with precision by this rack in the Norfolk shops of the Virginia Electric & Power Company

PRECISION and convenience have been furthered in the testing of various pneumatic equipments entering into the operation of Birney safety cars by an ingeniously assembled compressed air test rack in the shop of the Virginia Electric & Power Company, at Norfolk, Va. The assembly consists of a shop-made bench measuring 12 ft. long, 4 ft. wide and 30 in. high, supported by scrap angle iron. The bench has a $\frac{1}{8}$ -in. iron top and is fitted with a complete $\frac{1}{2}$ -in. piping system, a replica of the actual operating equipment.

The complete pneumatic assembly is mounted on the bench and is connected to the shop air compressor. Five test gages are so arranged that they work in conjunction with a pressure regulating valve operating between two 16-in. tanks and an independent 10-in. tank. These tanks are placed beneath the top of the bench and furnish the desired pressures for the various tests. The piping is so arranged as to afford an individual pressure test for each unit, free of the co-ordinated operating set-up required in a car. The assembly was completed at an estimated cost of \$100, and is finished in the shop color scheme of red, orange, green and blue. Tests have been made with precision and economy of time on brake valves, double check valves, emergency valves, relay valves, reservoir cut-off valves and door engines.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Sensitive Relays Require Careful Maintenance

By E. H. CARTER
Renewal Parts Engineer
Westinghouse Electric & Manufacturing Company

RELAYS play an important rôle in the correct functioning of electric railway car equipment. A relay which is not in good operating condition can be the source of a costly burnout or a serious delay. Too much emphasis cannot be placed on their proper maintenance.

Regular inspection and replacement of worn relay parts are necessary if trouble is to be avoided. On light inspection, conducting particles such as copper dust and brake shoe dust should be blown from the contacts and the insulation. Particles that cannot readily be removed with air can be wiped from the relay with a piece of cheesecloth. All main and control circuit connections should be inspected to insure tightness, and all moving parts checked for mechanical operation. The condition of the contacts should be noted, and any that are badly worn or burned should be replaced.

During regular overhauls, particular attention should be given to the mechanical parts of the relay. Wearing parts should be sparingly lubricated. All contacts, springs, disks, and wearing parts should be carefully inspected and replaced if they show signs of deterioration or serious wear. Insulating parts should be cleaned, and, if necessary, be given a thin coat of clean shellac. If the air gap or other adjustments which control the setting have been changed, the relay must be carefully calibrated so that it will pull in or drop out at correct voltage or current. These voltage and current values, of course, vary with the equipment. The maintenance men and inspectors should know these values and how the relays function.

Some common methods of adjusting the relay follow:

1. Vary air gap by change in position of core or armature.
2. Change tension of spring holding relay open or closed.
3. Adjust setting by varying calibration weight.

In setting relays it will be found of value to use a test lamp in series with the contacts. This lamp will light when the moving element is in the "make" position.

Improved contact disks, of metal graphite composition are now being used by many operators to replace the plain metal disks. These metal-graphite composition disks have a low voltage drop at the contact, and, therefore, can be operated at low contact pressure. Moreover, the contact drop with this disk is constant and does not increase due to oxidation. Lower contact pressure and constant contact drop result in longer life and reduced maintenance.

The function of the overload relay is to protect the main circuit apparatus by causing the line switch to open when a heavy current from an overload or short circuit occurs. A latch holds the relay in the tripped position until it is reset with the reset switch. The following points, therefore, are especially important:

1. Moving element should freely pull up at overload current.
2. Movement of armature should be quick and positive.
3. Armature should latch positively in trip position.
4. Closing the reset switch should drop the armature and prepare it for the next overload.

The overload relay can be checked both mechanically

and electrically by setting the brakes and notching up the controller until the line switch opens. An ammeter connected in the main circuit can be used to check the value of the current at which the relay operates.

The line relay is a no-voltage relay and acts to cut off power when the voltage varies from fixed limits. As this relay must act very quickly to protect the equipment from momentary voltage surges, it should be very sensitive. Voltage drops may be due to poor contact on the trolley wire, section breaks, or defective frogs. When inspecting no-voltage relays the following checks should be made:

1. The moving element should drop very quickly when voltage is interrupted.

2. The air gap should be great enough when the relay is energized so that there is no danger of the residual magnetism holding the moving element.

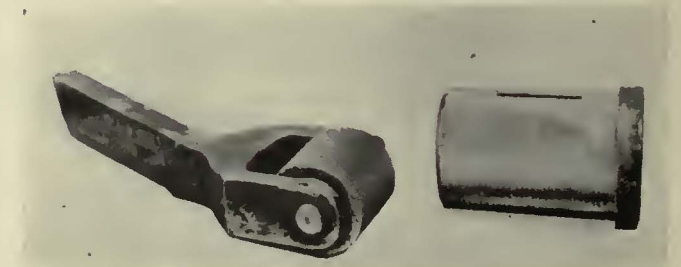
The accelerating relay controls the acceleration of the motors by pulling open when the accelerating current is high and closing when it has decreased. For this relay the following points are important:

1. Adjustment should be maintained so that both pull-in and drop-out current values are correct for the equipment.

2. Wearing parts and contacts should be carefully inspected as the operation is frequent and the duty important.

Reclaiming Undersized Motor Bearings*

By P. J. McQUADE*
Superintendent Shop Methods
Pittsburgh Railways



Knurling tool used by the Pittsburgh Railways to increase the outside diameter of worn motor bearings, and a sample of its work

WHEN the outside diameters of bearings for the box-type railway motors of the Pittsburgh Railways have become so reduced on account of wear that they can no longer be pressed into the armature housings, they are reclaimed at the Homewood shops by knurling. By this method we are able to increase the outside diameter sufficiently to obtain a tight fit when they are pressed in the housings.

The bearing is driven by a fluted live center in the lathe and a conventional type of pipe center in the tail stock end. The knurling tool is, as a rule, passed over the bearing only once to obtain the desired increase in the outside diameter of the bearing. One bearing can be knurled in about four minutes. By the use of this tool we have been able to make a large saving in time and material, and the results obtained have been very satisfactory.

*Submitted in ELECTRIC RAILWAY JOURNAL Prize Contest.

Reducing Failures

By R. E. TWIGGS
Formerly Master Mechanic
Steubenville, East Liverpool & Beaver
Valley Traction Company
East Liverpool, Ohio

of Rewound Armatures



[At left]
Removal of armature coils is facilitated by soaking in a hot cleaning solution for several hours



[At right]
Baking of armatures and fields is done in an oven kept at a temperature of 212 deg. F.

DIPPING and baking have been found to increase the life of rewound railway motor armatures, and to result in fewer failures and reduced maintenance cost on the Steubenville, East Liverpool & Beaver Valley Traction Company. Since the present maintenance program was begun in 1927 there has been a steady improvement, and in the first eleven months of 1930 there were only eleven rewinds out of 300 motors in service. This compares with 34 rewinds in 1927.

Dipping and baking are done by standard methods. The baking is done in a thermostatically controlled oven which accommodates six armatures and 30 field coils, the temperature being maintained at 212 deg. F.

When the rehabilitation program was started early in 1927, the armatures were removed from the motors which had been in service for some time, given a megohm test, and then dipped and baked even if re-winding was unnecessary. Field coils were checked with a Century tester and any of them showing low insulation were removed. During that year 34 armatures were re-wound, dipped and baked. The effect of this treatment was indicated by a reduction in rewinds toward the end of the year. In 1928 the remainder of the armatures were removed and tested. When a test of the field coils showed that one required attention, all four were removed and replaced with coils that had been dipped and baked. The results of the treatment were so pronounced that only nineteen rewinds were needed during the year.

As a result of the reduction in work of the armature department, the shops were reorganized in April, 1929. All overhauling of motors was transferred to the arma-

ture room and the foreman was placed in charge of all electrical repairs including brushholders, circuit breakers and line switches.

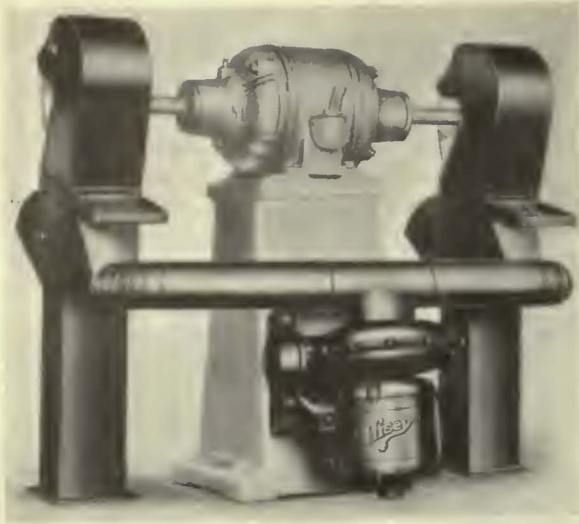
In order to have the cores in good condition for rewinding and to remove the old coils easily, the practice has been developed of placing the armature in a tank containing cleaning solution. The coil leads are first removed from the commutator slots and the armature is then submerged in the solution and the temperature held at 200 deg. F. for approximately three hours. After this treatment the coils are easily removed. The armature is again placed in the hot solution for additional cleaning, preferably being left over night at a somewhat lower temperature. In the morning the armature is removed and the core cleaned with wire brushes. It then has the appearance of a new armature. The labor for removing the coils and cleaning the armature is slightly more than 1½ man-hours, a material reduction from that with former methods.

Results obtained with the cleaning tank have been so good that it has been decided to install a second tank, large enough to accommodate bus, motor and compressor parts in addition to axle caps and motor housings. The same tank is used to heat pinions before installing on the motor shaft, in order to eliminate trouble with loose pinions.

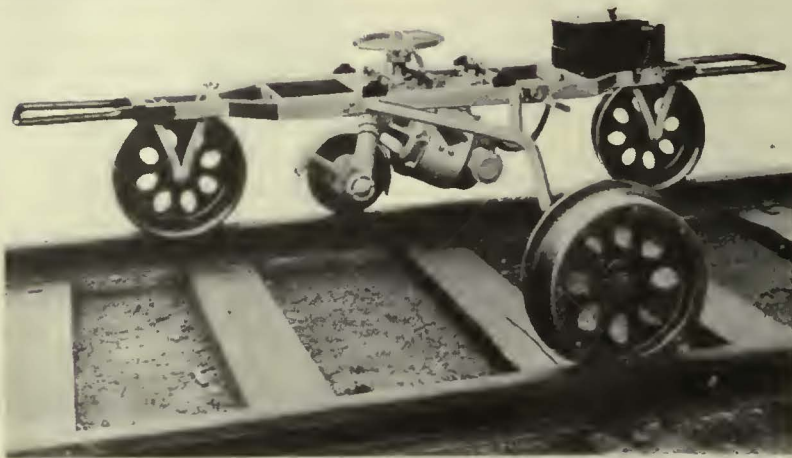
Use of these various devices has helped reduce the number of pull-ins. During 1927 there was an average of 47 pull-ins per month; for the first nine months of 1930 the average was only 24 per month. In September one of the company's shops did not have a single pull-in.

Recent Announcements of

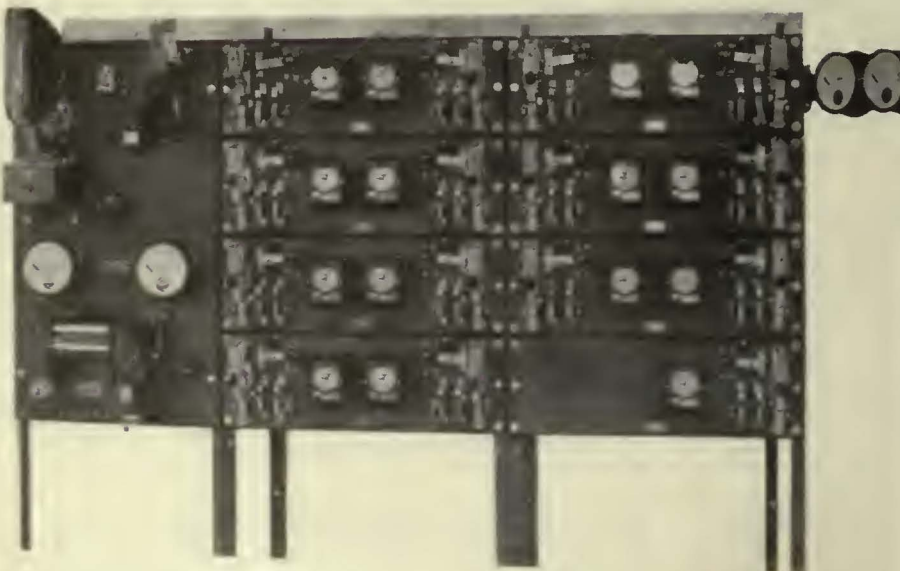
New Equipment



Buffing and Polishing Machine is equipped with an exhauster system, which is driven by a ball-bearing motor. One automatic motor starter simultaneously controls both motors. *Manufacturer:* Hisey-Wolf Machine Company, Cincinnati, Ohio.



Rail Grinder, known as Model P-8, has a detachable outrigger, permitting two men to lift it off the track. As it occupies little space, the grinder can be placed alongside the track to permit the passage of cars. A flexible shaft attachment is provided for separating and leveling rail ends after welding. *Manufacturer:* Railway Trackwork Company, Philadelphia.



Automatic Control Panel has fifteen circuits for charging storage batteries with a 75-kw., 85-85-volt motor-generator set. A regulator holds the generator voltage within the limits of 3 per cent. The charging current is automatically adjusted

to the correct value, depending on the state of discharge of the battery. The panel also affords protection against reverse current in case of failure of the alternating-current supply. *Manufacturer:* General Electric Company.

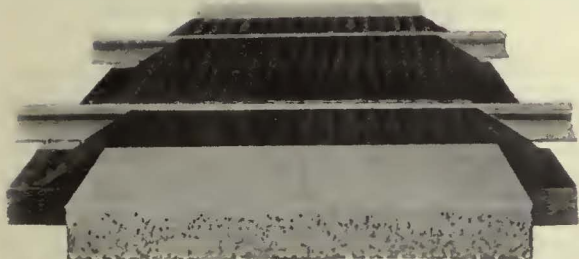
Wood-Block Flooring, available in oak, maple, beech and birch, is treated with transparent wood preservative for protection against decomposition, and against shrinking and swelling. A special heavy-duty block for herringbone patterns is made for industrial purposes. *Manufacturer:* National Wood Products Company, Howard City, Mich.



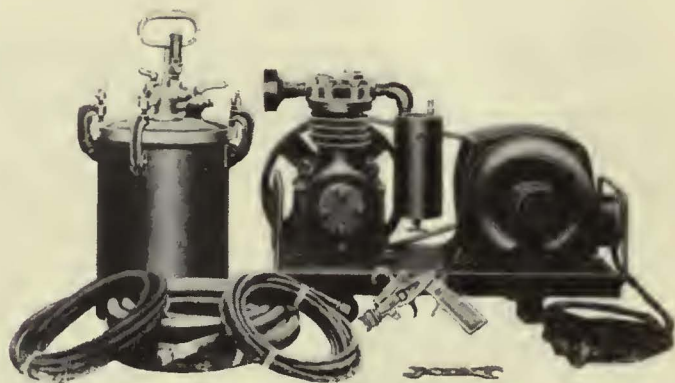


Demountable Truck Body is automatically loaded or unloaded quickly by a handling device attached to the chassis. The coupling, stopping and locking operations are all automatic. One main lever controls the mecha-

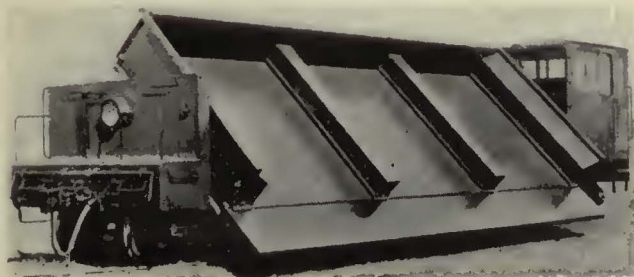
nism, and when thrown in engagement no further attention is needed. Device was invented by Austin Denehie, general manager of the Los Angeles Truck Exchange, Los Angeles, and it has not yet been placed in production.



All-Steel Foot Crossing is designed to eliminate the danger of pedestrians slipping or stumbling at sidewalk intersections. The foot crossing is constructed in three units. The units have flanged ends fitting snugly under the ball of the rails, and when placed in position they form a span level with the rails and the sidewalks. *Manufacturer:* Joseph T. Ryerson & Son, Chicago.

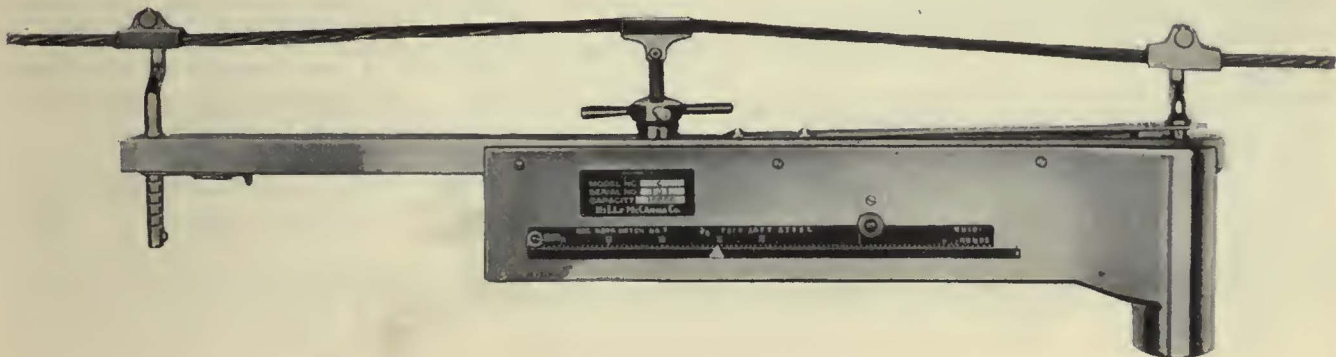


Spray-Painting Outfit is light in construction so that it can be carried about and operated by one man. It is equipped with a $\frac{1}{2}$ -hp. motor, one pressure-feed paint tank, 20 ft. of $\frac{1}{8}$ -in. air hose and connections, and 12 ft. of $\frac{1}{8}$ -in. fluid hose and connections. *Manufacturer:* DeVilbiss Company, Toledo, Ohio.



Gas-Electric Dump Car has a 24-yd. level-load dump body with a capacity of 35 tons. The car is equipped with two gasoline engines, rated at 155 hp., and two generators and four motors by Westinghouse. The air-brake equipment is Westinghouse, straight and automatic. *Manufacturer:* Differential Steel Car Company, Findlay, Ohio.

Tensiometer is built for service in the field. It can be hooked on the wire in any position, and deflects the wire by tightening the center bearing. A correct reading of the tension in the wire is given at once. The device is enclosed in an aluminum case, weighing 14 lb. The standard model will test all wires up to 1 in. in diameter, and has a tension capacity of 16,000 lb. *Manufacturer:* Hills-McCanna Company, Chicago.



NEWS of the Industry

Improvement Projects

Philadelphia, Pa.—Closing two years of struggle on the part of Northeast representatives, Councilmen decided on June 24 upon the direct subway line to Rhawn Street under Roosevelt Boulevard—a project estimated to cost ultimately \$29,000,000.

Beverly Hills, Cal.—The Pacific Electric Railway has been authorized by the Railroad Commission to relocate and reconstruct its tracks at grade across Rodeo Drive, Camden Drive, Bedford Drive, Roxbury Drive, and Linden Drive here to improve operating conditions and lower the grades of approach.

Baltimore, Md.—The United Railways & Electric Company has completed its present new car and rebuilding program under which 150 new cars and 155 rebuilt articulated and double-truck cars have been added to the quota of equipment.

St. Louis, Mo.—The State Highway Commission has asked the Public Service Commission to order the St. Louis Public Service Company to participate in the elimination of a grade crossing in St. Louis County at a point where State Highway No. 77 intersects the tracks of the railway. The commission estimates that the proposed viaduct will cost \$25,985, and the commission is asked to make the State and the railway each responsible for half the cost.

Seattle, Wash.—Work on the extension of the Municipal Railway into the Denny Hill regrade area at a cost of \$57,000, which was to have been started in June, will not begin until Aug. 1.

Memphis, Tenn.—Mayor Overton and W. D. Kyser, president of the Memphis Street Railway, have tentatively agreed to remove the car tracks and neutral strip from Lamar east of the intersection with Central Avenue, and erect a new trolley wire system from the Parkway west on Lamar and Vance Avenues all the way uptown preparatory to the installation of trolley bus service. If satisfactory arrangements can be worked out, the railway will immediately order six trolley buses at a cost of \$14,000 each, service to start Sept. 1.

Fare Changes

Long Island City, N. Y.—The Transit Commission has granted the New York & Queens County Railway permission to charge a 6-cent fare on its lines until December 31, next. The commission's action was necessary as the company's right to charge a 6-cent fare expires June 30, next. The commission approved a resolution prepared by Commissioner Lockwood providing that the revenues from the 1-cent additional fare be segregated.

Modified Toledo Grant Before Voters on Aug. 11

Revision of the Milner service-at-cost ordinance in Toledo has been approved by the City Council and the new measure will be placed on the ballot for action by the electorate at the city primary on Aug. 11. In that it embodies several new principles, the document contributes to the service-at-cost idea. Section by section, it was approved by the Railroads Committee of the City Council, and then passed with one dissenting vote.

The measure renews the original grant of the Community Traction Company for ten years, and brings motor coaches specifically under the ordinance. A new factor is a clause which gives the company a real incentive to economical operation.

In place of the former provision of a general sinking fund for retirement of bonds and preferred stock equal to 1 per cent of the company's entire capital value for each year of renewal, the new franchise provides that the surplus of receipts after meeting expenses, maintenance and repair fund, depreciation fund, sinking fund requirements on new capital, and interest on bonds and dividends on preferred stock accruing after the date of the renewal, shall be divided so that 70 per cent goes into the stabilizing fund and 30 per cent into the general sinking fund applicable to the bonds and preferred stock of the company.

As economies to the public are reflected only through the balance in the stabilizing fund, it is apparent that to retire capital the major portion of the net receipts after all fixed requirements must go into the fare savings. The greater the fare savings the greater the

amount for amortization of invested capital.

The new ordinance assures the company a monopoly of transportation service within a quarter-mile of any of its lines.

The city may require extensions and fix service standards on existing lines subject to arbitration provisions intended to safeguard the company from the imposition of unduly burdensome orders.

Limits of the depreciation fund formerly fixed between $\frac{1}{2}$ and $1\frac{1}{2}$ per cent, but in practice always carried at $1\frac{1}{2}$ per cent, have been raised to $1\frac{1}{2}$ to 4 per cent. Special limits for depreciation of bus properties are set at 10 to 25 per cent.

Accounting for bus operation must be in accord with the American Electric Railway Association standards and for railway operation in accord with Interstate Commerce Commission practice.

Flexibility in fares is assured. The maximum fare for school children through the high school period is to be 5 cents, a 1-cent fare is to be charged for those under eight years, and there are to be weekly passes and optional Sunday fares, but the regular scale is to be the same as that in effect in the old ordinance. The fare now is 10 cents cash or three tickets for 25 cents with a 1-cent transfer charge.

(Continued on Page 381)

Fewer Cabs and Trucks in Chicago

A recent traffic survey in the downtown area of Chicago indicated that more Chicagoans are driving their automobiles to work than did so during more prosperous times two years ago, according to Leslie J. Sorenson, city traffic engineer.

The survey, made by the police on May 26, shows that the number of taxicabs entering the downtown district has fallen off 21 per cent from the volume of 1929, and that the number of service vehicles and trucks has decreased 7 per cent.

The police counted 145,939 vehicles from 7 a.m. to 7 p.m., an increase of 4 per cent over the 139,891 counted on a similar occasion in 1929. Passenger vehicular traffic increased 15 per cent, from 88,439 to 101,831.

Wisconsin Associations to Meet at Fond du Lac

It has been decided to hold the transportation section convention of the Wisconsin Utilities Association on Aug. 13, and the annual convention of the Wisconsin Motor Coach Association on Aug. 14 at Fond du Lac, Wis. There will be a banquet for the combined groups on the evening of Aug. 13 at the Hotel Retlaw.

Coming Meetings

July 16-18—Mid-West Electric Railway Association, Brown Palace Hotel, Denver, Col.

Aug. 6-8—Pacific Claim Agents Association, Stockton, Cal.

Aug. 13—Transportation Section, Wisconsin Utilities Association, Hotel Retlaw, Fond du lac, Wis.

Aug. 14—Annual Convention, Wisconsin Motor Coach Association, Hotel Retlaw, Fond du lac, Wis.

Sept. 9-10—Central Electric Railway Master Mechanics' Association, Cincinnati, Ohio.

Sept. 26-Oct. 2—Annual Convention, American Electric Railway Association, Atlantic City, N. J.

Sept. 28-29—Annual Convention, National Association of Motor Bus Operators, Atlantic City, N. J.

Jan. 27-29, 1932—Electric Railway Association of Equipment Men, Southern Properties, Richmond, Va.

Art and Utility Combined in Ice Delivery Car



Distributing ice is no less a public service than is transportation

The Kentucky Traction & Terminal Company, Lexington, Ky., managed by the Kentucky Utilities Company, along with the Lexington Ice Company, another Insull subsidiary, has installed a special refrigeration car for hauling ice from the plant of the Lexington Ice Company to ice stations located on the lines of the Kentucky Traction & Terminal Company, at Georgetown, Paris, Nicholasville, and other points. This car, a reconstructed and insulated freight car, has large carrying capacity. It is very attractive in white, with black lettering and black running gear. Signs on both sides in big black letters read: "Pure Ice Protects Food," and "Use Ice the Year Around." Over the ice door openings of the car is a small sign: "Lexington Ice Company," while on the molding at the top of the car there appears in small letters: "K. T. & T. Company." The uniforms of the crews are white.

Substitution of Service Still Unsettled in St. Louis

Attorneys for the St. Louis Public Service Company on June 8 filed with the Public Service Commission a brief in support of the company's plea to withdraw its Tower Grove and Bellefontaine lines from Gravois Avenue. The city is widening Gravois Avenue between Grand Boulevard and Twelfth Boulevard to a 100-ft. thoroughfare. The cost to the company to relocate tracks on Gravois between Arsenal Street and Mississippi Avenue in the center of the widened street is estimated at \$113,000. The present tracks are in good condition and should be serviceable for many years. Undoubtedly the widened street will attract additional auto traffic and make railway operation on the street more hazardous. The company would install a fast through bus service on Gravois Avenue, but street car riders in the districts affected by the changes have voted overwhelmingly in favor of the rerouting of the Tower Grove and Bellefontaine lines and the installation of bus service on Gravois Avenue to the downtown district.

Burden of Amortization Out of Earnings Too Great

Price Waterhouse & Company has been auditing the books of the Detroit Municipal Railway for several months. It is expected that the report, to be presented within a few weeks, will recommend changes in the bookkeeping methods of the system. W. B. Bonthron, head of the company's Detroit offices, conferred with the street railway commission and Mayor Murphy recently, and urged changes in the allocation of depreciation charges. Mr. Bonthron is understood to feel that the D.S.R. for the past eight years has been paying off its debt too rapidly. He urged the commission to decide whether the charter should be amended to eliminate the provisions which require the eventual payment of all debts. Clarence E. Wilcox, corporation counsel, said that Senator James Couzens, under whose administration as Mayor municipal ownership was brought about, was of the opinion that a reasonable permanent debt was in accord with the tenets of sound finance.

Baltimore Railways Truck Fleet

The champion safety truck fleet of Baltimore is the United Railways' fleet of 37 trucks. This fleet, operated by 51 drivers, won the Baltimore Safety Council's award in the public utility truck division for the best six-month safety record from July 1, 1930, to Jan. 1, 1931. The trophy is a bronze plaque. Replicas of it have been painted on the sides of all the United Railways' trucks in the winning fleet, and every man has been presented by President Storrs of the railway with a trophy pin.

Dallas Men Feted for Safety Records

With words of praise for their splendid records and efficient service during 1930, officials of the Dallas Railway & Terminal Company entertained at a banquet held recently 26 trainmen who had perfect service records. Two outstanding men, one from each division, A. Trotter, Oak Cliff, and J. C. Haislip, East Dallas, were selected from the group for the annual award, a 21-jewel Ball watch. Every man present received a purse and card case engraved: "For Efficient Service." The two outstanding men were selected by G. I. Plummer, assistant general manager in charge of transportation, with the aid of the entire supervisory force of the transportation department. This is the second contest of the kind sponsored by the company. Last year Fred A. Hafner, of the Hafner Watch & Optical Company, and the Ball Watch Company were donors of the efficiency award. At that time 37 men had perfect safety records over a period of five months. So pleased was the railway with the outcome of this contest that it decided to make the award an annual affair and extended the contest period to one year. Mr. Plummer said:

We have found the efficiency contest to be one of the most outstanding things we have done in the interest of safety. It is a great honor for a man to be recognized as having passed an entire year with no charge of any kind against his record.

High tribute was paid by the railway officials to those present for their splendid co-operation. Service records of Mr. Trotter and Mr. Haislip date back to Oct. 9, 1894, and Aug. 31, 1922, respectively.



Twenty-six Dallas trainmen who completed year of service with perfect work

Bus Operations

Washington, D. C. — Street car type buses that replaced car service on the west end loop of the Capital Traction Company are showing favorable operating results. Traffic on this line is light and it was decided to substitute the buses since track reconstruction work costing \$370,000 would have to be carried out in connection with a street improvement program by the city.

Johnstown, N. Y.—Operation of buses by the Fonda, Johnstown & Gloversville Railroad between Fonda and Fort Johnstown, has been authorized by the Public Service Commission, but does not contemplate discontinuance of trolley service on any portion of the route.

Springfield, Ohio—Institution of bus service to replace the former trolley service on the East High Street and Belmont divisions of the Springfield Railways may lead to the barring of all parking in the congested area. The new service was started on June 22, the last cars operating over the divisions on Saturday night. The new service is the result of an agreement between the city and the company, and is to be effective until a permanent solution of the transit problem is reached.

New York, N. Y.—The Board of Estimate and Apportionment has set July 10 for a hearing on applications for bus franchises in Queens. The board, it was indicated, has selected tentatively as operators of the routes the North Shore Bus Company and the Jamaica Bus Company, Inc., subsidiary of the Jamaica General Railways.

Frostburg, Md.—The Cumberland & Westernport Transit Company has sent three affidavits to the Public Service Commission charging that the Lashley & Anderson Bus Company carried those making the affidavits from Westernport to Cumberland, and from Keyser to Cumberland in contravention of an order handed down by the commission directing it not to receive passengers in Westernport for Cumberland or in Cumberland for Westernport. The Cumberland & Westernport Transit Company secured the permits under which it is now operating buses from Westernport to Cumberland to protect business it handled for more than 30 years with trolley cars from Westernport to Cumberland by way of Frostburg.

Vancouver, B. C.—On motor buses the British Columbia Electric Railway has recently reiterated its stand that "wherever there is a field for the motor bus we will use it, but our knowledge of transportation tells us emphatically that the street car is the best possible vehicle for transporting the 200,000 daily passengers in the city of Vancouver."

Hudson, N. Y. — The Public Service Commission consented on June 24 to the transfer to Paul Hirschman of the certificate of public convenience and necessity for the operation of buses here and in the town of Greenport, issued to the Eastern New York Transportation Corporation. Mr. Hirschman has operated a bus line from Hudson to Phil-

mont for fifteen years, and he owns and maintains a garage in Hudson and has six buses. The same rate of fare now charged, which is 10 cents cash, or thirteen tokens for \$1, will continue in effect, and all outstanding tokens will be honored. The Philmont line will be operated independently of the local line. The bus company sustained a loss of \$5,000 during the past year, but Mr. Hirschman expects that he will be able to overcome this by intensive personal management. The Eastern New York Transportation Company was owned by the Eastern New York Utilities Corporation, which has been dissolved.

Washington, D. C.—Operation of the new taxi-coach has been started in Washington by the Capital Traction Company through a special arrangement with the Twin Coach Corporation. The coach has been in use on the Chevy Chase de luxe bus line, with very favorable public reaction. In the case of the Capital Traction Company, it has been found that the taxi-coach makes better speed than the conventional type of parlor bus.

Corning, N. Y.—The transfer of certificates of convenience and necessity issued to Frederick N. Carpenter for the operation of bus routes from Corning, to Waverly, and in Corning and between Painted Post and South Corning, to Carpenter's Rapid Transit, Inc., was approved on June 24 by the Public Service Commission. These bus lines replace service formerly rendered by the Corning & Painted Post Street Railway and the Elmira, Corning & Waverly Railway, which abandoned operation some time ago.

Service Changes

Chico, Cal.—The Sacramento Northern Railway has applied to the California Railroad Commission for authority to discontinue local service here. It operates a line along Park Avenue, Main Street, and the Esplanade, and a stub line, extending from Park Avenue to the plant of the Diamond Match Company.

Manufacturers

CONFIDENCE breeds COURAGE

COURAGE breeds ACTION

Get the first, the others will follow.

You can't come out of a dark room and see, *immediately*. You can't come out of a depression and *sense* the future, in a day. In both cases

You Can Have Confidence.

Having that, *Courage* and *Action* follow.

GET CONFIDENCE KEEP CONFIDENCE
SHOW CONFIDENCE

by exhibiting at the

50th A.E.R.A. Convention

at Atlantic City next September

You are invited.

THE EXHIBIT COMMITTEE.

New York, N. Y.—The Transit Commission has granted permission to the Union Railway, a subsidiary of the Third Avenue Railway, to establish 24-hour one-man car service on its 163rd Street Crosstown, Boston Avenue and Tremont Avenue lines, now operating one-man cars only part of the time.

Buffalo, N. Y.—The Public Service Commission on June 17 directed the International Railway to submit plans to provide increased protection at wyes where one-man cars are operated. Action followed complaints by the Mayor of Buffalo and the Mayor of Lackawanna in which it was alleged that operation of the one-man cars at wyes is dangerous to the public because cars must back across walks used by the public when turning on the wye tracks. The Buffalo Council adopted an ordinance requiring the railway to station another man at the wyes when cars are being turned, but the court held this illegal since authority to regulate street car operation rested with the Public Service Commission.

Cleveland, Ohio.—The Street Railway Commissioner has submitted to Council a plan for loading cars of the Cleveland Railway from the sidewalks on Public Square, by reversing the direction of the cars around the loops.

San Jose, Cal.—In a supplemental order the Railroad Commission has authorized San Jose Railroads and Peninsular Railway to abandon and remove their tracks on Willow Street between McClellan Avenue in San Jose and Lincoln Avenue in Willow Glen, provided that the Peninsular Railway give service over the track in Lincoln Avenue between Willow Street and Minnesota Avenue. The Peninsular Railway is also authorized to construct a connection and crossing at the intersection of Willow Street and Lincoln Avenue in Willow Glen, to provide a connection between the track on Lincoln Avenue to the north of Willow Street, with the track in that avenue south of Willow Street.

Wheeling, W. Va.—Withdrawal of service by the Wheeling Traction Company between Shadyside and Bellaire has been announced.

Richmond, Va.—A faster schedule on the Petersburg, Hopewell & City Point Railway has been arranged. Cars now leave Petersburg and Hopewell every 30 minutes from 12:30 to 9:30 p.m. The running time has been cut ten minutes.

Tacoma, Wash.—The Sumner-Tacoma Stage Company has asked the Department of Public Works for permission to route some of its buses via the tideflats so as to meet a demand for transportation from workers on the tideflats who live in the lower Puyallup Valley district. The city contends that such service would affect the revenues of its municipal belt line street railway.

Baltimore, Md.—Conductors of the Washington, Baltimore & Annapolis Electric Railroad are now permitted to sell round-trip tickets on its trains. In the past conductors could only accept single-way fares.

Midland United Gets Indiana Interurban

Properties of the Terre Haute, Indianapolis & Eastern Traction Company were sold at public auction on June 23 by Elmer W. Stout, receiver, acting under orders of Judge Ryan of the Marion Superior Court and subject to confirmation by him.

B. P. Shearon, secretary of the Midland United Company, Chicago, was the only bidder at \$2,500,000, the minimum price set by the court. Bonds in the amount of \$500,000 were deposited with the receiver as first payment for the properties.

Since Mr. Stout was appointed receiver on April 21, 1930, service on approximately 170 miles of leased lines has been abandoned. A petition to abandon an additional 61 miles of track between Indianapolis and Richmond is still pending before the Public Service Commission.

In July last year, the Midland United Company made an offer to purchase the \$4,816,000 of T.H.I. & E. first mortgage bonds at a price of 73, or for the sum of \$3,612,000. The offer was accepted by the bondholders' protective committee and 90 per cent of the bonds are now owned by the Midland United Company. Ownership of these bonds gives the Midland company control of the common stock of the Terre Haute Traction & Light Company, which is pledged as collateral security for the bonds. The latter company furnishes electric light and power and local railway service in Terre Haute.

With control of the T.H.I. & E. obtained by the Midland United Company it is likely that the line will soon become a part of the Indiana Railroad System, representing the co-ordinated operation of four other Indiana interurban lines controlled by the Midland company. Interurban properties included in the T.H.I. & E. purchase are the 72-mile line from Indianapolis to Terre Haute and the Indianapolis-Richmond line. Local railway systems in Terre Haute and Richmond were also obtained.

Plans for Indianapolis Reorganization Advanced

Plans for the reorganization of the Indianapolis Street Railway have been approved by Indianapolis members of the Security Owners' Protective Committee and copies have been sent to other members of the committees for consideration and approval. Indorsement of the proposal by the full membership is expected before July 1.

The new reorganization plan, as recently reported in *ELECTRIC RAILWAY JOURNAL NEWS*, would scale down the present outstanding securities from \$18,881,000 to \$10,134,000, and reduce the fixed charges from \$811,614 annually to \$459,200.

The plan also contemplates reconstruction of much of the company's trackage, purchase of 338 new street cars, gasoline buses and trolley buses, which would be paid for out of the company's earnings or through issuance of first

mortgage bonds that would assume priority over all other securities.

Approximately \$1,300,000 will be invested in the new company by the present holders of junior securities. It also is probable that \$2,000,000 of first mortgage open-end bonds will be issued if it becomes advisable or necessary to do so. The bonds, however, will not be issued in exchange for securities of the present company.

Enough securities already have been deposited with the committees to insure the success of the plan. The name of the reorganized company would be Indianapolis Railways, Inc.

Modified Toledo Grant

(Continued from Page 378)

The power contract with the Toledo Edison Company, extending to Feb. 1, 1941, is continued in the renewal. The rate is 1.25 cents per kilowatt hour.

Under the memorandum of agreement by which amortization was postponed on Feb. 1, it was agreed that half of the \$812,500 of notes given in July, 1928, when the bus ordinance was made effective, evidencing current obligations, will be cancelled by the interests holding the bonds.

Prospects point to the renewal ordinance having the support of general business interests, the press and most civic organizations.

Local Bus Service by Interurban

The Indianapolis & Southeastern Railroad has introduced local bus service between Aurora, Ind., and Cincinnati, Ohio, replacing electric railway operations abandoned last winter by the Cincinnati, Lawrenceburg & Aurora Electric Railway. The new bus schedule provides ten round trips daily, serving the intermediate towns of Lawrenceburg, Elizabethtown, Cleves, Zion, Mack and Cheviot. The local service between Cincinnati and Aurora is in addition to the company's through service from Cincinnati to Bates, Greensburg, Shelbyville and Indianapolis. Two new 21-

The Business Outlook

THE swift, sweeping reversal of psychology in world security and commodity markets has suddenly exposed the paralyzing doubt and deflationist dogma that have dominated and unduly prolonged this depression. This surge of speculative sentiment in the past week swamps the slow, stagnant statistics of business activity with steel, carloadings and even check transactions sagging under summer slackness. But prices have become the key to recovery, and the scramble to get on the bus is likely to leave business indicators behind for a while, unless the overloaded vehicle tries to take the steep hill. In short, American business appears to be bound back to the high road from its deflation detour. All that is needed now is a little financial free-wheeling.

—*The Business Week.*

passenger city type Dodge motor coaches have been purchased by the Indianapolis & Southeastern for service on its Cincinnati suburban line serving Fernbank, Cleves and Hooven, Ohio, in conjunction with the Cincinnati Street Railway.

Well Diversified Programs Arranged for Mid-West Meet

Announcement has been made of the program for the business sessions of the meeting of the Mid-West Electric Railway Association and the Mid-West Claim Agents Association at the Brown Palace Hotel, Denver, Col., July 16 and 17. The meeting will be opened at 9:30 a.m. on July 16 by President C. A. Semrad. Mayor Begole will welcome the delegates. Following Mr. Semrad's response two papers are on the program: "What Mass Transportation Means to a City," by Charles Gordon, managing director of the American Electric Railway Association, and "Psychology of Employee Relation," by F. G. Buffe, vice-president in charge of operations, Kansas City Service Company.

At 1 p.m. there will be round-table luncheons of the equipment section and the claims association and one for the consideration of general topics. The sponsors are R. W. Bailey, M. B. Bracken and Robert P. Woods. The claims luncheon topic is "Standardization of Claims Statistics," by C. I. Carr.

The afternoon topic of the Claims Association is "Claim Policies," a discussion in which it is expected all members will participate.

The session on July 17 will convene at 9:30 a.m. The topics are "Merchandising and Advertising Transportation," "Street Traffic Problems," and "Field Tap Control by Use of Resistors and Its Effect Upon Speed and Motors." The speakers are Lawrence Wingerter, Des Moines Railway; F. C. Lynch, director Kansas City Safety Council, and A. P. Cox, General Electric Company. At the morning session there will be an address by M. E. Simonds, commercial vice-president of the Westinghouse Electric & Manufacturing Company.

At the joint luncheon the topic will be "Safety, Speed, Service," by C. A. Porter, vice-president and general manager, Omaha & Council Bluffs Railway.

After the luncheon session the topic will be "Up to the Minute Trolley Bus Construction and Operation," by C. G. Guernsey, automotive division of the J. G. Brill Company.

Other topics are: "Operating Features and Problems of Trolley Buses."

"Trolley Bus in Smaller City Operation."

These topics will be presented respectively by E. A. West, general manager Utah Light & Traction Company, and A. T. Lewis, manager of transportation department Central Illinois Electric & Gas Company, Rockford.

Since Denver is in many respects a show city, an elaborate program of entertainment has been arranged. This includes sightseeing trips, luncheon and bridge, banquet and dance and special reception for the ladies.

Rerouting in Business District Essential

Answering the criticism of downtown business men who have objected to his suggestions that certain lines of the St. Louis Public Service Company entering the downtown district of St. Louis, Mo., should be rerouted, R. F. Kelker, Jr., transportation adviser of the St. Louis transportation survey commission, in a memorandum presented to the aldermanic committee now studying the report, has defended his recommendations. He said that it must be remembered that in supplying transportation to a business district, all of the street cars necessary to meet traffic demands of the district cannot be routed over a few tracks in the district or traffic congestion, and eventually stagnation, will result. He contended that the changes suggested in the report will provide more convenient and easier ingress to and egress from the downtown district and will check decentralization of the business district.

Egyptian System Tied to Illinois Traction

The Illinois Commerce Commission has approved the transfer to the Egyptian Motor Lines, Inc., of all of the bus lines, certificates of convenience and necessity of the defunct Egyptian Transportation System, Inc. The new company will operate a 500-mile network of bus lines in northern, central and southern Illinois. Recently the property of the Egyptian Transportation System was sold at foreclosure for \$160,000 to representatives of the North American Power & Light Company. It is anticipated that the newly formed Egyptian Motor Lines, Inc., will operate in close co-operation with the Illinois Traction System, Illinois Power & Light Corporation and other companies affiliated with the North American Power & Light Company.

Maryland Measures Subject to Referendum

The bill passed at the recent session of the Maryland Assembly and signed by Governor Ritchie exempting the Washington, Baltimore & Annapolis Electric Railroad, now in receivership, from the payment of taxes during the next two years will have to be approved by the voters before it can become effective. It will be impossible for the voters to act on the subject until the Congressional election in 1932. In the meantime, the law will be inoperative. Passage of the bill was sought as a means of helping to keep the line in service. Numerous other economies have been effected. Opponents of the measure have filed with the secretary of state a referendum petition containing the required number of signatures and the measure must now be placed on the ballot at the next election. Filing the petition prevents the law from becoming effective pending action by the voters.

Similarly, a petition has been filed with the secretary of state for a referendum on the bill passed by the last session of the General Assembly requiring taxicabs in all cities of more than 50,000 inhabitants to be equipped with meters and carry liability insurance, and also

placing them under the regulation of the Public Service Commission. The petition will have the effect of keeping the law from becoming operative unless it is approved by a majority of the voters. The law was to become effective on June 1, but was not to be enforced until Jan. 1, 1932. Under the referendum law, the voters cannot act upon the measure until the Congressional election in 1932.

Financial News

Louisville, Ky.—The Louisville Railway handled a very excellent volume of business during May. Attendance at the spring racing season here, which opened on May 2 and closed on May 23, and included the Kentucky Derby on May 16, was smaller than for the banner years, but this year more people used the street cars than last year. Excellent traffic arrangements prevailed on Derby Day, making it possible for the street cars to make excellent time. Immediately after the Derby, the fifth race, thousands started to leave but a steady line of street cars moved into position to load and traffic was handled with a minimum of delay with excellent co-operation on the part of the police department. Prior to the completion of the Fourth Street underpass beneath the tracks of the Southern Railroad and Louisville & Nashville Railroad, completed a year ago, street cars frequently became bunched at this intersection.

Iowa City, Ia.—A decree for the sale of the assets of the Iowa City Railway has been issued by Judge Harold Evans, with Aug. 1 set as the date for consideration of bids.

Regulation and Legal

Tallahassee, Fla.—The State Senate on June 23 defeated a bill that would have made the tax on gasoline in Florida 8 cents a gallon. The measure, sponsored by the administration, proposed an excise tax of 2 cents a gallon in addition to the 6-cent tax prevailing.

The P.R.T. Dividend

WHILE it is true that the abrogation of the Mitten Management contract, the cancellation of the Mitten Building lease, the substitution of one requiring a lower rental and other changes resulting from the McDevitt adjudication and the agreement following that judgment have placed additional financial resources at the disposal of the directors of the Philadelphia Rapid Transit Company, the period of their control has been too short for a final determination of the precise financial status of the corporation. It is to be noted that the announcement is that the dividend has been "deferred," not "passed," hence the shareholders—and this includes, although indirectly, the employees of the P.R.T.—may be justified in hoping that the dividend payments have only been postponed and will be made at a later date.

—Philadelphia Public Ledger.

Richmond, Va.—Governor Pollard is being deluged with requests urging appointment of specified individuals to his proposed commission to study problems of bus and truck taxation, and the motor vehicle laws in general. The executive said that he might alter his plan because of the difficulty of finding a commission entirely free from prejudice, and that instead he might have heads of the motor vehicle, highway, tax and finance departments of the State hold hearings at which proponents and opponents of motor bus transportation might be heard.

Buffalo, N. Y.—The State Court of Appeals has denied the International Railway permission to appeal from the ruling that it must pay for the cost of repaving abandoned track areas. The decision covers only the tracks and pavement in Best Street between Elm and Genesee Streets. The International took the position that it was willing to remove rails from streets on which it has obtained permission to abandon service, but that it should not be required to repave track areas.

Winnipeg, Man.—The Winnipeg Electric Company has informed the city finance committee of its inability to pay the 5 per cent gross earnings tax on its railway for 1931. In turn, the committee instructed the city solicitor to ascertain whether the company intended to discontinue rights and privileges enjoyed under the franchise agreement, and the company replied that it intended to pay 1930 indebtedness, but financial condition of the tramway prevented it from meeting this year's obligations.

Harrisburg, Pa.—The new motor and tractor bills, and a measure taking over 300 miles of second and third-class city streets on main State highways by the Highway Department were approved on June 23 by Governor Pinchot. The motor code is effective Aug. 1. It empowers Philadelphia, Pittsburgh and Scranton to enact ordinances for the impounding of automobiles parked contrary to their regulations. Under the new act, storage garages can be designated as pounds. The municipal ordinances must fix specific towing and storage charges. The owner of an impounded vehicle must be notified within twelve hours that the vehicle has been impounded.

Oklahoma City, Okla.—The City Council has voted down a motion to file suit before the Corporation Commission against the Oklahoma Railway asking for a reduction of fares. Kent Shartel, for the company, stated that the company is entitled to a profit of approximately \$900,000 a year, but that last year the return was negligible.

New York, N. Y.—The detailed report of the Transit Commission's engineers and accountants on valuation of B.-M.T. and Interborough Rapid Transit properties to be included in a unification plan, both on original cost and reproduction cost bases, was made public on June 20. It was embodied in a 518-page printed volume containing hundreds of tables, charts and financial statements relating to both companies and showed in minute detail how the statutory reproduction cost of \$503,540,205, marking the maximum price which the city can pay for the properties under the Public Service Law, was fixed.

Commission Counsel Explains New York's New Motor Bus Law

New York State's new law governing the operation of bus lines was explained in an address delivered on June 10 by Col. Charles G. Blakeslee, counsel to the Public Service Commission, before the New York State Conference of Mayors, in session in Glens Falls. Colonel Blakeslee explained that the new statute has clearly defined the commission's authority and eliminated uncertainty that existed previously.

Colonel Blakeslee said the authority of the commission in the past has been so indefinite that it urged upon the Legislature year after year the necessity of some law which would fix proper jurisdiction and control, but that for one reason or another no bus bill became a law until the passage of the act which as Chapter 531 became effective on April 21 of this year.

So far as the new 1931 law affects the powers of local authorities in controlling bus operation, the act confirms many rulings and regulations previously made by the commission in the absence of statute. In addition, it makes certain radical changes, the principal one being that a distinction is made between bus lines operating in a single municipality and those operating over routes which serve two or more communities. No changes are made in existing law relative to operation within the confines of one municipality, the local authorities being confirmed in their jurisdiction over such lines, but as to the longer lines the new procedure is provided.

In the past where a bus line was projected to furnish service between communities, and secured the necessary local consents from a majority of the communities, the entire project might have to be abandoned if a single community refused its consent. Under the operation of the new law this cannot happen.

The new law, said Colonel Blakeslee, permits the commission to:

1. Supervise omnibus corporations; inspect and examine their equipment; require reports of accidents and investigate the same; prescribe rules and regulations for operations and for safe and adequate equipment.
2. Require filing of annual reports; the furnishing of such information as at any time is necessary; prescribe the methods and form of keeping books and accounts; and when engaged in other or additional business, to keep separate accounts.
3. Fix just rates and prescribe rules for the printing, filing and publishing of tariff schedules; hold investigations and hearings and suspend proposed rates and fix temporary rates when necessary.
4. Approve the issue of stocks, bonds, notes and other securities of a bus corporation, and permit the issuance of securities for reimbursement of treasury during a ten-year period; authorize the reorganization of bus corporations and approve agreements for the same.

Free Rides in El Paso

Free transportation on cars and buses of the El Paso Electric Company has been offered for the past four years by the Popular Goods Company, El Paso, Tex., to induce customers to attend the opening day of the anniversary sale. Gratifying results have always followed. The store began its 29th anniversary sale on May 29, and passengers on all inbound cars and buses rode free as its guests between 8 and 10 a.m.

The power plant switch was pulled for 30 second intervals before and after the two-hour period. Operators counted all inbound passengers, keeping a separate tally for children and adults. All those visiting the store after reaching downtown El Paso received a coupon good for a return trip, and these were honored up to 8 p.m. on the day issued. These coupons were punched once for adults and twice for children, and operators turned them in with their trip sheets.

The plan was advertised both by El Paso Electric Company and the Popular Dry Goods Company. In addition to newspaper advertising, the El Paso Electric Company announced the event in dashboard posters and operators told all inbound passengers who rode during the two-hour period that they were guests of the Popular Dry Goods Company. The opening day of the sale was marked by an unusually large turnover, and earnings on the street cars and buses showed a gain over receipts during normal operation.

Chicago Rapid Transit Company Rewards Long Service

Diamond studded pins, emblematic of their long and faithful service to the public, have been awarded to 44 additional employees of the Chicago Rapid Transit Company who have rounded out 35 years of continuous service with the "El" lines. This makes a total of 103



Vice-President Fallon (extreme right) presenting a 35-year service pin to M. J. Feron, in the presence of (left to right) Otto P. Hintze and Frank L. Baxter, who also received this award

Rapid Transit employees who have been with the company 35 years or more, with an aggregate service record of 3,405 years. Many of these "El" veterans date their entrance into the transportation industry to the time of the World's Fair in 1893.

Other jeweled badges significant of long service have been presented to 55 additional employees who completed 30 years of service; 85 who finished 25 years with the company, and 123 who passed the twenty year mark. This makes a total of 1,194 employees who have been in "El" service twenty years or more.

Freight Ouster Contested

The reply of the Cincinnati & Lake Erie Railroad to the suit of the city of Springfield, in which the ouster of the company from the city's streets is sought, was filed at Springfield, Ohio, on June 24, in Common Pleas Court. The answer challenges the right of the municipality to enact any legislation which would prevent the inter-urban company from carrying on its interstate and intrastate freight and passenger business, and holds that the action of the city in adopting an ouster resolution was illegal. The developments of June 24 were another step in the controversy between the city and the company over the operation of freight trains through the city. The city has sought to limit such freight train operation to a motor and two trailers, but the company insists that it has the legal right to move as many as six cars.

Test New York City's New Subway Cars

Twenty of the 300 cars purchased by the Board of Transportation, city of New York, have been delivered to South Brooklyn to the tracks of the B.-M.T. system for a test prior to operation on the city's new subway now under negotiation for operation in unified service with the existing rapid transit lines, privately quoted.

The new equipment will be tested on the rails of the B.-M.T. system during the summer under the observation of engineers

of the Board of Transportation, the American Car & Foundry Company, which built the cars, by officials of the Westinghouse Electric & Manufacturing Company, which supplied and installed the motors and controls, and also by experts of the B.-M.T. Company.

The City of New York has agreed to pay the B.-M.T. Company 20 cents for each car-mile operated without passengers, and when the cars are to carry passengers as part of the test, the charge will be automatically cancelled for the mileage operated with revenue paying passengers.

The cars were described in detail in ELECTRIC RAILWAY JOURNAL for June, 1931.

Effort Made to Recast Seattle Purchase Terms

Negotiations for an agreement whereby the annual principal payment of the Seattle Municipal Street Railway purchase bonds would be substantially reduced have been resumed by members of the City Council. They are in conference with J. F. McLaughlin, president of the Puget Sound Power & Light Company, who has declared his purpose to co-operate in solving the problem of the railway in a way "fair to our security holders as well as to the general public."

The terms of the contract under which the city took over the local railway lines of the power company calls for annual payments of \$833,000 a year. Approximately \$8,006,000 remains unpaid of the purchase price of \$15,000,000. A two-year moratorium under which the 1929-1930 payments were deferred will expire next March. Virtually no funds have been accumulated to meet the payments due then. It is understood that city officials want bondholders to accept 30-year refunding bonds for the twelve-year bonds originally issued to pay for the street railway property. This would reduce the amount of the remaining installments on the purchase price from \$833,000 to \$300,000 a year. Pending arrangements for refunding, city officials hope to secure an extension for another year of the two-year moratorium which ends next March.

Central New York Interurbans Sold

Service on the Rochester & Syracuse Electric Railway is scheduled to be discontinued. The line, the last remaining interurban road to enter the city of Rochester, was sold to the Rochester & Syracuse Liquidating Corporation, composed of bondholders, for \$115,000 at a foreclosure sale in Syracuse on June 11. Supreme Court Justice Lewis has confirmed the sale. The only step necessary to abandonment is confirmation of the sale, under similar conditions, of the interurban railway connecting Syracuse and Oswego, the Syracuse, Lake Shore & Northern. This road, too, if Justice Smith confirms its sale, will discontinue. The lines connect 3 miles from Syracuse. On June 24 the Oswego Motor Bus Lines was reported ready to supply this service.

When the Rochester and Syracuse line is abandoned, the Eastern Greyhound Bus lines will open service over the same route. The bus company has obtained the necessary franchises from cities and towns along the way, but awaits a grant from the State Public Service Commission. No opposition is expected.

Another unit in the original Beebe electric railway system, the Auburn & Northern Railroad, connecting Auburn and Port Byron, is also scheduled for early sale under mortgage foreclosure proceedings. Richard T. Anderson of Auburn, is referee in that foreclosure, involving bond obligations of \$230,000 and defaulted interest.

When these lines cease operations, interurban electric railway service in so far as the Rochester and Syracuse territory is concerned, will have become a matter of history.

General

Baltimore, Md.—So heavy has been the demand for this year's Baltimore street railway and bus directory, issued by the United Railways & Electric Company, that the company has found it necessary to print a second edition. The first edition of 10,000 was completely exhausted.

St. Louis, Mo.—Two negroes have confessed to the police that they participated in four holdups of street cars on the Kirkwood-Ferguson division of the St. Louis Public Service Company in recent weeks.

Pittsburgh, Pa.—The Transportation Department of the Pittsburgh Railways is conducting a carhouse accident prevention competition against its own monthly record for 1930. Each month a 14x22-in. bulletin is posted at all carhouses showing the winner for the preceding month. At the close of the year a bronze plaque will be awarded to the carhouse making the best record.

Seattle, Wash.—Urging that the city light department act at once to take over from the Puget Sound Light & Power Company the balance of the electrical load still carried by the company for the operation of the Municipal Railway, Councilman Nichols, new head of the Council Finance Committee, told his fellow members: "We may as well face this responsibility first as last." Negotiations have been under way for several months, but appraisers for the city and the company have been unable to agree upon a third member to serve as a disinterested party in fixing the price to be paid for substations to be acquired from the power company.

Baltimore, Md.—The United Railways & Electric Company has sent one of its new cars to Brooklyn, N. Y., for tests under the supervision of the Presidents' Conference Committee of the A.E.R.A.

Camden, N. J.—Addressing the Camden Chamber of Commerce, Agnew T. Dice, president of the Reading Railroad, said that, in his opinion, the greatest need of South Jersey is co-ordinated transportation. Earnest work is being done in the consideration of unification plans, he said. The Board of Public Utility Commissioners is making an intensive study of the problem by order of the Legislature.

Toronto, Ont.—Citizens are responding to the invitation of the Toronto Transportation Commission, operating the local city-owned rail and bus lines, to visit the Hillcrest properties, the garage and the Danforth carhouse on June 27, the first day of the T.T.C. Open-House Week.

Long Beach, Cal.—Dogs used as eyes for blind persons will be permitted on Pacific Electric Railway cars without charge as the result of a ruling by the company approved by the Railroad Commission. The company's former rule barred other than lap dogs from the cars, but at the instance of Charles Brown, blind high school youth of Long Beach, who is led to and from school by a large shepherd dog, the rule has been modified.

Youngstown, Ohio—Harry Engle, former street railway commissioner, admitted in Common Pleas Court here on June 19 that he had threatened John T. Harrington, former president of the Pennsylvania-Ohio Power & Light Company. Mr. Engle contended that officials who were connected with the Pennsylvania-Ohio Company before it merged with the Ohio Edison last year, owed him more than \$200,000 on a contract made when Mr. Engle became street railway commissioner eight years ago. Mr. Engle was on the stand for four hours under cross-examination by counsel for County Prosecutor Ray L. Thomas, on trial for blackmail.

BOOK REVIEW

Another Able Contribution to the Literature of Business

"Policy and Ethics in Business," Charles F. Taesch, managing editor "Harvard Business Review," associate professor of business ethics Graduate School of Business Administration, Harvard University. McGraw-Hill Book Company. 624 pages, \$5.

Mr. Taesch has presented a scholarly discussion of the major problem of business, but wherever the work has deviated from philosophy, it has fallen short of coming to grips with the problems of business. In fact, the author discusses only the principles of business. He makes no attempt to solve them.

Full consideration is given to policies and ethics under conditions that exist. As the author sees it, business facts are not separable from the social texture into which they are woven, and the social texture in turn can be fully appreciated only by an understanding of the physical conditions which support it.

From a study of the relation of business to the church, it becomes apparent that the conduct of business was at first governed by the church and then by the state, a condition from which it is now breaking away. Among the questions which the author propounds is: "Has American business developed a sufficient sense of responsibility to be free to regulate itself?" And to this end he discusses among other things the related subjects of price cutting, reciprocal buying, trade piracy, misrepresentation, advertising, cancellation of contracts, limitation of production and commercial arbitration.

The chapter on advertising deserves more than a passing note. In it, no attempt has been made to develop the science of advertising. Rather has the purpose been to present the ethical problems of advertising in their relationship to the general problems of business ethics. This method of presentation holds true of the other subjects considered, but the subject of advertising appears to be put a little more concretely than some others, if the reviewer's observation is not biased by his own predilection for the consideration of this particular subject.

On the whole, the book is an important contribution to the growing volume of well-considered literature which is helping to put business into the category of the professions.

Prospects for London Unification Improved

During May the prospects of the London passenger transport bill brightened considerably. This bill, as previously reported, is promoted by the Ministry of Transport on behalf of the Government to establish a public board which is to take over and carry on all passenger transport services in the London traffic area. As also previously reported, the Underground group, including the London General Omnibus Company, agreed early in May to terms whereby their stockholdings would be exchanged for stock issued by the new statutory board. The next development of importance was announced later on in May to the joint committee of both Houses of Parliament which has been examining the bill and hearing witnesses. This was that an agreement has been reached between the promoters (which means the Government) and the four main-line railways of the country as to their London suburban traffic. It was, of course, felt that there could be no complete unification and co-ordination of London passenger traffic unless the suburban business of the trunk railways was included. This agreement provides for pooling the passenger receipts of the new statutory board and of the suburban passenger services of the main-line railways.

According to the statement by counsel for the promoters, the pool will amount to about £37,000,000 a year. The numbers of passengers comprised in this arrangement, taking figures for 1929, were: Underground group railways, 357,000,000; Underground group buses, 1,671,000,000; Underground group tramways, 197,000,000; main line suburban railways, 400,000,000; total agreeing undertakings, 2,625,000,000. The companies which had not yet agreed to the plan at the time this account was written carried the following numbers of passengers for the same year: Non-agreeing companies, 86,000,000; Tilling's, Ltd., 152,000,000; independent buses, 91,000,000; total, 329,000,000. In other words, counsel added, 89 per cent of the passengers (apart from the 885,000,000 carried by the municipal tramways proposed to be taken over) were carried by the companies which so far have agreed to the proposal.

On subsequent days of the sitting of the joint committee much was heard of the opposition by the London County Council, which objected to the Council's tramway system being taken over merely by a transfer to the new board of its capital indebtedness without allowance for the money taken from the local rates in past years to meet deficiencies.

At a later sitting of the joint committee, Sir William McLintock, chartered accountant, stated that when instructed to advise the Government on the financial aspect of the scheme, he was asked to proceed on the basis that no Exchequer grant would come into the picture. He estimated the net revenue of the Transport Board at £5,661,991 annually. For a number of years the board would have to pay a certain sum to local transport authorities. The maximum annual payment was £1,000,000. This would be gradually reduced over a period of 59 years. Ninety years

was the period taken in the bill for the repayment of the board's capital. Under the proposal that the board should not issue stock to the municipal tramway undertakings but simply assume that system's capital indebtedness, he was prepared to justify the proposition that the local authorities were likely to fare better under the terms of the bill than under a commercial basis. The proceedings were thereafter interrupted for a fortnight by the Whitsuntide recess. The first important announcement following this recess was to the effect that agreement had been reached regarding the London County Council's tramways. This payment bulks £8,500,000 in 4½ per cent stock.

Among general objections taken to provisions in the bill, one merits special attention as coming from so important a body as the Association of British Chambers of Commerce. Sir W. C. Lees, president of the association, has written to the Minister of Transport that since the transport board to be set up would be formed of members appointed by the Minister, the association feels it is unwise to provide that the appointments should be vested solely in a Minister. The opinion of the association is that the influence of party politics will be bound to make itself felt, and that this might ultimately lead to diminution in the efficiency of the undertaking. The letter urges the Minister to amend the bill so as to provide that the appointments are not subject to the influence of any political party.

Higher Speeds for British Trolley Buses

The recently passed road traffic act, which is applicable to the whole of Great Britain, increased the maximum permitted speed of petrol buses from the old limit of 12 m.p.h., to 30 m.p.h., provided that all road wheels are fitted with pneumatic tires.

Praise for Underground Posters

I CANNOT entirely agree with the Prince of Wales as to the ineffectiveness of British advertising. For instance, I believe that the maps, posters and newspaper notices of the London Underground Railways have never been excelled anywhere. I have no notion whether they have produced the desired results, but certainly millions of observers have admired them and many (myself included) have even made pilgrimage to the main office of the Underground (decorated, incidentally, with Epstein sculptures) and bought copies. I wish those posters were reproduced in postcard size. I was so pleased by one of their newspaper ads (reproduced with this comment) that I saved it and slipped it in my copy of Keats.—CHRISTOPHER MORLEY in the "Saturday Review of Literature," New York.

Now the new liberty is being extended to trolley buses. In connection with a 7-mile trolley bus route of the Rotherdam Transport Department, the Minister of Transport has approved a maximum speed of 30 m.p.h., though with lower limits at populous or dangerous spots. This is the first case in England where a 30-mile limit for trolley buses has been allowed. Tramway operators will doubtless call for similar liberty. Hitherto tramcar permitted speeds have varied according to locality and amount of street traffic.

Nagoya, Japan—An extensive railway electrification program has been decided upon at Nagoya and Fukuoka. As several hundred miles of railway line are involved the work will be done over a period of years. Power for the electrification may be supplied by utilizing the energy of the Tenryn River.

Lausanne, Switzerland—For service on streets too steep for electric railway lines the Administration des Tramways has started negotiations for the purchase of two trolley buses from Swiss firms. Another innovation is the operation of passenger trailers on heavy traffic bus lines in Lucerne.

Jamaica, W. I.—Under an order of Council, recently signed, the government of Jamaica has prohibited operation of buses on main business streets of Kingston, capital of Jamaica, and has given to the Transport Board authority to regulate operation of buses elsewhere. The Transport Board will limit the number of buses that may operate in various sections on the basis of use of transportation service in these sections. In recent years, competition of buses with the cars of the Jamaica Public Service Company has increased to the extent of jeopardizing that company's service.

Simonstown, South Africa—The 20-mile electric railway from Cape Town to Simonstown may be abandoned. This line was electrified early in 1928. It operated at a loss of £250,000 during the year ended March 30, 1930. One of the principal factors in the losses is ascribed to the cost of electric current supplied by another Government Department, while another important contributing factor has been the extent of the development of bus transportation in Cape Town during the past three years.

Stockholm, Sweden—A subway project has received a favorable vote in the City Council. The plan involves the construction of underground tracks for the suburban street car lines serving part of the city. In one of the sections where congestion is acute streets are to be built in three elevations.

Paris, France—The president of the Municipal Council of Paris, Mr. d'Andigne, favors forbidding all horse-drawn vehicles, street cars and hand carts in all the congested streets of Paris. He has suggested that deliveries effected by horse-drawn vehicles should be made before 10 o'clock in the morning, or during the night. As a concession to "atmosphere," he might allow a few hand carts on the streets at the height of the tourist season, but this spectacle should be so arranged as not to encumber traffic. The Municipal Council has long been considering various methods of alleviating traffic congestion, and some of the drastic reforms advocated by Mr. d'Andigne may be adopted.

PERSONAL MENTION

Greater Responsibility for G. I. Wright

George I. Wright, who, since September, 1927, has been engineer of electric traction of the Reading Railroad, has been made chief electrical engineer of that company with offices at the Reading Terminal, Philadelphia. He will have charge of electrical engineering, signal engineering, electric traction engineering and maintenance other than rolling equipment, power supply and wire crossings and occupations. The Reading has been carrying out extensive electrification projects in the Philadelphia suburban zone under the direction of Mr. Wright, and the new appointment is largely in recognition of the capacity he has shown in supervising the details of the work.

Following his graduation from Leland Stanford University in 1913 as an electrical engineer, Mr. Wright was employed by the Southern Pacific Railroad in connection with the electrification of branch lines. He left that post in 1917 to enter the United States Navy, being appointed electrical officer of the *U. S. S. Montana* after a course of instruction at the Naval Academy. In August, 1918, he was promoted to lieutenant and sent to the Portsmouth Navy Yard to supervise the construction of several submarines.

He resigned from active duty in February, 1919, and for three years was construction superintendent of the Duluth Edison Electric Company, at Duluth, Minn. Following this, he was employed by the Illinois Central Railroad as assistant engineer in charge of electrifying its Chicago terminal. He was with that company for five years, during which time he was promoted to office engineer and handled all features of that work.

Transportation Staff Realigned for Brooklyn Bus Operation

Under the plan for the functioning of the Brooklyn Bus Corporation as part of the Brooklyn-Manhattan Transit System, referred to elsewhere in this issue, a division of administration will be created under the direction of S. S. Hamilton. Functions of this division will consist of the management of depots; employment, training and discipline of conductors, motormen and operators; and the keeping of all records. F. J. Brennan will be in charge of the operation division, with the title of superintendent of operation, the function of this division including operation of schedules, system dispatching and reporting of all operating conditions. K. M. Hoover will be in charge of the traffic division with the title of superintendent of traffic. The functions of this division will include plans, studies and reports; checks of traffic conditions; and the making of schedules.

As president of the Brooklyn-Manhattan Transit Corporation, the Brooklyn & Queens Transit Corporation and the Brooklyn Bus Corporation, W. S. Menden will control the policies of the three companies, but supervision of transportation for both the bus company and the surface lines will be centered in the new traffic and transportation department. This department will supervise the operation of all buses and street cars of the Brooklyn & Queens Transit Corporation, the buses of the

Brooklyn Bus Corporation and the passenger service of the South Brooklyn Railway. William Siebert, new superintendent of transportation, will be in charge of this department with the title of general superintendent of traffic and transportation. The work of the department will be divided functionally into three divisions: administration, operation and traffic.

Receiver Announces His Staff

The affairs of the Eastern Michigan-Toledo Railroad will be administered in the future from the offices of the Michigan

Electric Shares Corporation, Jackson, according to John F. Collins, designated receiver for the railroad.

Mr. Collins has announced the appointment of the following Jackson men as officials of the Eastern Michigan-Toledo line: H. D. Sanderson, manager; O. H. Degener, secretary-treasurer; C. C. Dancer, assistant secretary-treasurer; J. B. King, auditor of freight accounts; A. T. Margwath, auditor of passenger receipts; G. W. Quackenbush, traffic manager; S. S. Major, freight claim agent. R. C. Taylor, Albion, will be superintendent of equipment.

The officials who will manage the Eastern Michigan-Toledo company hold similar positions under the Michigan Electric Shares Corporation.

Passenger and freight service on the line connecting Detroit and Toledo will be continued without change for the present.

Canadian Association Headed by K. B. Thornton



K. B. Thornton

When the present owners of the Montreal Tramways took control in 1925, they cast about for a man with the personality and aggressiveness needed to carry out a plan for major improvements to that property. They found him in Kenneth B. Thornton, who was appointed to the position of assistant general manager. In that office he had charge of the modernization of all departments. The improvements included the revamping of tracks, purchase of new cars, and an almost complete revision of the power supply. He also found it desirable to augment the rail services with numerous bus lines, so that today the Montreal Tramways is one of the largest operators of buses in Canada. The success that has attended his efforts is manifest by his contribution to the work of maintaining the physical condition of the property and his preserving through the years the excellent employee and public relations so long outstanding accomplishments at Montreal. In 1930, Mr. Thornton was promoted to the position of general manager, Col. J. E. Hutcheson becoming managing director.

Prior to his appointment as assistant general manager of the Tramways, Mr. Thornton was chief engineer, general manager and director of the Canadian Light & Power Company and the Quebec New England Hydro-Electric Corporation, with headquarters in Montreal. In 1915 he also became consulting engineer for the Montreal Tramways, principally in connection with the power supply. This appointment gave him a great deal of familiarity with the property and was of material aid to him when he assumed his managerial duties. From 1904 to 1911 he was electrical engineer in the operating department of J. G. White & Company, of New York. His first position after completing his education in 1893 was that of engineer of the operating department of the Montreal Light, Heat & Power Company.

Mr. Thornton has spent the greater part of his life in Montreal, where he was born on June 26, 1873. Seeking a broadened viewpoint, he attended the Central Technical College in England, being graduated from that institution in 1893. Despite his intensive professional work, he has found time to engage in many activities. He is a member of the Corporation of Professional Engineers of the Province of Quebec, a member of the Engineering Institute of Canada, and a member of the American Institute of Electrical Engineers. He is a past vice-president of the Engineering Institute of Canada. He has been connected with the Canadian Electric Railway Association for a number of years, having served on the board of directors. His election at the recent meeting of the association in Ottawa to the office of president, the highest honor that can be conferred on an electric railway operator in Canada, is a fitting tribute to the esteem in which he is held by the men of the industry.

Kansas City Lawyer on Missouri Commission

The Missouri Senate has approved the appointment of George H. English, a Kansas City attorney, as a member of the Missouri Public Service Commission. He was named to the commission by Governor Henry S. Caulfield some time ago.

Frank Pick Heads British Institute of Transport

Frank Pick, managing director of the London Electric Railway, the Metropolitan District Railway, the City & South London Railway, the Central London Railway, and other companies associated in the London Underground combine, has accepted the presidency of the British Institute of Transport for the 1931-32 session.

Mr. Pick has had a brilliant career. Born at Spalding in 1878, he was educated at York, and was subsequently articulated to an attorney in that town. In 1902 he qualified as an attorney, and in 1903 became LL.B. (London University) with first-class honors. In 1902 he entered the service of the Northeastern Railway, under Sir George Gibb, then general manager, and worked successively in the statistics office, district superintendents' offices at Sunderland and Newcastle-on-Tyne, the rates office, and finally the general manager's office.

Mr. Pick went to London in 1906, at the instigation of Sir George Gibb when Sir George took over the management of the Metropolitan District and the London Electric Railways. Upon Sir George's retirement in 1907, Mr. Pick was transferred to the staff of A. H. Stanley, now Lord Ashfield, then president of the Board of Trade, to take charge of the Household Fuel and Lighting Department of the State Coal Mines Department. In 1921 he was appointed joint assistant managing director of the companies comprised in the London Underground Combine, while in 1924 he assumed full administrative control under Lord Ashfield, chairman of the board.

Mr. Pick's appointment as sole managing director dates from March, 1928. He is a foundation member of the Institute of Transport, a member of the London and Home Counties Traffic Advisory Committee, a member of the Empire Marketing Board, member of the Council of the London & Provincial Omnibus Owners' Association and the Commercial Motor Users' Association, and a member of the Standing Joint Committee on Mechanical Transport. He is also president of the Railway Students' Association.

Editorial Recognition for President Menden

Credit long deferred is accorded to W. S. Menden, chief operating officer of the vast Brooklyn-Manhattan Transit System, in an editorial in the New York *Evening Sun* recently. Under the title "Mr. Menden Scores," the *Sun* said:

In discussing prices to be paid for the rapid transit lines if they should be unified under his plan, Mr. Untermyer has made the point that the loss in passenger revenue means that the properties are worth less. Nobody can successfully attack the economic soundness of this opinion.

In eight months of its fiscal year, the B.-M.T. receipts from passengers fell \$600,000 below the receipts for eight months in the prior fiscal year. But the B.-M.T. cut operating expenses slightly and lowered actual maintenance expenses \$550,000 below the expenditures of the prior year. By this means the net loss was reduced to \$61,000. Management cut down expenses 12 per cent. On a net basis, therefore, the value of the B.-M.T. properties would be approximately the same as for the prior year. The Interborough's

actual maintenance for the same period increased \$560,000.

The operating president of the B.-M. T. is William S. Menden. Mr. Untermyer has paid many compliments to Mr. Menden, whose latest accomplishment must draw the admiration of the directors and stockholders of the company.

Commissioner Out Under Pinchot in Pennsylvania

James S. Benn, who has been under the fire of Governor Pinchot of Pennsylvania since the primary of last May, has resigned from the Public Service Commission of the Commonwealth. Mr. Benn said:

During the last year or eighteen months the present executive has made regulatory law in Pennsylvania the football of politics. To keep kicking this football in the air for another year or more to come, it is the declared intention of the executive to call a special session of the Legislature in 1932.

This makes it quite evident that the administration of the Public Service Company Law in Pennsylvania is for a further indefinite period to be subjected to misrepresentation and the exigencies of politics. Under these circumstances, and particularly in view of the personal antipathies which characterize the Governor's campaign, I feel that it would be unjust to the commission and to the Senate to permit my nomination to remain as a factor in the situation.

Mr. Benn has been a member of the commission for more than eleven years, having been first appointed by Governor Sproul. In 1925 an attempt was made by Governor Pinchot to remove Commissioner Benn and Commissioner Ray Shelby, but the effort was rendered abortive by a decision of the Supreme Court of the State, which held that the power of appointment and removal was in the hands of the Legislature. The Governor, it was held, was merely the nominating agency. Mr. Pinchot renewed his attacks upon the commissioner immediately upon announcing his candidacy for Governor last spring.

C. B. Short Goes to Portland

C. B. Short has resigned as manager of the Roanoke Railway & Electric Company and the Safety Motor Transit Corporation, Roanoke, Va., to become manager of the Pacific Northwest Public Service Company, Portland, Ore. He will be succeeded at Roanoke by W. H. Horne, former superintendent of transportation.

Mr. Short will leave for Portland in the near future to assume his new duties. The Portland company operates 600 street cars over 300 miles of track and has 1,600 employees. Both it and the Roanoke Railway & Electric Company are subsidiaries of the Central Public Service Company, the former including the largest electric railway system controlled by the Central Public Service Company.

Since June, 1928, Mr. Short has served as manager of the Safety Motor Transit Company, Central Public Service Company acquiring the bus company at this time. He succeeded J. W. Hancock as manager of the railways at Roanoke. He is a native of Vinton.

Mr. Horne has been in the employ of the Roanoke Railway & Electric Company since 1898.

Joseph T. Sullivan, for nearly two years manager of the gas department of the Virginia Electric & Power Company at Norfolk, has been transferred to Richmond as general manager of the electrical department. Mr. Sullivan succeeds Roy S. Nelson, recently resigned to become connected with the Baton Rouge Electric Company. Mr. Sullivan went with the Norfolk division of the Virginia Electric & Power Company in September, 1929. Prior to that he was manager of the Stone & Webster property operating in Reno, Nev.

Earl E. Grover, director of safety for the Columbus Railway, Power & Light Company, Columbus, Ohio, has been named president of the newly formed Safety Council organized by the Chamber of Commerce at Columbus. The council will seek to check the increasing number of accidents in the home and on the streets by combating the apparent indifference of people to the tragedies of accident.

C. S. Clevestine, traffic manager of the Clinton, Davenport & Muscatine Railway, Davenport, Iowa, has been named general superintendent. He succeeds the late C. F. Dege. Mr. Clevestine started with the Tri-City Railway, Davenport, in 1905 as a conductor. In 1912 he was transferred to the interurban. In 1917 he became train dispatcher of the combined C. D. & M. Railway, a rate clerk in 1923, and traffic manager in 1928, the post he has held until the present promotion.

Harry K. Cuthbertson, Peru, a state senator, has been appointed a member of the Public Service Commission of Indiana by Governor Leslie. At the same time, the Governor announced the reappointment of Commissioner Howell Ellis, of Indianapolis. Senator Cuthbertson will succeed to a democratic post on the commission now held by Commissioner Calvin McIntosh, whose four-year term expires May 1. John W. McArdle and Fred C. King have been reappointed chairman and secretary, respectively, of the commission.

Charles C. Buckland has resigned as general manager of the Berkshire Street Railway, Pittsfield, Mass., and will remove to Minneapolis. Mr. Buckland is a son of E. G. Buckland, chairman of the board of the New York, New Haven & Hartford Railroad. He was graduated from Yale University in 1922 and became connected with the company at Pittsfield last December.

T. W. Noonan, general manager of the Pittsburgh Motor Coach Company, affiliated with the Pittsburgh Railways, was elected president of the Pennsylvania Bus Association at the annual convention of the association in Juniata on June 5. Nearly 200 delegates, representing more than 100 motor coach companies operating in the state, were represented at the gathering. Mr. Noonan has been general manager of the Pittsburgh Motor Coach Company since its organization on Aug. 14, 1925.

Frederick M. Feiker, formerly a member of the staff of the McGraw-Hill Publishing Company, has been designated by President Hoover as director of the Bureau of Foreign and Domestic Commerce, one of the largest and most important of the government's bureaus.

Work of C. J. Roggi Recognized

Charles J. Roggi, who joined the staff of *ELECTRIC RAILWAY JOURNAL* in July, 1930, has had his duties widened as assistant editor to cover a range of activities more nearly in consonance with the breadth of his previous training, covering as it did not only engineering, but public utility management in its wider phases and traffic management, and reflecting the capacity shown by him in his editorial work during the past year.

Mr. Roggi was graduated from Massachusetts Institute of Technology. He directed his entire collegiate training toward the field of transportation. His work at M.I.T. began in 1925 with his enrollment in the five-year co-operative course in electrical engineering during which he obtained about 68 weeks of co-operative practice with the Boston Elevated Railway. This practice was in



C. J. Roggi

the nature of a student apprentice course in which he spent some time in nearly every department of the company.

Not content with that, he attended the Harvard School of Business Administration during his last year at "Tech." There, as a special student, he took courses in traffic management and public utility management. He was graduated from M.I.T. last year with B.S. and M.S. degrees. Mr. Roggi was born in Brooklyn, N. Y., in 1907.

Duties with Westinghouse Company Increased

J. S. Tritle has been elected vice-president and general manager of the Westinghouse Electric & Manufacturing Company in charge of manufacturing, sales and engineering operations of the company, reporting to President F. A. Merrick.

Mr. Tritle was born in Virginia City, Nev., in 1872. He received his early schooling in New Haven, Conn., and was graduated from Yale University in 1893 with a degree in science. In 1895 he entered the electrical engineering contracting business, but at the outset of the World's Fair in St. Louis he accepted a position as chief of construction. At the close of the fair he became manager of the Kansas City district for the Westinghouse Company. In 1915 the St. Louis and Kansas City offices were consolidated, Mr.

Tritle assuming charge of both. In 1922 he was made manager of the merchandising division of the general sales department of the company. In 1925, when a separate department was made of the merchandising business, Mr. Tritle was made general manager of the merchandising department overseeing engineering and manufacturing, as well as sales work, with headquarters in Mansfield, Ohio, where most of the merchandising products are made. From Mansfield he was moved to East Pittsburgh on May 1, 1929, as vice-president in charge of manufacturing operations. In his new position as vice-president and general manager, Mr. Tritle will retain his headquarters in the Westinghouse Company's main works at East Pittsburgh, Pa.

G. R. Fulton With Gulf States Company

George R. Fulton, formerly of Richmond, Va., has been appointed superintendent of production of Gulf States Utilities Company, Beaumont, Tex., succeeding H. R. Sharpless who recently joined the Gulf Refining Company in a similar capacity at Port Arthur.

Mr. Fulton joined the Stone & Webster organization in 1916 as a station student engineer with the Savannah Electric Company at Savannah, Ga. From that company he went to the Baton Rouge Electric Company and thence to the Galveston-Houston Electric Company. From the latter company he entered the power division of the Stone & Webster Engineering Corporation, and more recently has been assistant manager of production and transmission of the Virginia Electric & Power Company.

M. C. Cleveland New York Commission Engineer

Malcolm C. Cleveland, New York City, assistant chief engineer of the Lehigh Valley Railroad and engaged in engineering work for more than 30 years, has been named chief engineer of the New York Public Service Commission, to occupy the position made vacant by the resignation of Charles R. Vannemann, who retired to become head of the firm of Charles R. Vanneman, Inc., for the practice of consulting engineering.

Mr. Cleveland goes to the commission with a wide experience in the various fields of engineering work. After he was graduated from the Case School of Applied Science he entered railway service with the Baltimore & Ohio Railroad. From 1902 to 1904 he was assistant engineer maintenance of way for the Cleveland, Cincinnati, Chicago & St. Louis Railroad, and from 1904 to 1907 he was engineer maintenance of way for that road. From 1907 to 1910 he was division engineer of the Michigan Central Railroad.

Mr. Cleveland became special engineer on the staff of the vice-president of the New York Central Railroad in 1910. He later was made engineer maintenance of way of the Chicago, Indiana & Southern Railroad, now merged with the New York Central.

For more than a dozen years Mr. Cleveland was valuation engineer of the Lehigh Valley Railroad; during which time he was in entire charge of all the work in connection with the valuation

made by the Federal Government. He became principal assistant engineer of the Lehigh Valley in 1927 and two years later was elevated to the position of assistant chief engineer of that road.

J. T. Porter Heads Southern Equipment Association

J. T. Porter, superintendent of equipment of the Virginia Electric & Power Company, Richmond, Va., elected president of the Electric Railway Association of Equipment Men, Middle Atlantic States, at its meeting held in Washington, D. C., May 14 and 15, is a native Texan. He entered the street railway business in 1902 as an armature winder with the Houston Electric Company, Houston, Tex. Since that time he has held such positions as master mechanic, general foreman and general superintendent on the properties in Texas, Louisiana and Oklahoma. He went



J. T. Porter

with the Virginia Electric & Power Company, as superintendent of equipment in March, 1926, which position he holds at the present time. He has had the distinction of serving two properties under the management of Stone & Webster, namely, the Northern Texas Traction Company and the Virginia Electric & Power Company, at the time they won the Coffin Award.

"Here Come the Elephants" Receives Recognition

John R. Marsh, manager of the public relations department of the Georgia Power Company, Atlanta, Ga., was elected a member of the board of directors of the Public Utilities Advertising Association, in convention at New York on June 17.

The department, of which Mr. Marsh is head, also was honored by the award of two prizes in recognition of outstanding advertising done during 1930. The Georgia company was presented with second prize in the Better Copy contest, electric railway division, for its advertisement captioned "Here Come the Elephants," which was published in Atlanta newspapers last June. The company also was awarded second nation prize in the car cards and posters division for a poster which appeared on the dashboards of the street cars last year—decorated with a long vista of "No Parking" signs and captioned "Shop by Street Car."

Harrison Hoblitzelle, vice-president and general manager of the General Castings Corporation at its Granite City, Ill., plant, has been transferred to Philadelphia to become executive vice-president of the company. He has been in charge of both plants for some time. Mr. Hoblitzelle was vice-president of the Commonwealth Steel Company when that company was absorbed by the General Castings Corporation.

Michael J. Feron, assistant to the vice-president in charge of operation of the North Shore Line and the Chicago Rapid Transit Company, recently rounded out 36 years of continuous service with the latter organization. In recognition of this long-time record, he has been awarded a diamond-studded pin instituted as a merit badge for employees who have served 35 years or more with the "El" lines.

standing lawyers of the country. Of him *Teamwork*, official publication of the company, said: "The statement has been made repeatedly, and agreed to by every person connected with the company from the president down, that Mr. Tinley probably knew more about the Omaha & Council Bluffs Street Railway than any other man. Mr. Tinley's passing from the company creates one of the rare instances where a man can be succeeded but not replaced."

OBITUARY

H. E. Chubbuck

H. E. Chubbuck, long executive vice-president and general manager of the Illinois Traction System, Peoria, Ill., and following that an officer and a director of the Illinois Power & Light Corporation, the successor company, died in that city on June 4. For many years Mr. Chubbuck was one of the most influential men in the electric railway field in the Middle West. He was the close associate of the late Senator William B. McKinley in the management of the Illinois Traction System and other properties, familiarly known as the McKinley system, combining trackage of more than 700 miles and serving the principal cities of central Illinois. With the Senator, he shared the prestige which these properties gained, a prestige nationwide because of successful operating accomplishments, financial stability and engineering achievements, including the famous bridge over the Mississippi River at St. Louis.

The McKinley system was a vast enterprise. During Mr. Chubbuck's incumbency as executive vice-president, it included two main line railroads, completely electrified, and many light, gas, heat and railway system in Illinois and several in Kansas and Iowa. The task of co-ordinating through him all the activities of this vast system was colossal, but Mr. Chubbuck achieved it with the greatest celerity. He was very widely known in the communities in which the various companies operated, and, despite the exactions of his official positions, found time to be a factor in civic affairs, particularly in Peoria. Following his withdrawal from active participation in the affairs of the Illinois Power & Light Corporation, he served in a number of business enterprises, notably as a director of the Merchants & Illinois National Bank at Peoria.

Mr. Chubbuck came of a family of electrical geniuses. His grandfather, S. W. Chubbuck, was a pioneer in the then undeveloped field of electricity. He collaborated with Morse in the invention of the telegraph. He lectured over the country on electricity, and was an inventor of note. Mr. Chubbuck's father, A. S. Chubbuck, was also an inventor. He perfected the telegraph sounder and established, at Utica, N. Y., the first factory for the manufacture of telegraph instruments in the world. He was also the inventor of the jack-knife bridge.

As this brief recital shows, H. E. Chubbuck was raised in this atmosphere of electricity, and at the age of eleven was actively at work in his father's factory. He associated himself with the Thomson-Houston Company, pioneers in the electric-

lighting field, where he was on the staff of experts. He then went with the General Electric Company. Among other properties that stand as milestones of his advancement is the railway system of Pueblo, Col. During the dark days of the panic of 1893, Mr. Chubbuck was appointed receiver of this company by the United States Court. He took charge when the property was run down, in debt and demoralized. He rehabilitated it physically and financially.

In his association with Mr. McKinley, Mr. Chubbuck first took charge of the Quincy, Ill., railway lines, and brought these to a high standard of perfection. He was then put in charge of the Chicago, Ottawa & Peoria Railway which ran through Princeton, Marseilles, Ladd, Peru, Spring Valley, Streator, Ottawa, Morris and Seneca. Here again Mr. Chubbuck distinguished himself, so much that Mr. McKinley placed him in absolute charge of all the properties.

Stephen G. Shaw, claim agent for the Denver Tramway, Denver, Col., for the last eighteen years, died on June 18 after an illness of three weeks. He was born at Rockport, Ill., 66 years ago.

Conrad C. Steinbrenner, one-time vice-president of the Galena Signal Oil Company, died recently at Long Beach, Cal. Mr. Steinbrenner was identified with the Galena company from 1893, when he entered the railway auditing department, until 1918. The remains were interred at Franklin, Pa., on June 4 under Knight Templar rights.

Harrington Emerson, efficiency expert who was president of the Emerson Engineers from 1900 to 1923, died on May 23 in his 77th year. A native of Trenton, N. J., Mr. Emerson was educated at the Royal Bavarian Polytechnic. After six years as professor of modern languages in the University of Nebraska, he spent fourteen years as a banker and realty operator. As the American representative of a British syndicate, he examined many industrial plants and mines in this country, Mexico and Canada. His efficiency methods first became widely known through the results achieved on the Santa Fe Railroad.

Emmet Tinley, on the legal staff of the Omaha & Council Bluffs Street Railway, Omaha, Neb., since 1902, when the Omaha company leased the Council Bluffs property and the bridge, died on May 12. He was made a member of the board of directors in 1927 and was a member of the board when he died. Mr. Tinley was regarded as one of the out-

John W. Walsh, an attorney for 25 years associated in the law department of the Chicago Surface Lines, died on May 28 after an illness of several months. He was a specialist in damage suits.

Frederick William Warren, former manager of street railways, died on May 28 at his home in Kingston, N. Y., in his 76th year. After serving the West Shore Railroad at Kingston, he managed electric railroads in Canada and Birmingham, England. Later he was with the Dominion Coal & Steel Corporation at Sydney, N. S.

Irwin Fullerton, general auditor for the Detroit United Railway, Detroit, Mich., for 27 years until his retirement in 1922, died recently at his home in Pleasant Ridge, Mich. He was 74 years old. Mr. Fullerton's connection with the Detroit United Railway began in 1895 when he moved from Cleveland to Detroit. He withdrew from the service of the company following the purchase of the local city lines of the company by the city for municipal operation.

William A. Smith, associated with the Omaha & Council Bluffs Street Railway, Omaha, Neb., for more than 50 years, and president of the company for some time, died on June 19 in his home in Council Bluffs. When he went to Omaha 59 years ago he drove a horse car. He was 84 years old.

Michael F. Ryan, at one time superintendent of surface lines of the Philadelphia Rapid Transit Company, but for a number of years attached to the office of special agent, died on May 25. He was 78 years old. Mr. Ryan entered railway service in Philadelphia on July 23, 1872, as a conductor. He became division superintendent at Sixteenth and Jackson Streets on Nov. 11, 1896, and he was made superintendent of surface lines on Nov. 16, 1908.

Richard J. Cullinan, assistant counsel to the New York Board of Transportation, died recently. He was 42 years old. Mr. Cullinan was born in Brooklyn and was educated at the Cathedral School in Manhattan, Fordham High School and Manhattan College, graduating from the college as a Bachelor of Science. He subsequently studied law at Fordham University Law School, graduating in 1920 and being admitted to the bar in the same year. In 1914 he joined the Public Service Commission, First District, and two years later was transferred to the Transit Construction Commission. He then served as a structural draftsman in the Board of Transportation until 1927, when he was appointed to the legal staff.



Electric locomotive to handle high-speed passenger trains of the New Haven

New Haven Locomotives on Test

The first of ten electric passenger locomotives under construction for the New York, New Haven & Hartford Railroad at the Erie works of the General Electric Company has been delivered after undergoing a series of rigid tests. Deliveries of the remaining units are to be made this summer.

The new locomotives will take over a number of the high-speed passenger runs between New Haven and New York City. The weight and capacity of the units, exceeding those of the present equipment by a wide margin, will permit the handling of heavier trains at high maximum speeds with a single locomotive unit.

Provision has been made for operation on the 600-volt direct-current supply of the New York Central, as well as on the 11,000-volt single-phase main lines of the New Haven and the Pennsylvania.

Designed for a maximum speed of 70 m.p.h., the locomotives have a continuous rating of 2,740 hp., and a one-hour rating of 3,440 hp. The running gear is of the 2-C+C-2 type, similar to the Cleveland Union Terminal locomotives. Each of the six driving units is a twin motor carrying two armatures, with the two pinions meshing in a single gear mounted on a quill. The quill spider on each axle contains six spring cup elements engaging with the wheel at each end.

The motor consists of two twelve-pole stators in a single frame, with multiple-wound armatures. Control equipment is provided for handling the motors in either the a.c. or d.c. zone. The line breaker is of the high-speed air-break type, operative on both a.c. and d.c. service. This is the first application of this device to a.c. locomotives. Provision is made for multiple operation of the locomotives, and for control from either end.

\$4,700,000 for Construction of Electric Locomotives

Pennsylvania Railroad has placed orders for the construction of the mechanical parts or chassis of 90 of the 150 electric locomotives for which the railroad recently ordered \$16,000,000 of electrical equipment. Construction and material orders for the 90 chassis will cost \$4,700,000.

Of the locomotives included in the or-

ders, 54 will be built by Westinghouse, 25 will be constructed by General Electric, and eleven will be built in the Pennsylvania Railroad shops at Altoona. The locomotives to be built at the Altoona works of the Pennsylvania Railroad will carry electrical equipment built by the General Electric. Contracts for the installation of the electrical equipment and control will be awarded later.

Deliveries on this order are scheduled to begin not later than December, 1931, and the entire consignment of 90 locomotives is to be ready June, 1932.

Each locomotive will have a one-piece cast-steel main frame or bed. The beds for these and the remaining locomotives in the total present program of 230 units or engines, will be built by the General Steel Castings Corporation. Locomotive parts included in the order consist of driving wheels, axles, trucks, frame and cab and structural parts in which the electrical apparatus will be installed later. The construction and material costs are in addition to the cost of the electrical equipment recently ordered.

The passenger locomotives for which construction orders were placed, are known as Class P-5. This type is a heavy-duty, high-speed passenger locomotive, 62 ft. 8 in. in length, and weighing 375,000 lb. This locomotive has three pairs of 72-in. driving wheels and a four-wheel engine truck at each end. It is composed of three distinct units, the chassis unit, a deck unit and a cab unit.



New station under construction for Chicago's rapid transit system

Baltimore Orders 50 Buses for Replacement Program

The United Railways & Electric Company, of Baltimore, has recently placed an order for 50 buses at an approximate cost of \$450,000. These new buses will be used entirely to replace buses now in service that are rapidly becoming obsolete. This move is in line with the company's policy of modernizing all of its equipment as soon as its financial position permits.

The order was distributed among three companies as follows: 30 to Mack, ten to Yellow Coach, and ten to American Car & Foundry. All the buses will be of the single-deck type, with seating capacities ranging from 31 to 33.

Of the 30 buses to be built by Mack, twelve will be equipped with rear-exit treadle-operated doors, and four with gas-electric drives. The rear-exit buses will have a seating capacity of 31, the remaining eighteen a capacity of 33. Specifications of the Mack buses include dual ignition, Barlow fuel pump with vacuum tank as reserve, special air intake permitting air to be taken from the exterior in the summer and from under the hood in the winter, and inverted dual reduction axles. The gas-electrics will be equipped with General Electric single-motor drive.

All the buses will be special jobs because of the restriction of the State of Maryland to a maximum width of 93 in.

Indiana Railroad Building New Substations for its High-Speed Interurban Service

A new rotary converter substation with a capacity of 500-kw. was recently placed in service near Montpelier, by the Indiana Railroad. The station is the first of five being built by the Indiana Railroad to increase the power supply on the line from Indianapolis to Fort Wayne for operation of the new high-speed interurban cars to be inaugurated next month. The other four substations, located near Fortville, Pendleton, Eaton and at a point 5 miles south of Montpelier, will be completed within the next three weeks. The station at Eaton and the one south of Montpelier will be equipped with 500-kw. rotary converters; those at Pendleton and Fortville will have mercury arc rectifiers, having a capacity of 850 kw. each.

Track Elevation Work Speeded

The work of elevating the tracks on Evanston division of the Chicago Rapid Transit Lines between Church and Isabella Streets, a distance of 1½ miles, is moving forward rapidly. Plans have been made for three new stations to be erected in connection with the track elevation. The first of these will be at Central Street which, in addition to serving a thickly-populated suburban district, is the main transportation point for thousands attending football games at Northwestern University in Evanston. Special features for handling the football crowds with the maximum of speed and convenience will be installed at this station.

Equipment Pageant Will Picture Future of Mass Transportation

As a contribution in commemoration of the Golden Jubilee of the American Electric Railway Association, equipment manufacturers will offer a pageant of modern cars and buses at the convention at Atlantic City. The pageant will be arranged for the plaza space in front of the auditorium. Plans were agreed upon at a subcommittee meeting of the Manufacturers' Advisory Committee, appointed to co-operate with the exhibit and entertainment committees of the association.

The pageant will include ten units incorporating all the latest improvements and design features. The units to be included in the pageant, and the manufacturers tentatively appointed to display each unit are shown below:

1. High-speed car..... 56 ft. Brill
2. Large city street car... 50 ft. St. Louis
3. Medium city street car... 45 ft. Cincinnati
4. 40-passenger trolley bus. 33 ft. Twin Coach
5. 30-passenger trolley bus. 26 ft. Brill
6. 42-passenger gas bus.... 33 ft. Mack
7. 38-passenger gas bus.... 33 ft. White
8. 33-passenger gas bus.... 31 ft. General Motors
9. 21-passenger gas bus.... 25 ft. Fargo
10. Taxicab..... 16 ft. General Motors

All units will be painted in a uniform color scheme with light green panels, cream superstructure and aluminum painted roof. The standard A.E.R.A. monogram of dark blue and gold will appear on one side.

Chicago Looking Ahead Toward Suburban Electrification

Eventually, electric rapid transit trams will operate over the rights-of-way of steam railroads in the Chicago area, Britton I. Budd, president of the Chicago Rapid Transit Company, predicts.

Edward J. Noonan, engineer for the City Council's railway terminal committee, has estimated the cost of adapting steam railroad lines for electrical service at about \$10,000,000. There are 100 miles of line and 200 miles of track within 5 to 10 miles of the Chicago Loop. Railroad engineers estimate it would require \$500,000,000 for complete electrification of Chicago terminals and suburban service.

New Type Escalators for Boston Elevated

Installation of a new single file escalator at Forest Hills and the installation of another new escalator at a later date after the removal of the existing escalator is asked by the Boston Elevated Railway in plans filed with the State Department of Public Utilities. The cost of the first escalator is estimated at \$47,600 and of the second at \$47,100. This includes the cost of removing the present escalator. Installation of the first escalator will take three months from the time it is ordered.

The proposed escalator is the newest "clean-step" type embodying the good features of the old cleat and step escalators. There is only one escalator like it in Boston, although similar escalators are used in department stores in New York and in foreign countries. The cleats form distinct steps, 12 in. wide and 7½ in. high.

The cleat steps rise gradually at the bottom and flatten out at the top. Another advantage of the proposed escalator is that the passenger when reaching the head of the escalator steps off in front instead of sideways as at the present Forest Hills escalator.

The proposed escalator would have a rise of 28 ft., 7 in. at a 30 deg. angle. It is 2 ft. wide, capable of accommodating 4,000 person an hour and travels at a rate of 90 ft. a minute. The first escalator will be built southerly of the present escalator and will operate from South to North; the second escalator will operate North to South. Both will discharge passengers near the center of the platform and will result in better distribution of passengers.

AC Spark Plug Company announces the appointment of Charles Wesley McKinley as chief development engineer to succeed Joseph Zubaty. Mr. Zubaty is leaving after eight years of service for an extended stay in Prague.

Buda Company, Harvey, Ill., manufacturers of railroad supplies, Diesel engines and power units for various portable and stationary requirements, are celebrating their 50th anniversary.

Brill Closes St. Louis Plant

The J. G. Brill Company has announced the closing on July 1 of its plant in St. Louis, formerly known as the American Car Company. In closing this plant, the Brill Management is following the trend toward the elimination of uneconomical operation by concentrating its manufacturing activities for electric railways in the West and Middle West at the plant of the J. G. Brill Company of Ohio in Cleveland.

With the growing interest in trolley buses and the larger emphasis being placed today on the importance of public appeal in both trolley buses and electric cars, it was also felt that the facilities at the Cleveland plant were more adequately suited to and possessing even a larger capacity than required to meet the needs of electric railways in the middle and western territories. Therefore, in concentrating its activities for these territories in one plant the Brill Company feels itself in even better position to take care of the requirements of those electric railways interested in new equipment and to provide the service necessary to satisfactory operation.

The J. G. Brill Company's Western region will continue sales representation in St. Louis, with R. S. Hood at 1558 South Vandeventer Avenue.

Gas-Electric Wrecking Crane for Cleveland Union Terminal



Double-end wrecking crane, the first wrecking crane with gas-electric drive, has recently been purchased by the Cleveland Union Terminal Company, from the Industrial Brownhoist Corporation, Cleveland. Designed specially for work in tunnels

with close clearances, it has a capacity of 105 tons at each end. Three independent sources of power are available, consisting of two 225-hp. gasoline engines connected directly to 350-amp., 400-volt d.c. generators, and one 208-cell storage battery.

Simplified Packaging of Overhead Material Adopted

A simplified practice recommendation covering the packaging of twenty items of overhead electric railway materials was adopted at a general conference of representatives of all interests, held under the auspices of the division of simplified practice of the Bureau of Standards, Department of Commerce, at Pittsburgh.

Recommendations were made for the packaging of the following materials: protecting trolley armor, pole bands up to and including 6 in., pole bands 7 in. and more, fork bolts with insulator ½ in. in diameter, fork bolts with insulator ¾ in. in diameter, angle crossarm braces, flat steel crossarm braces, crossings or cross-overs, trolley wire clinch ears, trolley frogs, straight line hangers, cap and cone insulators, section insulators, Globe & Giant strain insulators, wood strain insulators, feeder pins for steel crossarms, straight line suspension pullovers, soldered trolley wire splicing sleeves, mechanical trolley wire splicing sleeves and line section switches.

ADVERTISING LITERATURE

Carbon Brushes and the principles governing their characteristics and performance are discussed in a 42-page booklet offered by the Boxill-Bruel Carbon Company, Columbia Park, Ohio.

Potentiometer Pyrometers are featured in its new catalog No. 1101 by the Brown Instrument Company, Philadelphia. A short introduction outlines the nature and application of the potentiometer principle to pyrometry.

Mercury-arc Rectifiers with steel tanks is the subject of the Westinghouse publication C-1907-A. Principles of operation, design characteristics and auxiliaries are the topics covered.

Kips Bay Station of the New York Steam Corporation is described in a booklet issued by the Combustion Engineering Corporation, 200 Madison Ave., New York. Detailed description is given of the fifth steam generating unit, recently placed in service.

Bus Deliveries

Boston Elevated Railway, Boston, Mass., four Twin Coach, Model 40.

Boston, Worcester & New York Street Railway, Framingham, Mass., five white, Model 65A.

British Columbia Electric Railway, Vancouver, B. C., one White, Model 613.

Chicago Surface Lines, Chicago, Ill., ten Twin Coach trolley buses.

Columbia Railway, Gas & Electric, Columbia, S. C., seven Twin Coach, Model 20.

Columbus & Zanesville Transportation Company, Zanesville, Ohio, three Yellow Coach, 29-passenger parlor type.

Eastern Massachusetts Street Railway, Boston, Mass., nine A.C.F., metropolitan type; three Twin Coach, two Model 30 and one Model 40.

Capital Traction Company, Washington, D. C., one A.C.F., 37-passenger parlor type.

Nashua Street Railway, Nashua, N. H., two Mack, 29-passenger city type.

Northampton Street Railway, Northampton, Mass., one Mack, 25-passenger city type.

Pacific Electric Company, Los Angeles, Cal., twelve Twin Coach, Model 30.

Public Service Company of Colorado, Boulder, Col., four Mack, 20-passenger city type.

San Antonio Public Service, San Antonio, Tex., six Yellow Coach, 21-passenger city type.

Sault Ste. Marie Traction Company, Sault Ste. Marie, Mich., one Yellow Coach, 21-passenger city type.

Scranton Bus Company, Scranton, Pa., five White, Model 54.

Three Rivers Traction Company, Three Rivers, Que., four White, Model 613.

United Service Company, Tulsa, Okla., two White, Model 613.

Virginia Electric & Power Company, Richmond, Va., five Twin Coach, Model 30.

Receiver Named for Hale & Kilburn

A federal court receiver has been appointed for Hale & Kilburn Company, manufacturers of automobile, street car and bus equipment, in a mortgage foreclosure suit filed by the Fidelity-Philadelphia Trust Company, trustee for the bondholders. The bill of particulars states that the company defaulted in the payment of installment interest of \$26,820 on outstanding mortgage bonds of \$894,000. No figures were given as to the general liabilities and assets. The mortgage was created in 1919 when the company was known as the Hale & Kilburn Corporation.

Material Prices

JUNE 26, 1931

Metals—New York

Copper, electrolytic, delivered, cents per lb.	8.50
Lead.....	4.25
Nickel, ingot.....	35.00
Zinc.....	3.90
Tin, Straits.....	24.10
Aluminum, 98 to 99 per cent.....	22.90
Babbitt metal, warehouse	
Commercial grade.....	33.25
General service.....	28.50

Track Materials—Pittsburgh

Standard steel rails, gross ton.....	\$43.00
Track spikes, 1/2-in. and larger, per 100 lb....	2.70
Tie plates, steel, cents per 100 lb.....	1.95
Angle bars, cents per 100 lb.....	2.75
Track bolts, per 100 lb.....	3.90
Ties, 6m.x 8m.x 8 ft.,	
White Oak, Chicago.....	1.35
Long leaf pine, New York.....	1.00

Waste—New York

Waste, wool, cents per lb.....	11.00
Waste, cotton (100 lb. bale), cents per lb.:	
White.....	7.00-11.00
Colored.....	7.00-10.00

Wire—New York

Bare copper wire, cents per lb.....	10.25
Rubber-covered wire, No. 14, per 1,000 ft....	\$4.22
Weatherproof wire base, cents per lb.....	12.125

Paint Materials—New York

Linseed oil (5 bbl. lots), cents per lb.....	8.90
White lead in oil (100lb. keg), cents per lb....	13.25
Red lead in oil.....	14.75
Turpentine (bbl. lots), cents per gal.....	54.00
Putty, com'l grade, 100 lb. tins, cents per lb.	2.75

Hardware—Pittsburgh

Wire nails, per keg.....	\$1.80
Sheet iron (24 gage), cents per lb.....	2.15
Sheet iron, galvanized (24 gage), cents per lb.	2.75
Auto body sheets (20 gage), cents per lb.....	3.05

Bituminous Coal

Pittsburgh mine run, net ton.....	\$1.40
Central, Ill., screenings.....	.85
Kansas screenings, Kansas City.....	1.50
Big seam, Ala., mine run.....	1.70
Smokeless mine run, Chicago.....	1.60

Paving Materials

Paving stone, granite, 5 in., f.o.b.:	
New York—Grade 1, per thousand.....	\$120.00
Wood block paving 31, 16 lb. treatment, N.Y., per sq.yd., f.o.b.....	2.50
Paving brick, 3 1/2x8 1/2x4, N.Y., per 1,000 in. carload lots, f.o.b.....	50.00
Paving brick, 3x8 1/2x4, N. Y., per 1,000 in. carload lots, f.o.b.....	45.00
Crushed stone, 1-in., wholesale, f.o.b. per cu.yd.....	1.75
Cement, Chicago, in carload lots, without bage, f.o.b.....	1.35
Gravel, 1-in., cu.yd., wholesale, f.o.b.....	1.60
Sand, cu.yd., wholesale, f.o.b.....	1.00
Asphalt, in pkg. N.Y., f.o.b. ref., per ton....	15.00

Scrap—New York

Heavy copper, cents per lb.....	6.00
Light copper.....	5.00
Heavy brass.....	3.00
Zinc.....	1.25
Lead, heavy.....	2.60
Mixed babbitt.....	2.88
Battery lead plates.....	1.13
Cast aluminum.....	9.50
Sheet aluminum.....	10.00
Auto radiators.....	3.00
Tires, standard, mixed, per ton.....	\$5.00
Inner tubes, mixed, per cwt.....	\$1.20

Old Material—Chicago

Steel car axels, net ton.....	\$11.75
Cast iron car wheels, gross ton.....	10.25
Steel car wheels, gross ton.....	10.00
Leaf springs, cut apart, gross ton.....	11.25
Angle bars, gross ton.....	9.50
Brake shoes, net ton.....	5.75
Steel rails (short), gross ton.....	11.25
Relaying rails, gross ton (65 lb. and heavier)	24.50
Machine shop turnings, gross ton.....	3.75
Coil springs.....	11.75

Conspectus of Indexes for June, 1931

Compiled for Publication in **ELECTRIC RAILWAY JOURNAL** by
ALBERT S. RICHEY

Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Last Five Years	
				High	Low
Street Railway Fares* 1913 = 4.84	June, 1931 7.81	May, 1931 7.81	June, 1930 7.77	June, 1931 7.81	July, 1926 7.35
Electric Railway Materials* 1913 = 100	June, 1931 116	May, 1931 118	June, 1930 139	Dec., 1926 159	June, 1931 116
Electric Railway Wages* 1913 = 100	June, 1931 233.0	May, 1931 233.2	June, 1930 231.7	Apr., 1931 233.2	June, 1926 225.5
Electric Ry. Construction Cost Am. Elec. Ry. Assn. 1913 = 100	June, 1931 184	May, 1931 185	June, 1930 200	Nov., 1928 206	June, 1931 184
General Construction Cost Eng'g News-Record 1913 = 100	June, 1931 187.2	May, 1931 189.3	June, 1930 203.4	Jan., 1927 211.5	June, 1931 187.2
Wholesale Commodities U. S. Bur. Lab. Stat. 1926 = 100	May, 1931 71.3	Apr., 1931 73.3	May, 1930 89.1	May, 1926 100.5	May, 1931 71.3
Wholesale Commodities Bradstreet 1913 = 9.21	June, 1931 8.64	May, 1931 8.91	June, 1930 10.77	Jan., 1928 13.57	June, 1931 8.64
Retail Food U. S. Bur. Lab. Stat. 1913 = 100	May, 1931 121.0	Apr., 1931 124.0	May, 1930 150.1	Dec., 1926 161.8	May, 1931 121.0
Cost of Living Nat. Ind. Conf. Bd. 1923 = 100	Apr., 1931 88.2	Mar., 1931 89.1	Apr., 1930 98.7	April, 1926 105.5	Apr., 1931 88.2
General Business The Business Week Normal = 100	June 6, 1931 78.5	May 9, 1931 78.7	June 7, 1930 91.3	Oct. 6, 1928 117.6	Jan. 31, 1931 77.0
Industrial Activity Elec. World, kw.-hr. yeed 1923-25 = 100	May, 1931 109.8	Apr., 1931 106.4	May, 1930 119.0	Feb., 1929 140.4	Jan., 1931 97.6
Bank Clearings Outside N. Y. City 1926 = 100	May, 1931 68.6	Apr., 1931 76.0	May, 1930 92.1	Oct., 1929 111.8	May, 1931 68.6

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street

railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 121 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

can Speed be coupled with Safety?

The populace of every city in the country is clamoring for accelerated movement of vehicles.

And with increasing traffic hazards you need emergency brakes that will act under any conditions.

With this increased speed comes increased accident

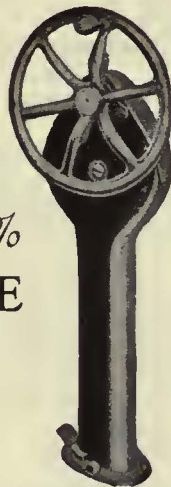
Specify "Peacock" Staffless Brakes.

NATIONAL BRAKE CO., INC.

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

Buffalo, N. Y.

The Ellcon Company—General Sales Representatives
50 Church St., New York



100%
SAFE

100%
FAST

PEACOCK

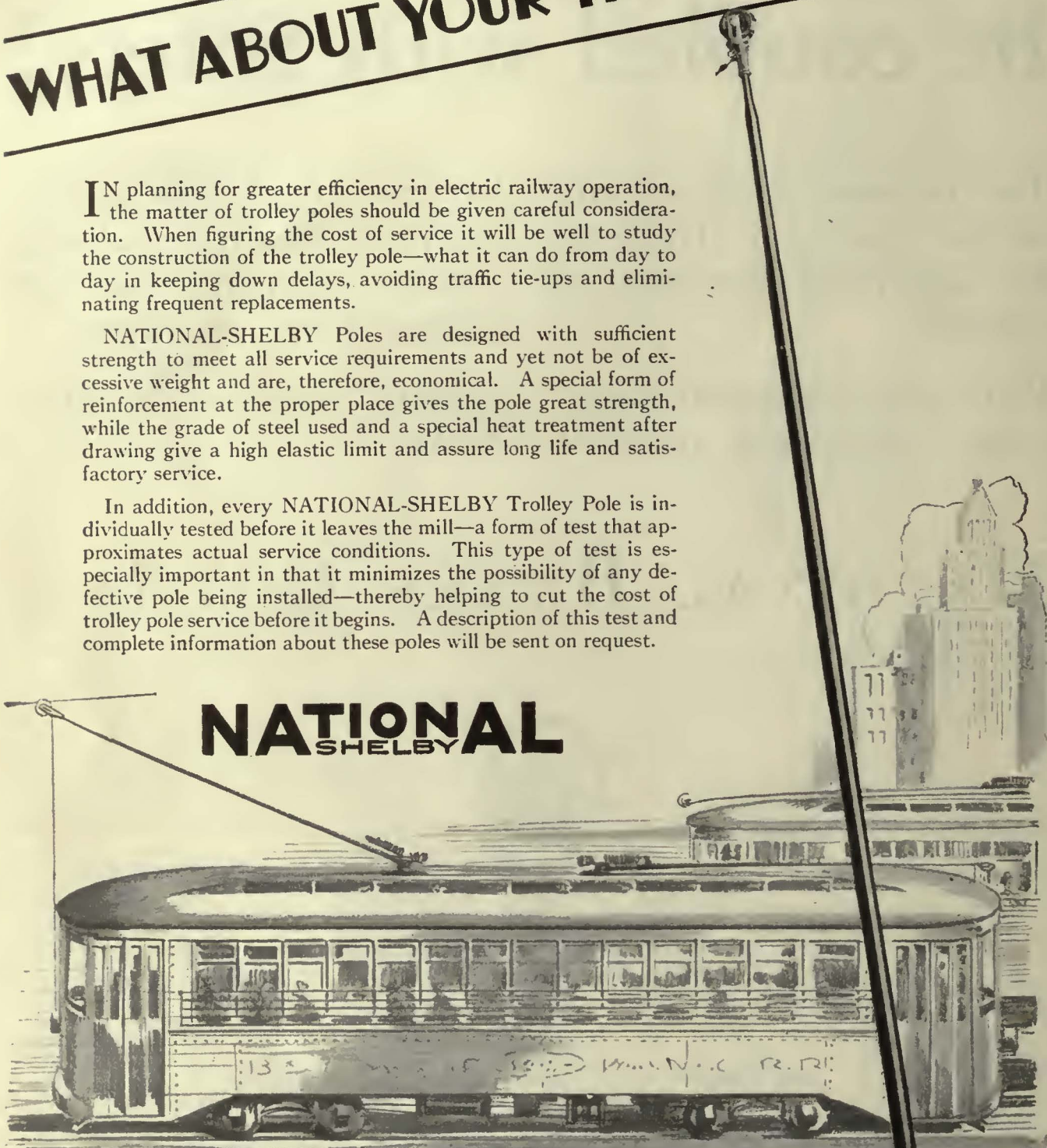
STAFFLESS BRAKES

WHAT ABOUT YOUR TROLLEY POLES?

IN planning for greater efficiency in electric railway operation, the matter of trolley poles should be given careful consideration. When figuring the cost of service it will be well to study the construction of the trolley pole—what it can do from day to day in keeping down delays, avoiding traffic tie-ups and eliminating frequent replacements.

NATIONAL-SHELBY Poles are designed with sufficient strength to meet all service requirements and yet not be of excessive weight and are, therefore, economical. A special form of reinforcement at the proper place gives the pole great strength, while the grade of steel used and a special heat treatment after drawing give a high elastic limit and assure long life and satisfactory service.

In addition, every NATIONAL-SHELBY Trolley Pole is individually tested before it leaves the mill—a form of test that approximates actual service conditions. This type of test is especially important in that it minimizes the possibility of any defective pole being installed—thereby helping to cut the cost of trolley pole service before it begins. A description of this test and complete information about these poles will be sent on request.



NATIONAL SHELBY

NATIONAL TUBE COMPANY
Frick Building, Pittsburgh, Pa.

SUBSIDIARY OF UNITED STATES STEEL CORPORATION



PRINCIPAL SUBSIDIARY MANUFACTURING COMPANIES

- | | | | |
|--------------------------------------|---|-------------------------|--------------------------------------|
| AMERICAN BRIDGE COMPANY | COLUMBIA STEEL COMPANY | ILLINOIS STEEL COMPANY | OIL WELL SUPPLY COMPANY |
| AMERICAN SHEET AND TIN PLATE COMPANY | CYCLONE FENCE COMPANY | MINNESOTA STEEL COMPANY | THE LORAIN STEEL COMPANY |
| AMERICAN STEEL AND WIRE COMPANY | FEDERAL SHIPBUILDING AND DRY DOCK COMPANY | NATIONAL TUBE COMPANY | TENNESSEE COAL, IRON & R. R. COMPANY |
| CARNEGIE STEEL COMPANY | | | UNIVERSAL ATLAS CEMENT COMPANY |
- Pacific Coast Distributors: Columbia Steel Company, Russ Building, San Francisco, Calif. Export Distributors: United States Steel Products Company, 30 Church Street, New York, N. Y.*



Canton Motor Coach, Inc., Canton, Ohio, operates 75 city buses on Goodyear Tires

“More than 50,000 miles ON GOODYEARS”

Long mileage isn't the only thing it takes to make a good tire for motor coaches. But it's one of the best indications that tires can run without trouble and keep passengers moving on schedule.

That's the case in Canton. “On some lines in our city-wide service, buses have traveled more than 50,000 miles on Goodyears and indications are that these tires are still

good for many more miles. We have had very few road service calls, which is an important feature in building up and retaining the good will of the riding public.”

Whether you want safe, sure traction on hills, wet pavements or country roads—whether you want a tire stout enough to stand up under the speed of interstate runs—or a tire to roll out

comfortable transportation on city streets—you'll find operations like yours which get what you want in Goodyears.

Find out why *more people ride on Goodyear Tires than on any other kind*—it's just as true of motor coaches as it is of passenger cars. The next time you order new equipment—specify delivery on Goodyears.

THE GREATEST NAME IN RUBBER

GOOD YEAR

More Tons are Hauled on Goodyear Tires than on any other kind

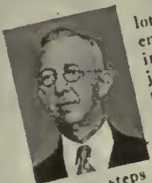


The "Inside Track" in which the Market Street Railway Company tells its employees about the operations of their company.

View on Sutter Street, San Francisco, taken May 27, 1931, after reconstruction had been completed. White arrows show location of two Thermit welded rail joints in foreground.

The Mystery of the Thermit Weld on Sutter Street

C. W. COCHRAN, Engineering Dept.



There has been quite a lot of interest shown by employees of the company in the welding of rail joints in our reconstruction work on Sutter Street. At this time it might be of additional interest to give a description of the various steps in the process, insight into just what takes place in the welding of a joint.

The first step is the preparation of the rail ends to be welded. The rail ends are cleaned of paint, rust and matter to insure the best in the fusion of the metal. The rail ends are laid in the track between the ends of the rails half inch. Into this space an insert of the right width is driven. The insert is of steel of the same chemical composition as the rail. This insert is in contact with the continuous running surface of the track.

The rail must be in contact with the continuous running surface of the track. The rail must be in contact with the continuous running surface of the track. The rail must be in contact with the continuous running surface of the track.

After the rail ends are thus prepared the two halves of the mould are placed in position and securely clamped. These moulds are prepared in advance by a mould maker. They consist of two metal boxes, or flasks, which are welded. The particular rail sections to be welded. The moulding sand is composed of two parts good, clean silica, or river sand, and one part calcined fire clay thoroughly mixed and wetted to the proper consistency.



The METAL & THERMIT

120 Broadway, New York, N. Y.

Pittsburgh

Chicago

Albany

So. San Francisco

Toronto

In *San Francisco* California

Market Street Railway Company
Joins the list of users of

THERMIT

"There has been quite a lot of interest shown by employees of the company in the welding of rail joints in our reconstruction work on Sutter Street," says Mr. Cochran, in his article in the "Inside Track," Company publication of the Market Street Railway. His article then goes on to describe the process of Thermit Welding as used on their lines. This is part of the \$2,500,000 program of reconstruction and rehabilitation recently started by this important property. 106 lb. rail is being laid, with Thermit Welded joints.

Besides telling the story to its employees, the Market Street Railway Company placed posters in the cars to explain the improvements to the patrons of the road.

Thermit-Welding gives a smoother riding track because the rails are actually joined—not jointed. There is no gap, no rough spot left for the wheels to bump over. Welded solidly together, and ground to absolutely level smoothness, the rails form an unbroken path of steel which means smooth and quiet operation of cars. The Market Street Railway, like many other users of Thermit Welding, is pleased to point this out to patrons as one more step toward better public relations.

"Thermit Welding Under Traffic"—our new method of making welds without interrupting service, is being used on this job.

Thermit Welding is now being done at lower cost than ever before. It can be done under adverse traffic conditions if necessary. The time to do it . . . is now! Ask our nearest office for quotations.



CORPORATION

120 Broadway, New York, N. Y.

Pittsburgh

Chicago

Albany

So. San Francisco

Toronto

REO QUALITY IN THE LOWEST PRICED TRUCK FIELD

NEW $1\frac{1}{2}$ TON REO

... with a wide range of Reo bodies to fit your needs

In the entire field of low price trucks, only the new $1\frac{1}{2}$ -Ton REO SPEED WAGONS embody all these excellling features:

Powerful 4 and 6 cylinder truck engines with *five* and *seven* bearing crankshafts; maximum piston displacements; full force feed oiling even to the piston pins; chrome nickel cylinders that wear seven times longer; extra large 7" deep frames; full floating rear axles; long, heavy springs; Spoksteel wheels; and large internal, self-equalizing hydraulic brakes!

Wheelbases are longer, with greater loading spaces back of the cab. With this sturdy chassis, Reo is prepared to supply every popular type of panel, stake, express or dump body—also special types for special needs. Prices are low and quality extraordinary.

A drive under load—over test routes of your own choosing—will tell more about the smooth, powerful action of these new

\$ 625

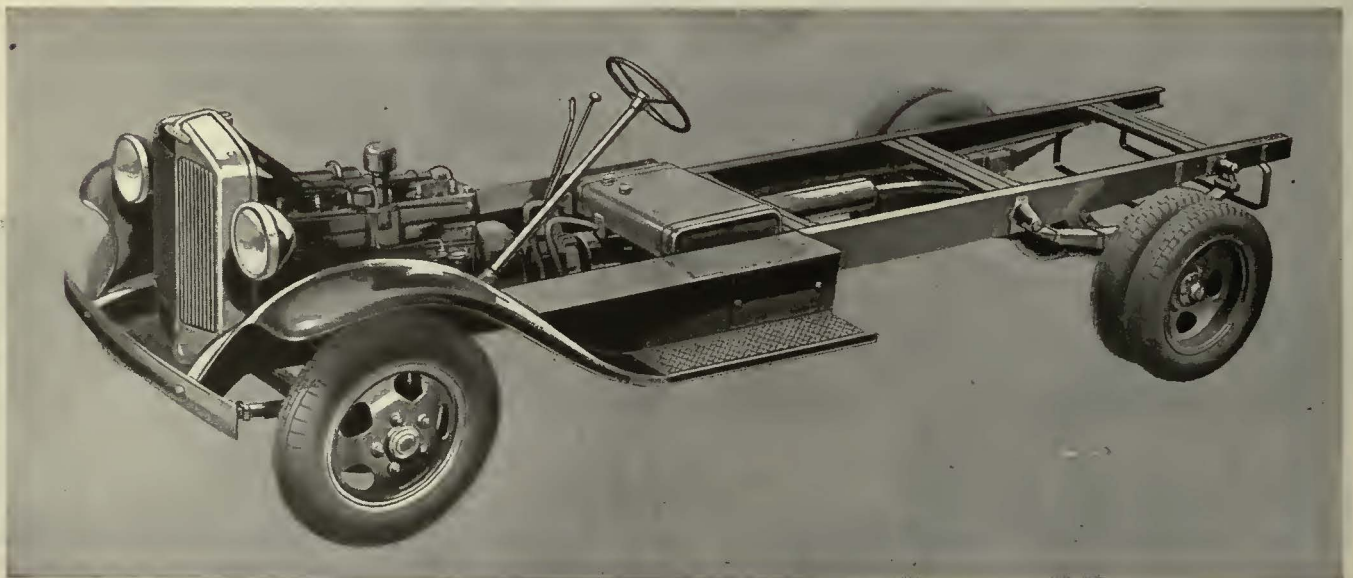
Four-Cylinder \$625, Six-Cylinder \$725
Chassis f. o. b. Lansing, Michigan
DUAL WHEELS EXTRA

Speed Wagons than words could possibly convey. Note carefully the savings in time and gas—and the *exceptional* size and strength of vital parts.

Any Reo salesman will gladly show you a portfolio which proves, by illustrated life-size comparisons of parts, the real and indisputable margin of Reo superiority.

By all means, see this SPEED WAGON before you buy!

REO MOTOR CAR COMPANY
LANSING - TORONTO



HARD NUTS

for strenuous Railroad Service

NESMITH PHOTO



. . . Another R B & W Standard

The titans of the rails get as much solicitous attention as a thoroughbred race horse. A locomotive's life is crowded with cleaning, oiling, adjusting.

Important, if small, accessories in an engine's daily work are the nuts that must be frequently adjusted to a nicety to maintain smooth operation.

R B & W Case Hardened Nuts are standard on American locomotives. Builders feel they can not afford to take chances on ordinary nuts.

Once a prominent locomotive builder sent us his first order for

case hardened nuts with a specification so rigid that it was commercially impractical, and would have impaired the strength of the threads. Investigation by the R B & W Engineering Service discovered the locomotive builder had had much trouble with such nuts bought from other sources. The changed specifications we recommended resulted in

a nut so satisfactory that not another complaint has been received. Now this customer wouldn't think of entrusting his case hardened nut orders to anyone but R B & W, because the EMPIRE Brand stands up under the rigorous service demanded.



Use the R B & W Engineering Service when you plan or redesign bolting material.

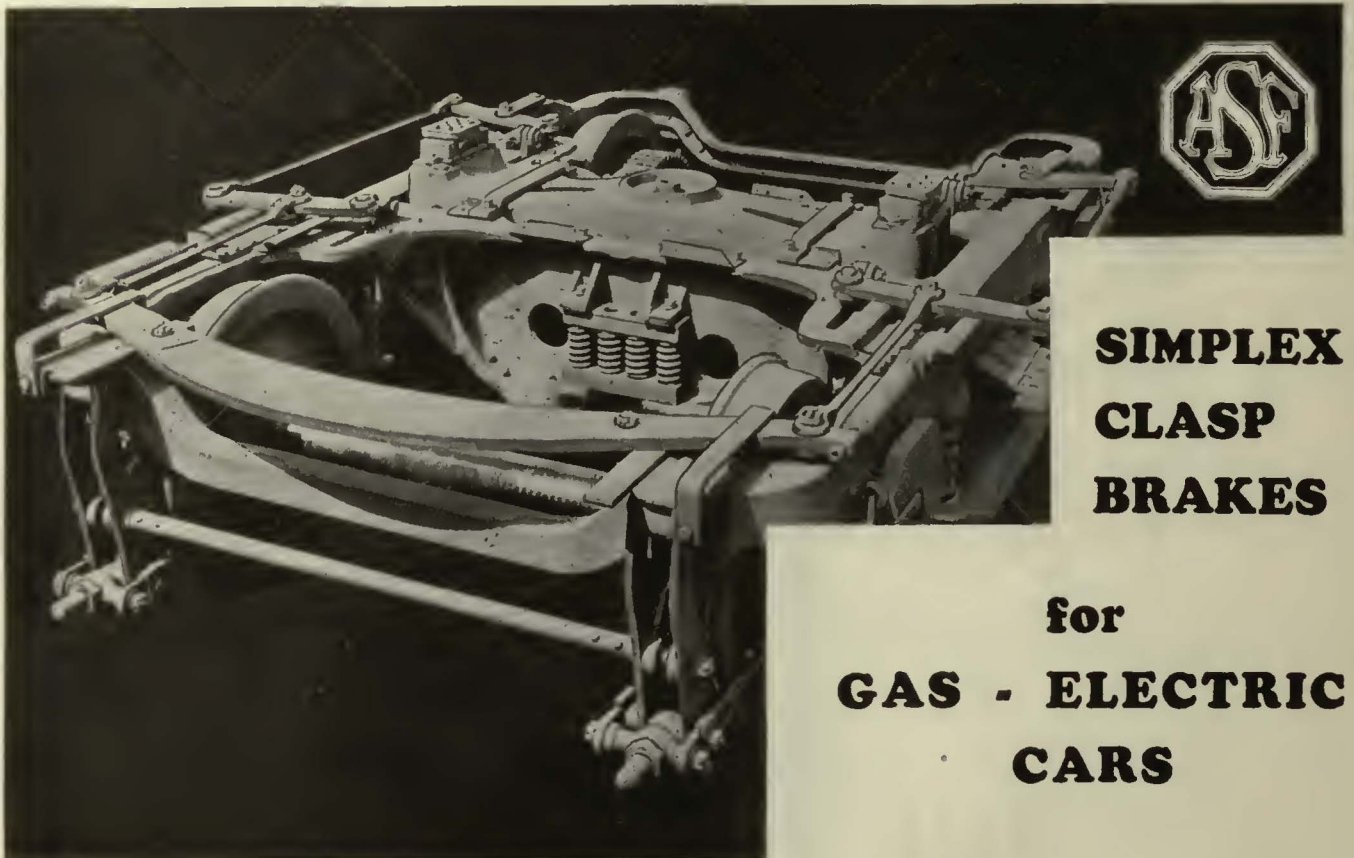
RUSSELL, BURDSALL & WARD BOLT & NUT CO.

ROCK FALLS, ILL.

PORT CHESTER, N. Y.

CORAOPOLIS, PA.

Sales Offices at Philadelphia, Detroit, Chicago, San Francisco, Los Angeles, Seattle, Portland, Ore.



**SIMPLEX
CLASP
BRAKES**

**for
GAS - ELECTRIC
CARS**

RAILROADS of the country are using American Steel Foundries Clasp Brakes for passenger equipment.

Greater retardation; reduction in brake shoe wear; desirable balancing of braking forces—all have proved the value of Clasp Brakes.

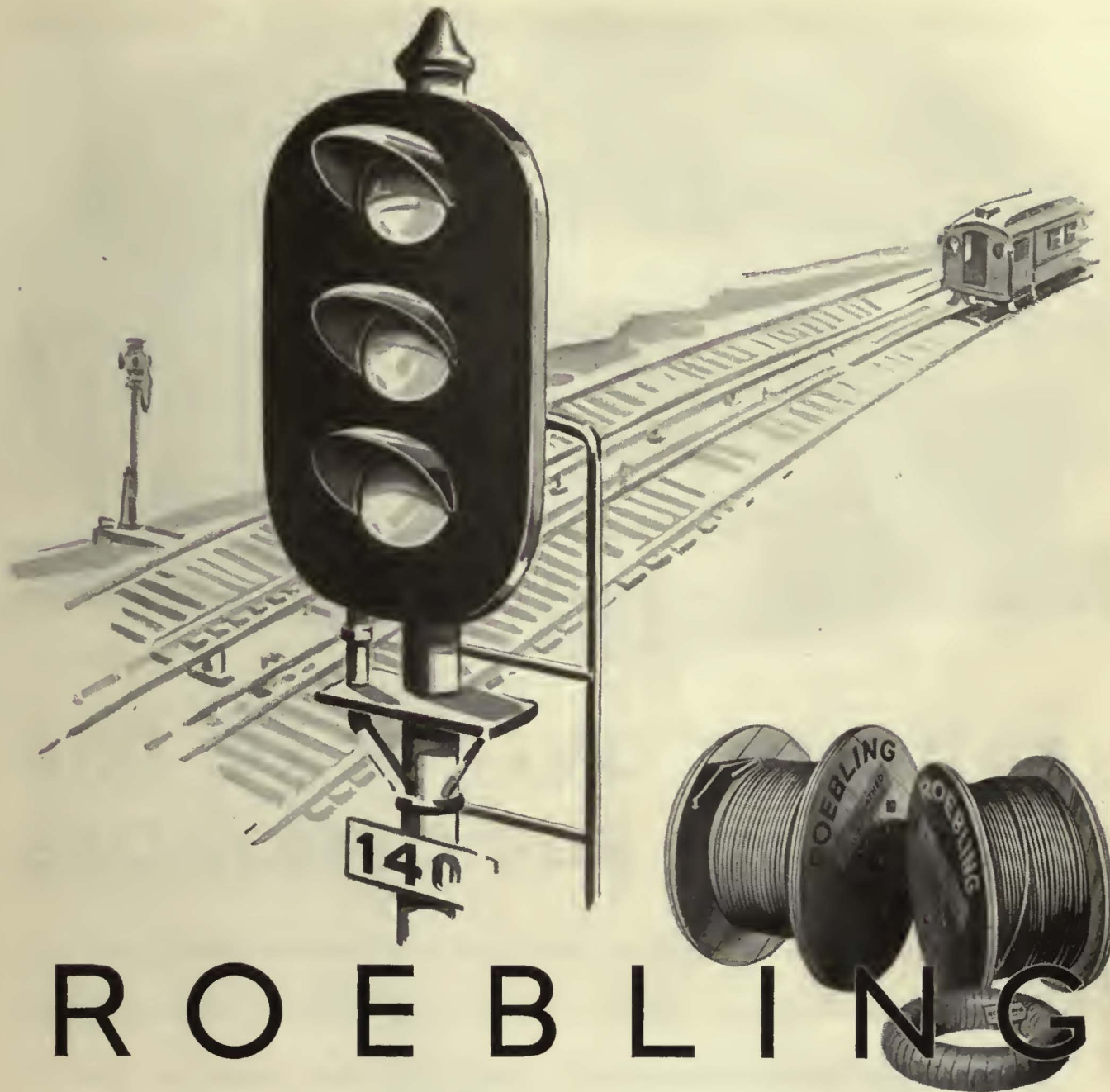
Gas-electric cars have increased in weight and size until they now are frequently larger than standard passenger cars. For these reasons, they, too, need Simplex Clasp Brakes. Clasp Brakes are applicable to Gas-Electric Car Trucks and should be included in your specifications.

AMERICAN STEEL FOUNDRIES

NEW YORK

CHICAGO

ST. LOUIS



ROEBLING

When you need signal wires and cables—or any other types of wires and cables for electric railway use—remember that Roebling makes all. In fact, the Roebling Line ranges from magnet wire for winding coils to heavy High Tension Lead Sheathed Power Cables.

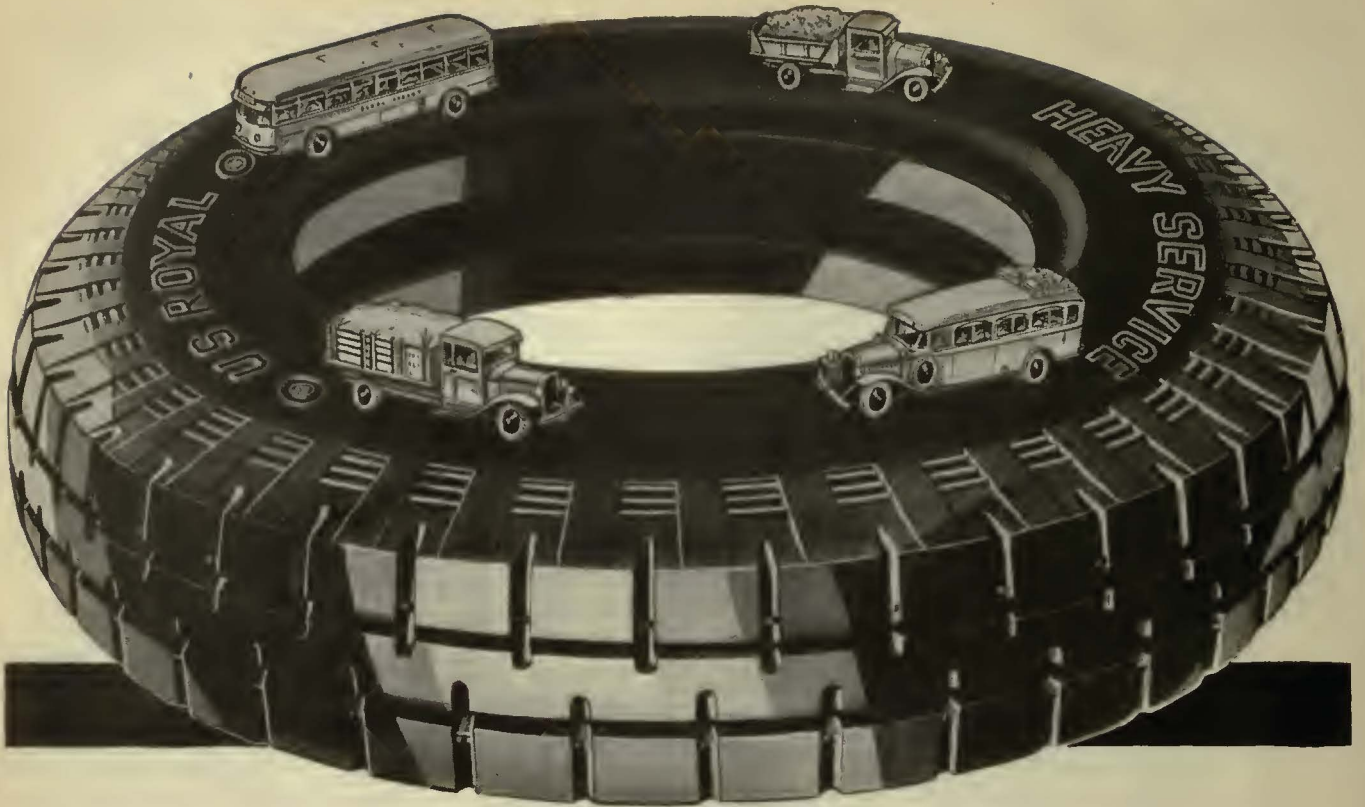
Roebling is equipped to give you prompt service, too. Quick shipment of standard types of wires and cables can be made from all warehouse points below.

We would be glad to have an opportunity to furnish information and prices regarding any of the Roebling Wires and Cables listed.

JOHN A. ROEBLING'S SONS COMPANY, TRENTON, N. J.
 Atlanta Boston Chicago Cleveland Los Angeles New York
 Philadelphia Portland, Ore. San Francisco Seattle Export Dept.—New York, N.Y.

Railway Signal Wires and Cables » Parkway Cables » Power Cables; Paper, Cambric, Rubber; Braided or Leaded » Car Wire » Locomotive Wire » Bronze Trolley and Contact Wire » Copper Trolley and Contact Wire » Copper Transmission Strand » Guy Wire and Strand » Bond Wires » Ground Wires » Welding Cable; Trailing and Electrode Holder » And a wide variety of other Wires and Cables.

ELECTRICAL WIRES AND CABLES



REDUCING OVERHEAD FOR TRUCK AND BUS OPERATORS



By millions of miles of tested service—every conceivable road and load—U. S. Heavy Service truck and bus tires have demonstrated their outstanding superiority. The U. S. Rubber Company—World's Largest Producer of Rubber—is able to maintain quality from source to finished product—"from tree to truck." The extra mileage, which truck and bus operators from coast to coast have come to associate with U. S. Tires, is assured by exclusive U. S. features of construction found in no other tire. That's why

THE BIG SWING IS TO U. S. TIRES

United States Rubber Company

WORLD'S LARGEST  PRODUCER OF RUBBER

YELLOW *announces*

Type 250

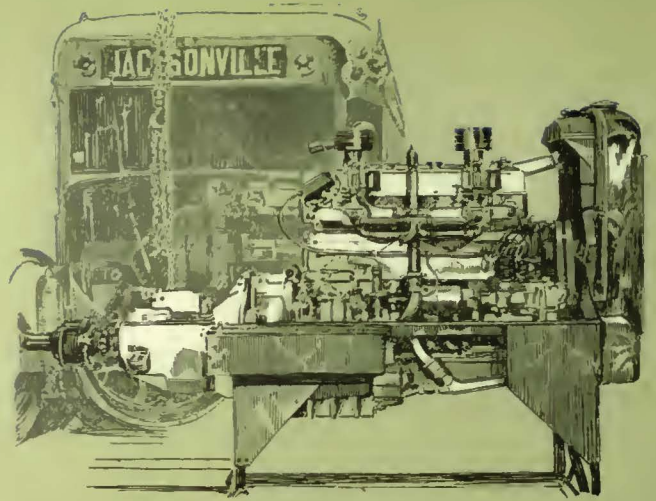
*now available with quick
removable power plant and
many added refinements*



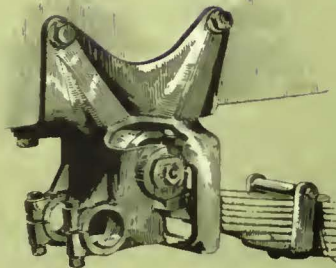
One of the most important of the new refinements incorporated in the new Type 250 design is the quick removal and replacement of the radiator, engine, clutch and transmission as a single unit. This entire assembly can be removed by two men in less than ten minutes and can be replaced in less than twenty minutes.



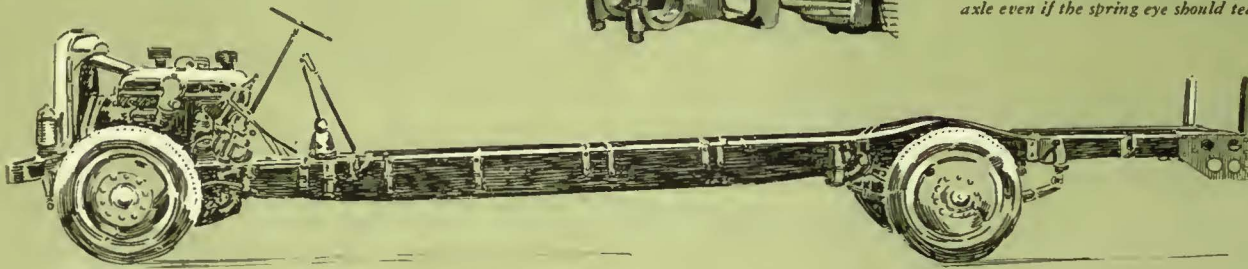
Without disturbing any adjustment or even removing the water from the radiator, two men can remove and replace the entire power plant assembly, including radiator, engine, clutch and transmission as a unit, in the same amount of time ordinarily required to replace a radiator.



The power plant unit is rolled, not lifted, out of the frame. All connections, including exhaust line, and fuel leads to the engine are quickly demountable and no adjustments are affected. By means of special connector blocks all wiring, including ignition and generator wiring and starter leads, can be instantly disconnected.



This new spring design and spring mounting insures against delays from spring failures. The two top leaves of each spring are wrapped and the third leaf partially wrapped around the eye of the springs. An encircling retaining bracket on the unbacked end of the front spring assures alignment of the front axle even if the spring eye should tear out.



The frame has been straightened so that it parallels the floor ramp. This eliminates the usual high kick up and provides better seating arrangement at the wheel housing. The strength of the frame has been increased materially by extending and bending the lower flanges downward at points where maximum stresses occur.



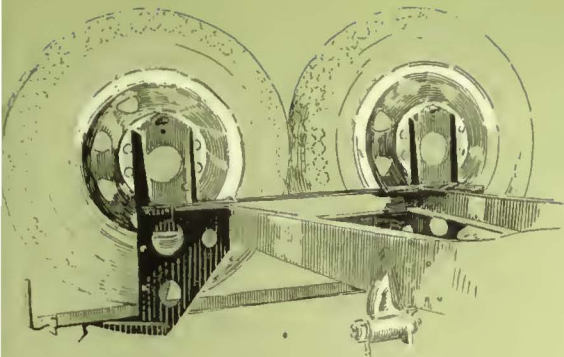
The frame now parallels the slope of the floor ramp.

Again Yellow sets

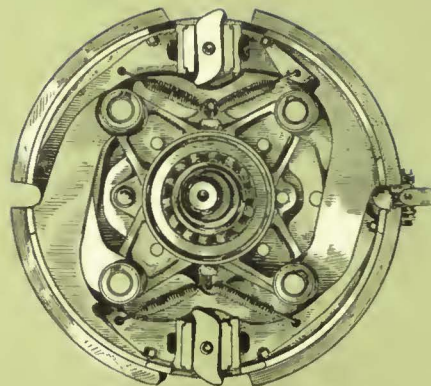
Less than 18 months ago, Yellow set a new pace in motor coach design when the transcontinental Type 250 Parlor Coach was introduced. Instant and enthusiastic recognition followed. The country's largest and most successful operators were quick to value its advanced engineering improvements, its rider appeal and comfort, its smooth power and exceptional performance, its low mainte-

nance cost and high revenue earning ability. Never has there been a coach design more universally satisfactory.

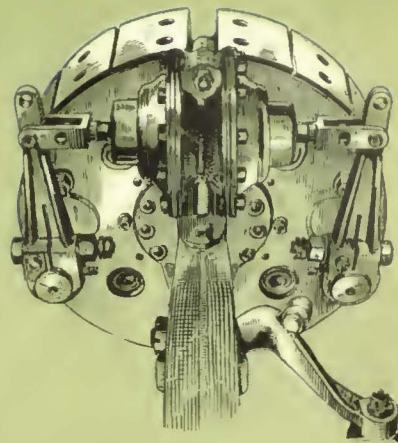
Today Yellow announces the addition of many notable refinements but no changes in the fundamental design of this popular model—features which add still further to its low cost of operation and ease of maintenance



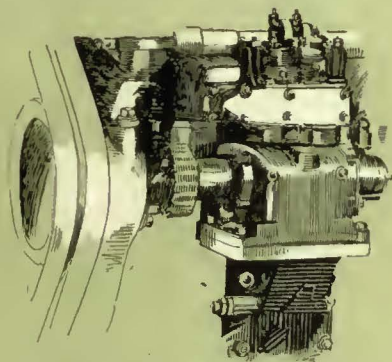
The frame side rails have been extended to form a support for the carrier for spare tires and direct fastening for the rear bumper. Thus the body structure is freed of the usual spare tire load.



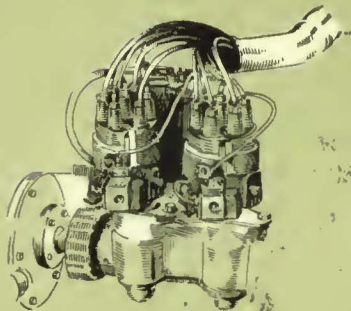
Brakes are of four-wheel type. Brake shoes, blocks, drums and slack adjusters are interchangeable, front and rear. The actuating brake parts in each wheel are of the duplex type and consist of four shoes simultaneously operated by two cams.



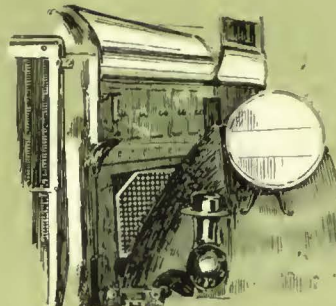
The brake shoes are actuated by double acting brake chambers, each single diaphragm actuating two shoes. With this improved design, brake area is increased to 676 square inches and efficient braking is obtained with air pressures as low as 35 pounds. Drums are of nickel iron, 17 1/4 in. diameter, 4 in. wide, with ventilating, reinforcing ribs.



The compressor is direct mounted to the engine and quickly detachable. It is driven by dual belts and is automatically lubricated from the engine lubricating system.



Accessibility is a noteworthy feature of the dual ignition assembly. Condensors are mounted to the hood side of the distributors.



A ventilating duct leads cool air to under side of driver's pedal plate.

the pace

and to its extraordinary performance characteristics.

The power plant is the same but the famous "616" engine can now be removed by two men in less than ten minutes—can be replaced in less than twenty minutes. The frame has been made straighter, with less kick up, and stronger and more rigid. Brake adjustment and maintenance has been greatly simplified.

The spring construction and mounting has been improved and a special feature added that protects against road delays from spring breakage.

From radiator to tail light, every unit and part has been meticulously studied and the original design refined or improved, made lighter or stronger or more accessible as directed by operating experience and sound engineering practice. No detail has been overlooked that would contribute to longer service life, improved performance or simplified maintenance.



DeVilbiss

**HEADQUARTERS FOR SPRAY-PAINTING
AND FINISHING EQUIPMENT
FOR
ELECTRIC RAILWAYS**

THE close adaptation of DeVilbiss Spray-painting and Spray-finishing Equipment to the needs of electric railways is graphically illustrated in the many kinds and types of surface coatings which can be spray-applied economically, quickly and efficiently.

All liquid or semi-liquid coatings, from the lightest stains to the heaviest viscous compounds, are within the range of DeVilbiss Equipment. Lead and oil, ready mixed paints, asphaltums, rust and water proofing com-

pounds are as easily handled as glazes, shellacs, lacquers, mill whites or similar materials. In fact, there is no liquid coating, whether protective or decorative, which cannot be easily handled by DeVilbiss Equipment.

The wide line of DeVilbiss Spray-painting and Spray-finishing devices and accessories should be familiar to every electric railway executive, for there is no equipment which electric railways can buy which will so materially reduce maintenance and upkeep costs.

THE DEVILBISS COMPANY . TOLEDO, OHIO

NEW YORK PHILADELPHIA CLEVELAND DETROIT INDIANAPOLIS CHICAGO
ST. LOUIS LOS ANGELES SAN FRANCISCO WINDSOR, ONTARIO

Direct sales and service representatives available everywhere

The wide DeVilbiss Line embraces every outfit and accessory for spray-painting and spray-finishing



THE SAFETY CAR CONTROL EQUIPMENT

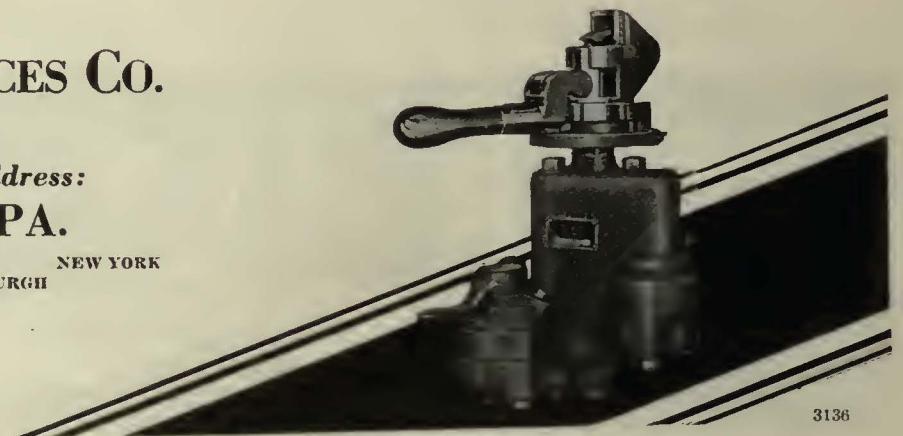
~ PROVIDES
Greater Convenience

INTERLOCK of brakes with doors, by means of a common operating valve, simplifies manipulation, and the selective door control feature, which permits treadle control of rear exit, insures prompt and flexible passenger interchange under varying traffic conditions.

SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.

Postal and Telegraphic Address:
WILMERDING, PA.

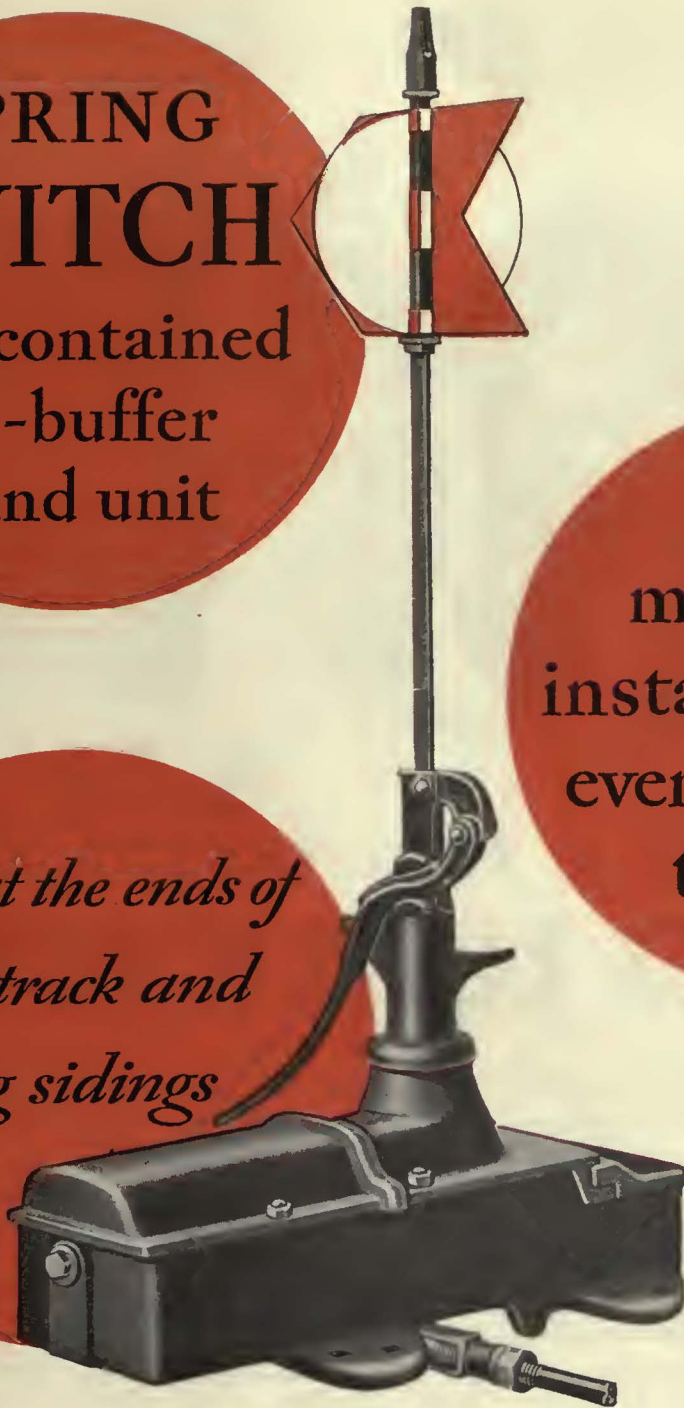
CHICAGO SAN FRANCISCO NEW YORK
WASHINGTON PITTSBURGH



SPRING SWITCH
 self-contained
 oil-buffer
 stand unit

*used at the ends of
 double track and
 passing sidings*

Saves
 more than
 installation cost
 every month of
 the year



**3-IN-1 SWITCH STAND
 STYLE NO. 100-A**

After severe tests at such locations, many of the leading roads have now adopted the 3-in-1 switch stand as standard. None of the claims we have made for this stand were disproved during these tests. The 3-in-1 was especially designed for use at the ends of double track and passing siding. Its three features, all combined in one compact housing, are:

1. A rigid-throw always ready for hand operation.

2. Two automatic double-coil springs returning points after trailing train has passed.

3. An oil-buffer preventing return of points between successive pairs of wheels. This is the first switch stand to combine all these features in one compact housing; in throwing it cannot

be closed and locked when an object intervenes between the points and the stock rail. Many locations on your railroad need this switch stand. Write today for complete printed information about the 3-in-1.

RAMAPO AJAX CORPORATION

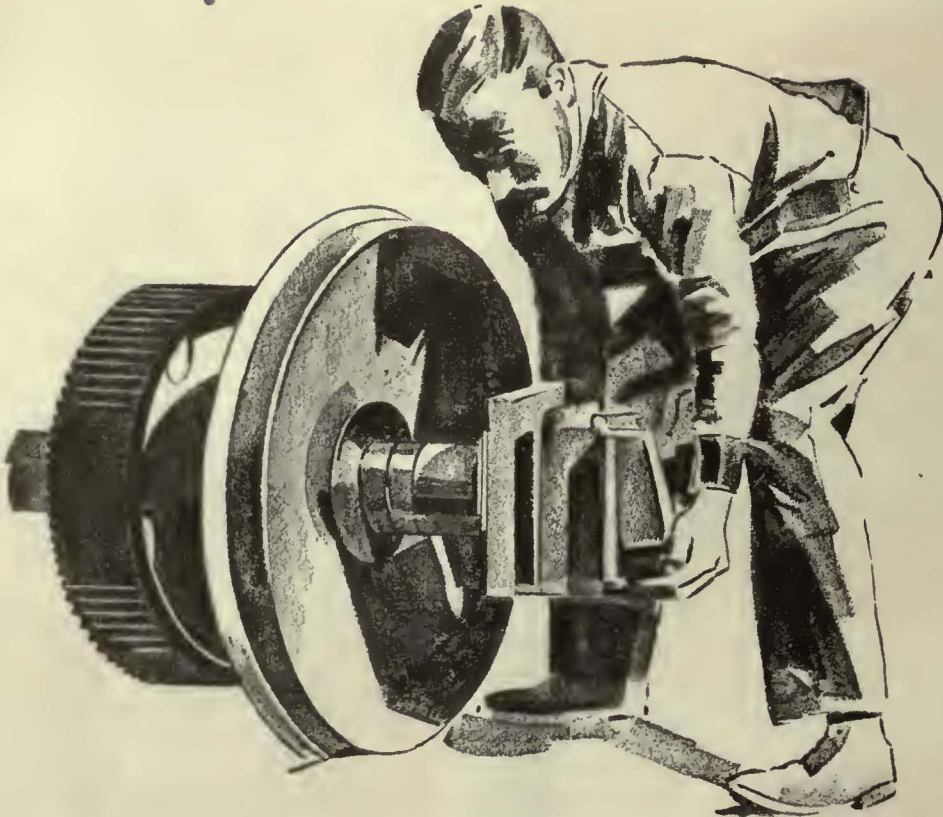
Racor Pacific Frog and Switch Company Los Angeles—Seattle
 Canadian Ramapo Iron Works, Limited Niagara Falls, Ontario
 General Offices—230 Park Avenue, New York

Sales Offices at Works and McCormick Bldg., Chicago Midland Bank Bldg., Cleveland, Ohio Builders Exchange Bldg., St. Paul Metropolitan Bank Building, Washington Union National Bank Building, Houston, Texas

Nine Racor Works: Hillburn, N. Y.
 Niagara Falls, N. Y. Chicago, Ill.
 East St. Louis, Ill.

Superior, Wis. Pueblo, Col.
 Los Angeles, Cal. Seattle, Wash.
 Niagara Falls, Ont.





ROLLING-STOCK PURCHASERS SPECIFY TEXACO LUBRICATION

A number of rolling-stock purchasers in the Electric Railway Industry who have made tests of the new Texaco System of Journal Lubrication (of which Texaco Lovis Oil and Texaco Oil Seals are important elements) are now specifying this new Texaco System of Journal Lubrication for the new cars they order.

The tests made by these purchasers of rolling-stock proved exactly what The Texas Company's own tests have proved, namely:

The Texaco System of Car-Journal Lubrication gives more effective lubrication—and *does it at less cost*. Oil-house costs are less. Waste consumption is greatly reduced. Shop time for journal truing and bearing replacements is lower; and pull-ins due to

bearing troubles are practically unknown. With the Texaco System, power consumption per car-mile is decidedly less.

There are two reasons for these economies. First: Texaco Oil Seals permanently seal the journal box against the entrance of abrasive dust and water, and second: Texaco Lovis Oils have definitely proved more effective lubricants than the high-viscosity oils formerly used.

Write The Texas Company. Texaco engineers will gladly lay the facts before you, or arrange for thorough tests on your own lines. The Texaco System of Car-Journal Lubrication is now used by an increasing percentage of the country's electric railways.

TEXACO  LUBRICANTS

THE TEXAS COMPANY, 135 EAST 42nd STREET, NEW YORK



for all traction equipment...

TIMKEN AXLES

FRONT *and* WORM DRIVE REAR

Strong, long-lived, *and*
permanently silent



1881

**ANNOUNCING
THE
GOLDEN JUBILEE
CONVENTION
NUMBER OF
ELECTRIC
RAILWAY
JOURNAL**

50th ANNUAL CONVENTION

Golden Jubilee

of the A. E. R. A.

ATLANTIC CITY

Sept. 26—Oct. 2

AT Atlantic City, September 26-October 2, the American Electric Railway Association will celebrate its 50th Anniversary by a Golden Jubilee Convention and Exhibit. A great occasion. The oldest memories will be revived; the newest developments displayed.

The Convention Number of **ELECTRIC RAILWAY JOURNAL** will contain an authoritative historical review of the industry's 50 years of progress, with interesting illustrations of early days.

This year, for the first time, the National Association of Motor Bus Manufacturers will hold their annual convention in conjunction with the A. E. R. A., September 28-29, at Atlantic City.

The Convention Number of **ELECTRIC RAILWAY JOURNAL** will be mailed to subscribers September 15—ten days before the convention—and will be distributed at the convention itself. Advertising forms close September 11.

ELECTRIC RAILWAY JOURNAL
McGRAW-HILL PUBLISHING COMPANY, INC.
Tenth Avenue at 36th St., New York

1931

C O N V E N T I O N N U M B E R

Electric Railway Journal

OUT SEPT. 15

FORMS CLOSE SEPT. 11



Monotube Pole with ornamental base used for distribution lines and trolley span wire support.

LET'S TALK about POLE COSTS

COSTS come in for plenty of attention these days. Every dollar must be stretched just a little farther.

About pole costs. Union Metal Monotubes fall in the low price range. Compare them with other steel poles—strength for strength—you'll find the prices right in line.

Then consider the advantages incorporated in Monotubes which you do not get in other poles—one-piece construction, no horizontal joints, choice of two types of anchorage, cold-rolled steel, better appearance—all for the same price as ordinary poles. And because Monotube construction reduces corrosion to a minimum, these poles last longer.

Install Monotubes jointly with other utilities. Use them for distribution lines, trolley span wires, feeder lines, traffic signals or what you will. Monotubes will cut costs for you year after year.

At whatever price you wish to pay for poles or for lighting standards, Union Metal offers you an outstanding buy. The line is complete. There is a pole—Monotube or Fluted Steel—and lighting standard—Pressed Steel or Ferronite (super cast iron)—to match every requirement of style and price. Write us for complete information or request a Union Metal engineer to call.

THE UNION METAL MANUFACTURING COMPANY
GENERAL OFFICES AND FACTORY + + CANTON, OHIO

SALES OFFICES: New York, Chicago, Boston,
Los Angeles, San Francisco, Dallas, Atlanta

Distributors:

General Electric Merchandise Distributors
Graybar Electric Company, Inc.
Offices in all principal cities



Abroad: The Canadian General Electric Co.;
The International General Electric Co. Inc.

UNION METAL MONOTUBE POLES



Moratorium!

*Declared by TWIN COACH
as long as four years ago
in July, 1927*



PROTECTION

MORATORIUM . . . is a word that fills the front pages of the world—meaning a suspension of PAYMENT.

Applied to Twin Coaches it means a suspension of OBSOLESCENCE PAYMENTS.

Such payments have been excessive due to frequent new bus models designed without proper regard for transportation problems to be met. On this basis, annually designs are brought out which obsolete early models before purchaser has had a fair chance to use the old vehicle.

New buses and improvements are a constant necessity but fundamental changes in design represent progress only when they are designed around and better meet the transportation problems confronting the railway operator.

Twin Coach policy during 1927, 1928, 1929, and 1930 has called for a standardization of design with a non-obsolescent body—and provided for the application of all improvements in the coach art upon the original vehicle in the owner's garage.

Furthermore, the Twin Coach standardization policy calls for the same relative design for all capacities with a maximum interchangeability of parts.

Today this idea fathered by Frank R. Fageol is acknowledged widely as the keystone of successful bus manufacturing, purchasing, servicing and operation.

Cold sales figures prove this assertion.

for the Buyer

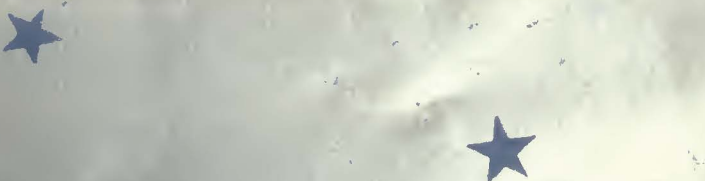
SIGNED orders are the most authoritative endorsement of advertising statements.

In these times of the closest scrutiny of purchases — the Twin Coach policy of STANDARDIZATION with its ELIMINATION OF NEW MODELS has stood the severest of tests set up by the prospective purchaser.

RECENT ORDERS AND DELIVERIES

<i>June Deliveries</i>	. . .	\$500,000.00
<i>June Orders (Undelivered)</i>	. . .	1,500,000.00
<i>Grand Total</i>	. . .	<u>\$2,000,000.00</u>

All Twin Coach products are manufactured under patents issued or pending.



Proof!

you can't beat twins



NEW ACCOUNTS FOR JUNE

26 Seater Twins

KANSAS CITY MISSOURI
Kansas City Public Service Co.

KNOXVILLE TENNESSEE
Tennessee Public Service Co.

WILLIAMSPORT PENNSYLVANIA
Williamsport Transportation Co.

DULUTH MINNESOTA
Duluth Street Railway Co.

READING PENNSYLVANIA
Reading Transit Bus Co.

The secret of this operating success lies in the fact that these smaller capacity Twin Coaches are built of the same materials and of the same units (single motor) used and developed thru four years of manufacturing the famous 40-passenger Twin Coaches of a standard basic design—which eliminates the troubles so frequently the result of redesigning from year to year to bring out new type motor coaches.

SILENT

and more efficient



3000 KW Mercury Arc Rectifier
for 600 volt Railway Service

AMERICAN BROWN BOVERI CO., INC., CAMDEN, N. J.

AMERICAN BROWN BOVERI

Pioneers in Mercury Arc Power Rectifiers



WHERE INSULATION MUST
BE DEPENDABLE

Using Vartex Varnished Cambric
Tape in the manufacture of an
AMERICAN BROWN BOVERI
10,000 K.V.A. Transformer.

VARTEX—for Dependable Insulation

The light and power supply of whole communities often depends on the unfailing performance of such transformers as the one illustrated here. Only the finest materials can be considered for their construction.

There can be no better proof of the high quality of Vartex Varnished Cambric Insulation than is afforded by its selection by American Brown Boveri Co., Inc., for this exacting service.

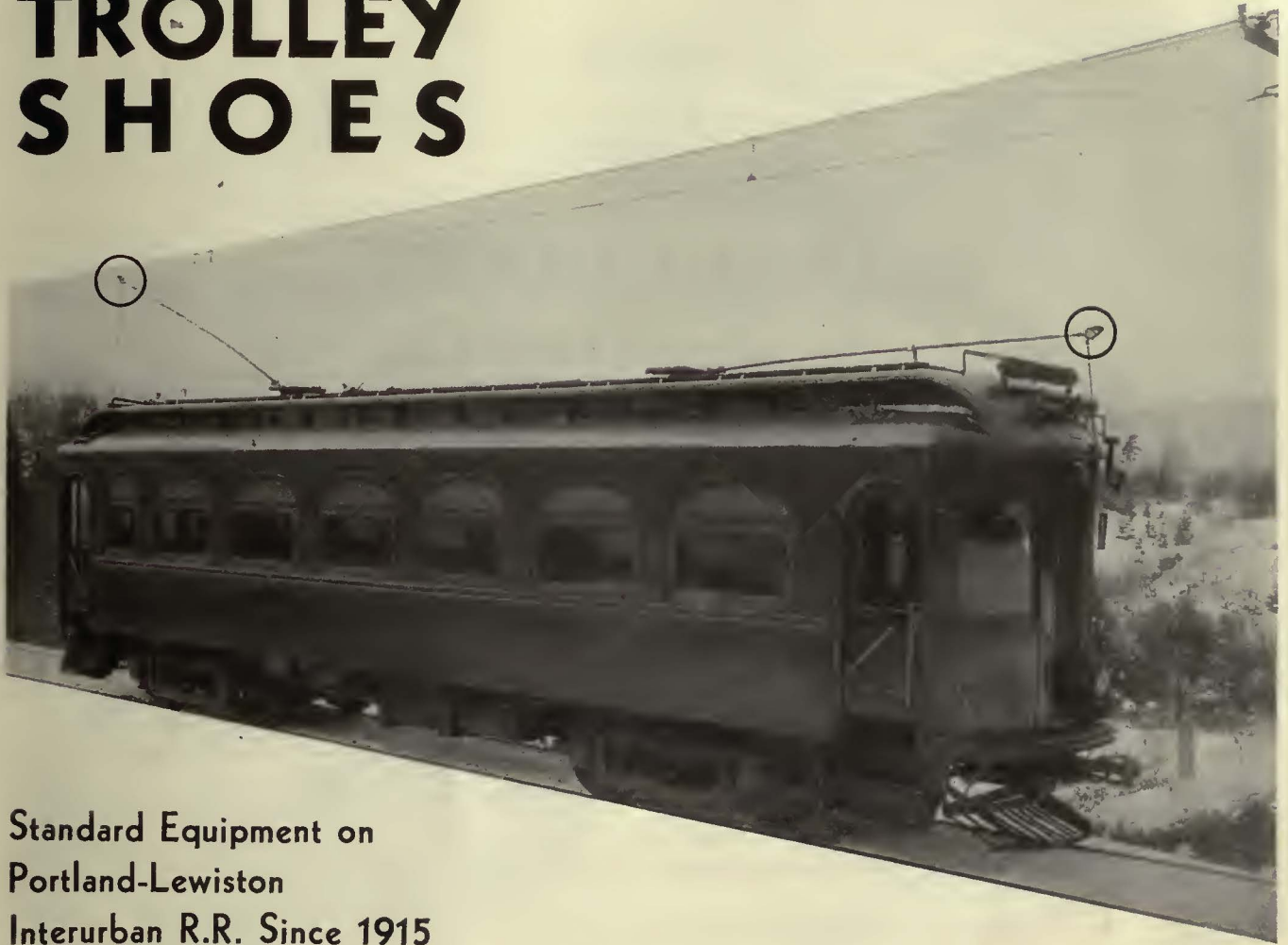


NEW JERSEY WOOD FINISHING CO., INC.

FOUNDED 1907

ELECTRICAL INSULATION DEPARTMENT
Woodbridge
New Jersey

MILLER TROLLEY SHOES



Standard Equipment on
Portland-Lewiston
Interurban R.R. Since 1915



This company has been using these smooth running sliding contact shoes for over fifteen years. At that time they abandoned trolley wheels because of frequent dewirements and high replacement expense.

MILLER TROLLEY SHOES provide 3 inches of smooth running sliding contact surface. They are especially adapted to draw heavy current at high speeds without arcing. Users report fewer dewirements and less wear of trolley wire.

To quote Mr. P. E. Weymouth, general superintendent: "We are operating heavy interurban equipment with heavy motors on a high gear ratio, so that a heavy current is required, particularly in starting and on grades. On account of this we believe that a sliding contactor of some kind is necessary for satisfactory operation. The Miller Trolley Shoe was adopted and has proved to be very satisfactory."

Miller Trolley Shoes are helping to reduce costs for many of the leading traction companies in all parts of the country.

Write for descriptive literature and quotations.

MILLER TROLLEY SHOE CO.

Columbia Road

Boston 21, Mass.



INSULATING MATERIALS

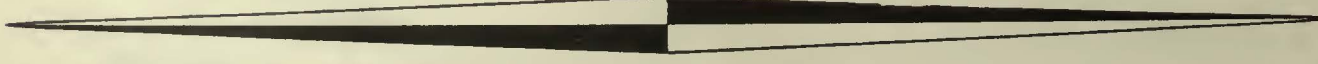
The dependability of electrical apparatus is determined often by the quality of its insulating materials. General Electric, to insure this dependability, manufactures the Insulating Materials used in its many products. These same Insulating Materials that are manufactured, used, and recommended by the General Electric Company can be obtained from your nearest General Electric Merchandise Distributor. See him, or write Section M-317, Merchandise Department, Bridgeport, Connecticut.

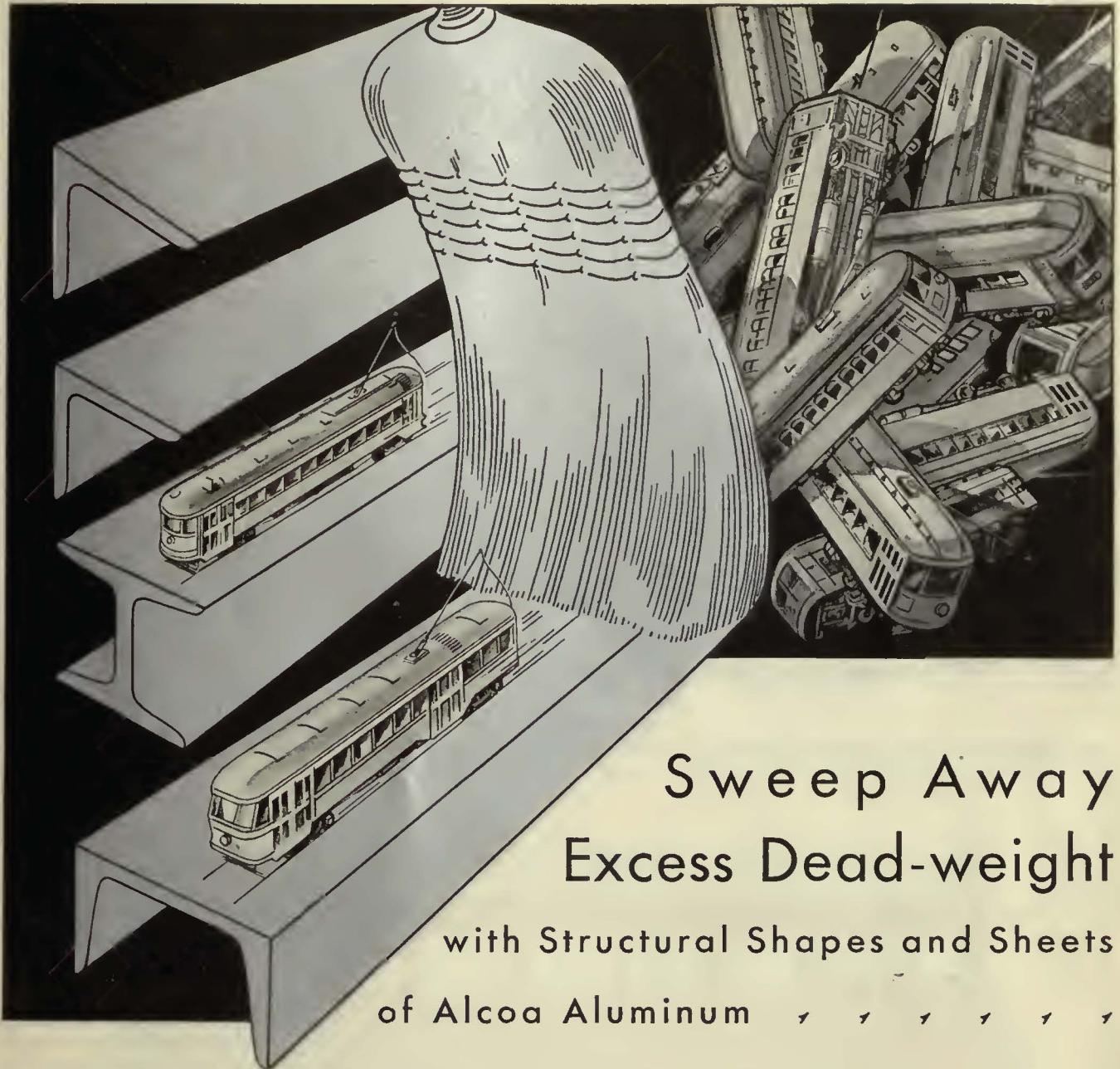


GENERAL  **ELECTRIC**

INSULATING MATERIALS

MERCHANDISE DEPARTMENT, GENERAL ELECTRIC COMPANY, BRIDGEPORT, CONNECTICUT





Sweep Away Excess Dead-weight with Structural Shapes and Sheets of Alcoa Aluminum

It's time to clean house of dead-weight. The keynote of a new program of progress and profit in street car construction is to build of the strong alloys of Alcoa Aluminum, equivalent in strength, but only 1/3 the weight of structural steel.

You can scrap tons of dead-load in every car. Dead-load that pays no fares. Get away to quicker starts; make easier stops; increase your schedules; save wear and tear on tracks and road beds; provide more riding comfort.

The additional cost to accomplish this is soon paid off—forgotten entirely as being of no consequence, as compared with the increased profits resulting from lower operating costs.

Standard structural shapes made of the strong alloys of Alcoa Aluminum, equal in strength to structural steel, yet weighing only 1/3 as much, are available from stock in depths up to 10 inches and in lengths up to 90 feet. Plates, rivets, bolts and screws are also available.

In the form of sheets, castings and forgings, the strong alloys of Alcoa Aluminum can be used in cars to save the weight of roofs, side and floor members, panels, seats, conduit, doors and fittings.

The engineering handbook, "Structural Aluminum," is available at \$1.00 a copy. Address ALUMINUM COMPANY of AMERICA; 2463 Oliver Building, PITTSBURGH, PENNSYLVANIA.



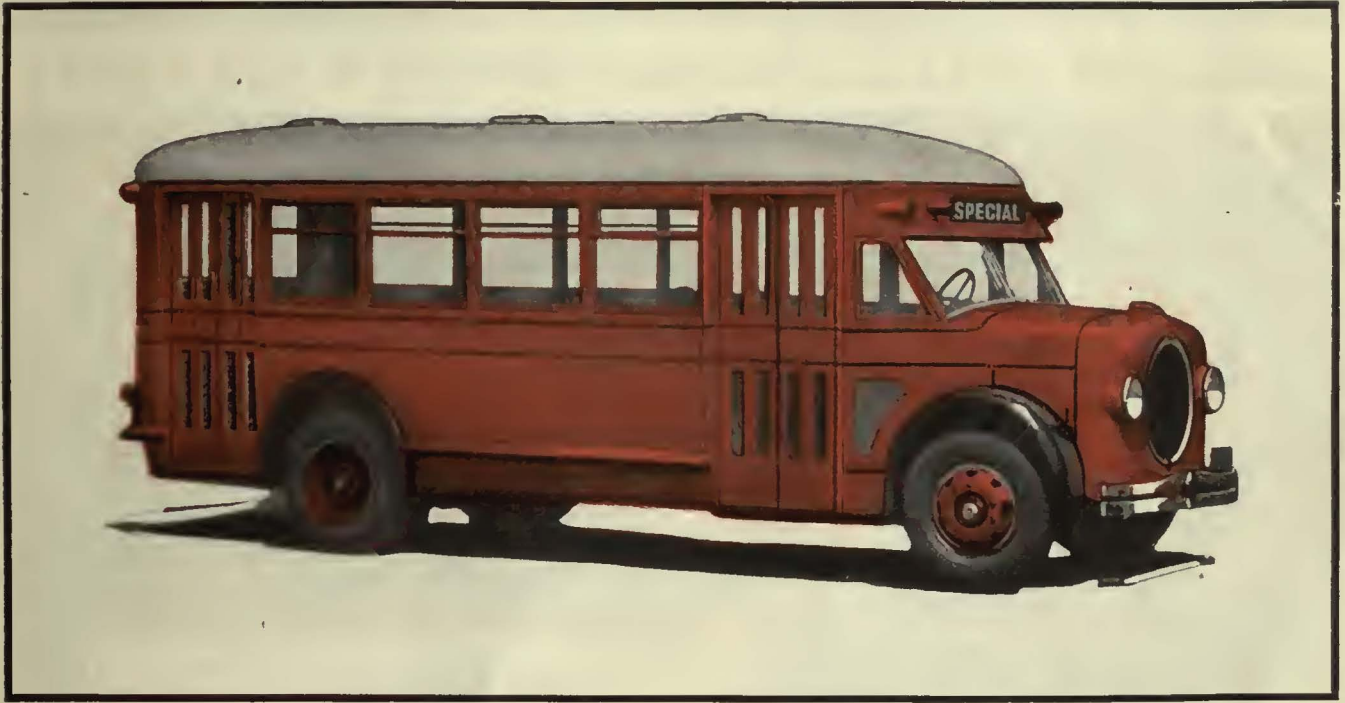
ALCOA ALUMINUM

In FARGO Coaches All these features

In Fargo Model 90 Street Car and Model 91 Parlor Coach, operators find an impressive number of modern features. The advantages of each have been proved conclusively through hundreds of thousands of miles in actual service.



IN THE PARLOR COACH: Seats for 21-25 passengers. All, except auxiliary and rear section, are of the reclining type with 3-position adjustment and arm rests on both aisle and window sides . . . Interior baggage lofts are commodious and exceptionally sturdy . . . Interior appointments are finished in a distinctive modernistic motif.



IN THE STREET CAR: Seats for 21 passengers . . . Two large loading wells and 22-inch aisle (measured at seat cushions) that accommodate upwards of 40 standees in comfort . . . Two doors for rapid passenger circulation; each door 24 inches in clear.

IN BOTH COACHES, operators find an 8-cylinder, 120-horsepower engine that assures ample power and exceptional smoothness and pick-up . . . a rugged heavy-duty 4-speed transmission . . . an unusually short wheelbase—only 172 inches . . . 10³/₄-gallon cooling system . . . accessibility for engine adjustments and entire power plant quickly removable as a unit . . . full-floating rear axle of the worm-drive type . . . 10" double-drop frame—outriggers lined up with cross-members to provide firm base for body . . . steering gear mounted ahead of front wheels . . . unusually short turning radius . . . 4-wheel, internal hydraulic brakes with booster . . . these and many other features whose advantages have been readily recognized by experienced operators everywhere.

FARGO MOTOR CORPORATION

DETROIT, MICHIGAN

DIVISION OF CHRYSLER CORPORATION



3,000,000 MILES *with* SILVERTOWN SECURITY



One of the Eastern Massachusetts Street Railway Company's rapidly growing fleet of Golden Arrow Motor Coaches.

Eastern Massachusetts Street Railway Standardizes on Goodrich

THREE million miles a year! Thru Boston's crowded streets...over good roads and bad...up steep hills and down.

Such service demands a tire that will stand the gaff. A tire that will deliver maximum mileage with a minimum of road delays. A *safe* tire. An easy riding tire. That's why the Eastern Massachusetts Street Railway chooses Silvertowns.

If you want increased riding comfort

and safety for your buses—lower operating costs per tire mile—greater freedom from tire troubles, then you, too, should change over to Silvertowns.

Join the Silvertown Safety League

The Goodrich Rubber Company's nationwide campaign to reduce accidents through more careful driving has met with overwhelming response. Leading bus and taxicab operators have joined the Silvertown Safety League—are displaying the League Emblem—

Why not show your patrons that you

stand on the side of safe driving? Enlist today. Pledges, lapel buttons and emblems for your drivers may be had without cost or obligation from your nearest Goodrich Distributor.



The B. F. Goodrich Rubber Co., Est. 1870, Akron, Ohio. Pacific Goodrich Rubber Co., Los Angeles, Calif. In Canada: Canadian Goodrich Co., Ltd., Kitchener, Ont. The International B. F. Goodrich Corporation (Export).

Goodrich HEAVY DUTY Silvertowns

SPECIFY GOODRICH ON YOUR NEW BUSES

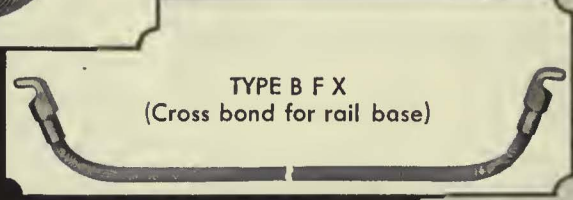
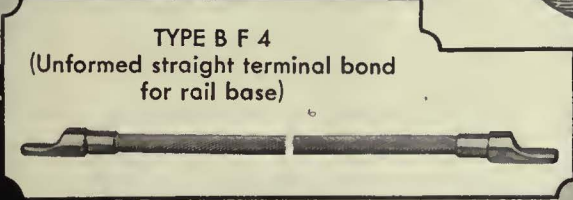
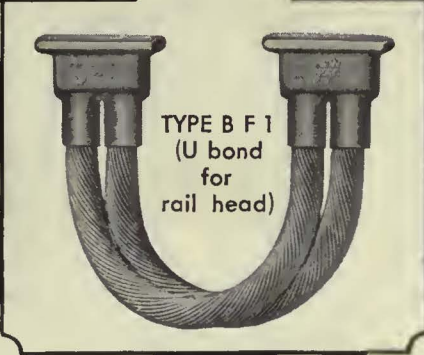
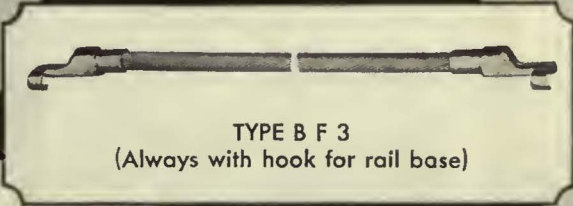
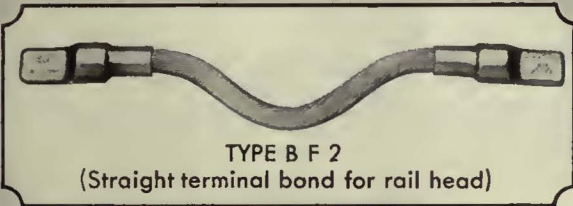
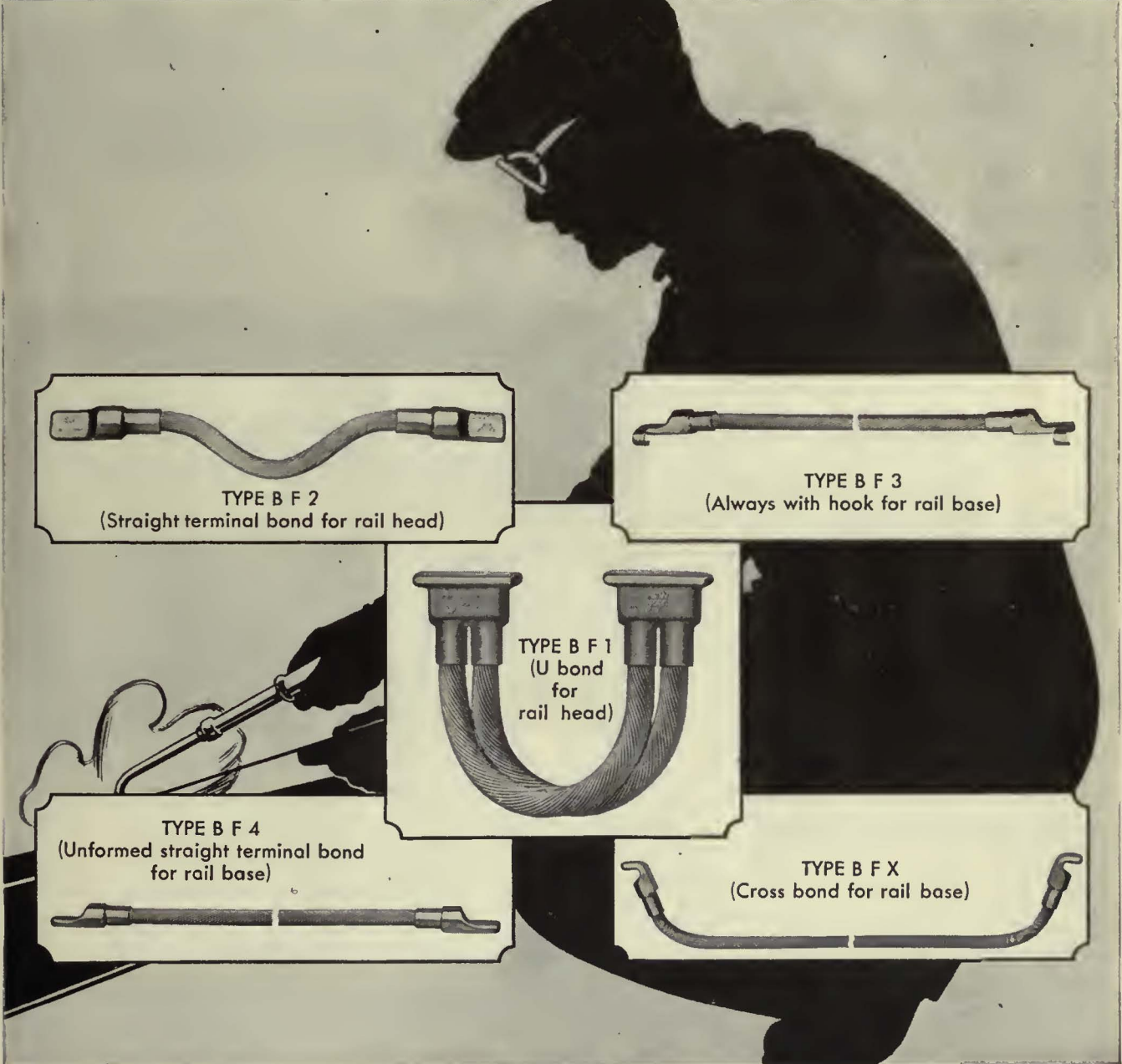
TIGER-WELD

FLASH-BUTT-WELDED

POWER BONDS

THIS latest and most significant advance in power bond design assures welding simplicity and economy never before realized—as well as higher resistance to vibratory stresses. By newly developed manufacturing methods, the wires are intimately flash butt-welded to solid soft steel terminals, making it easy for any welder to give you better installations at lower cost. Five types—adaptable to flame or arc welding—each bond stretch-tested to insure positive unity. Full particulars and samples on request. Address the nearest office.

A TRIUMPH IN PERFORMANCE AND ECONOMY



1831



1931

AMERICAN STEEL & WIRE COMPANY

208 South La Salle Street, Chicago

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

And All Principal Cities

Pacific Coast Distributors: Columbe Steel Company, Russ Building, San Francisco

Export Distributors: United States Steel Products Company, New York

ROY W. HOWARD

**Chairman of the Board
Scripps-Howard Newspapers**

● "The twenty-five Scripps-Howard newspapers are members of the Audit Bureau of Circulations because of their high regard for the Bureau's integrity and efficiency. The A. B. C. has provided the advertiser and his agent with the yardstick for intelligent buying of advertising space. The almost all inclusive membership in the Bureau is a tribute to the high standards of honesty prevailing in the publishing business."



ADOLPH S. OCHS

**Publisher
The New York Times**

● "The ABC of circulation is good—essential—as far as it goes; but there are twenty-three more letters in the alphabet of advertising, and knowledge of their application is also essential for the intelligent use of A. B. C. reports. 'All is not gold that glisteneth.' A printing press and a sheet of paper are not all that is necessary to make a newspaper, nor is the number of circulated copies the only information necessary to measure the value of newspaper space."



AS one of the leaders in American journalism puts it, "—nor is the number of circulated copies the only information necessary to measure the value of newspaper space."

An A. B. C. report is full of other information quite as important to the advertiser as the number of copies of the publication distributed. Men whose business it is to buy space should read every page of an A. B. C. report, for therein they will find answers to every question an advertiser wants answered. Only thus can

they judge whether or not the publication will meet the requirements demanded.

Advertisers, publishers and agencies are working to give the advertiser—for whom the service is planned—this only complete, accurate knowledge about a publication's circulation. The maintenance of the organization which makes these facts available is vital to every advertiser. To help support it costs each an insignificant sum as compared with what it saves each advertiser yearly.

Those publishers who have given freely verified circulation information should be encouraged to continue this most valuable contribution to advertising.

The advertisers in the United States and Canada, having profited by this action on the part of publishers, should give their support to the A. B. C. by becoming members and taking an active interest in its work.

Complete information regarding membership may be had upon request.



**An advertisement by the
AUDIT BUREAU OF CIRCULATIONS**

Executive Office · · · Chicago



“*Economy* and *Reliability*”...

Are teammates in this ERICO Brazed Bond. The first cost of these bonds is low—in line with today's markets. Application is rapid—15 to 20 bonds per hour—means the minimum amount of labor for each joint bonded. Economy extends to maintenance too, for the left lay concentric stranding of the bond cable means the longest bond life.

Brazed bonding methods produce uniformly reliable results. The entire application can be watched without the use of dark glasses—each step of the application is under constant check. Yet despite this low heat of application, the large area of welded contact offers ample resistance to forces tending to loosen the terminal from the rail and provides a welded contact of the lowest resistance.

Electric Railway Improvement Co.

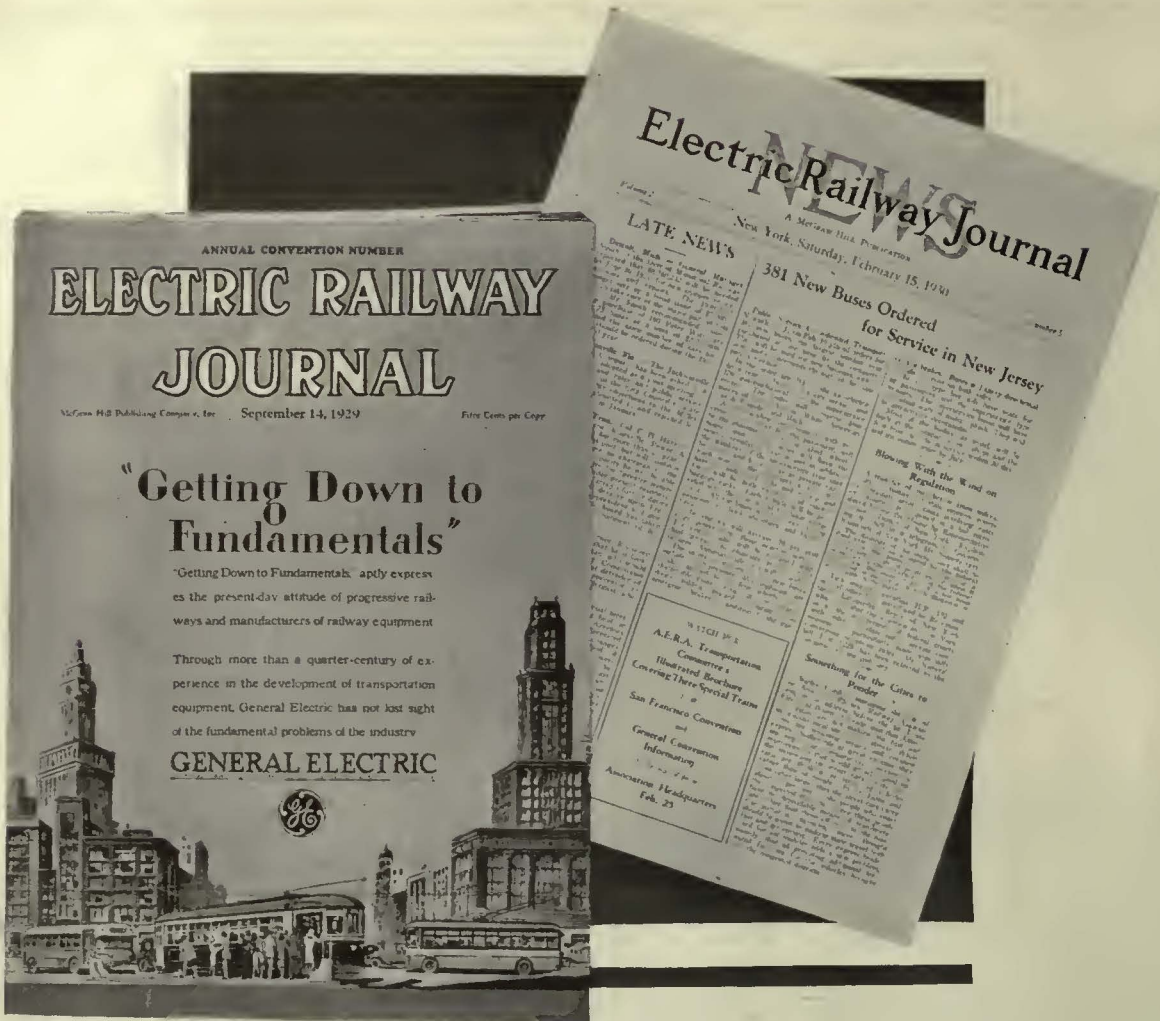
2070 East 61st Place, Cleveland, Ohio

For track areas
use

Brick Pavements

+
Improves your service and
lowers your costs
+

Write National Paving Brick Manufacturers Association,
1245 National Press Building, Washington, D.C., for data.



You need both— The Journal *plus* The News

THE monthly edition of *Electric Railway Journal* gives you comprehensive articles on changing trends, technical advances and broad problems facing the industry.

And the *E.R.J. News*—the newspaper of the field—presents terse, accurate news dispatches of fare changes . . . court decisions . . . financial and corporate notes . . . new legislation . . . association meetings . . . personal notes . . . all the vital news of the industry.

You need **BOTH** for a complete picture of the electric railway field. If you read only the monthly magazine, you miss the current news of the industry . . . accurate, vital, fresh . . . gathered by telegraph with newspaper

speed. If you read only the *News*, you don't receive the benefit of the interpretive editorials, the authoritative articles, the maintenance and operating data of the *Electric Railway Journal* monthly magazine.

Subscription price of the *E.R.J. News* is low—only \$2 for the complete year's service of thirty-nine issues (it appears on thirty-nine Saturdays during the year). Foreign rate, \$4 a year. Sold in combination with the monthly edition of *Electric Railway Journal* for \$5 a year domestic and \$9 foreign.

Send no money now. Simply fill out the coupon below—and mail it today! Give yourself a bird's-eye view of the entire electric railway field.

Just tear off,
fill in and
mail this
coupon today!

ELECTRIC RAILWAY JOURNAL
10th Ave. at 36th St., New York

Check
one:

- Enter my subscription to the *Electric Railway Journal NEWS* and send me a bill for \$2. (Foreign rate: \$4 year).
- Enter my subscription to both the *Electric Railway Journal* monthly magazine and the separate *NEWS* service. Bill me for \$5.

15 years without repair...



Subway car in use on the Interborough Rapid Transit System, New York. The J-M Truss Plate steel car flooring has been in service since 1916 without any repairs.

J-M Truss Plate has the advantage of light weight—great strength and stiffness—easy application to car frame—high thermal resistance—low maintenance cost.



J-M Truss Plate steel car floor-

ing has perfect record on Interborough Rapid Transit Test

J-M "Type A" Tile Flooring is a finished decorative flooring that is waterproof, resilient, acid proof and will outlast any other resilient type of floor covering. It is available in 9 different colors and several sizes and shapes.



IN 1916 the Interborough Rapid Transit System in New York City placed in operation the first car equipped with J-M Truss Plate steel car flooring. For fifteen years this car has been subjected to the heaviest passenger traffic in the world—and not one cent has been spent on the sub-flooring for repair. Today, hundreds of units have been installed in the subway cars of New York City.

J-M Truss Plate can be adapted to any type of underframe—it will give you the same satisfactory results on your equipment that the Interborough Rapid Transit System has experienced. Address Johns-Manville, 292 Madison Ave., New York.

Johns-Manville



Service to Transportation



Superb Stand, Typical of Jackson Lumber Company's
Dense Long Leaf Yellow Pine

DIXIE POLES ARE CUT FROM OUR OWN TIMBER

The outstanding superiority of Dixie Poles lies in our complete control of operation from tree to car.

With timber ownership sufficient to afford perpetual operation, Dixie products are marketed upon the policy of establishing and maintaining the highest standards in uniform excellence.

From this natural superiority in raw material, on through our comprehensive sorting plant, drying methods and certified inspection, we offer the trade the utmost in dependable quality, identified by the long established Dixie Trade Mark.



Selling Agents

ROBERT W. FORBES
Room 2845
Grand Central Terminal
New York City

F. B. MERRITT
Room 1560
First National Bank Bldg.
Detroit, Mich.

JACKSON LUMBER CO.

Manufacturers

Lockhart, Alabama

A CROSSETT WATZKE GATES INDUSTRY

CHOSEN for PERFORMANCE

TROLLEY wheels are never chosen for looks, never selected because one kind costs a little more or less than another. They're chosen for performance. That's why

KALAMAZOO



trolley wheels and harps are the standard of comparison today. That's why many properties use them exclusively. There's a difference in trolley wheels. May we tell you about it?

THE STAR BRASS WORKS

KALAMAZOO, MICHIGAN



UNION INTERLOCKING

Where Traffic Is Heaviest



“Union” Interlocking is constantly in demand the world over—wherever traffic is heavy and must be moved quickly. “Union” Interlocking gives a long life in service, a period free from petty problems of maintenance, has a compact design which permits many functions to be operated from one lever. Its simplicity and sturdy construction make it an important consideration in the economical and efficient functioning of any transit line. Specify “Union” Interlocking for long years of satisfactory service.



1881

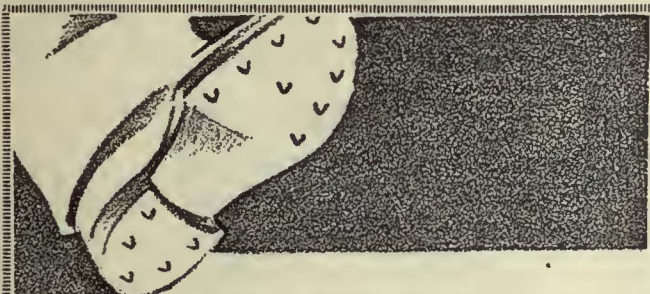


Union Switch & Signal Co.



1931

SWISSVALE, PA.



TUCOLITH

Long Wearing

Even the rough brogans of stamping workmen do not injure the hard, tough surface of Tucolith floors.

6 REASONS WHY

Tucolith is the popular flooring material for cars and busses.

- | | |
|---------------------|-------------------|
| 1. Long Life | 4. Fireproof |
| 2. Attractive | 5. Sound Deadence |
| 3. Non-Slip Surface | 6. Sanitary |

TUCO PRODUCTS CORP.
30 CHURCH ST., NEW YORK
PEOPLES GAS BLDG.,
122 S. MICHIGAN AVE., CHICAGO

Utility

Car
Heaters
fitted with

ENCLOSED HEATING elements carry the Underwriters' Laboratories Label. They give 100% energy output for what you put in.



CHROMALOX STRIP



NO. 10 REGULATOR
UTILITY HEAT
COMB VENTILATORS keep the
air pure and wholesome.

UTILITY HEAT
REGULATORS economize in current consumption.

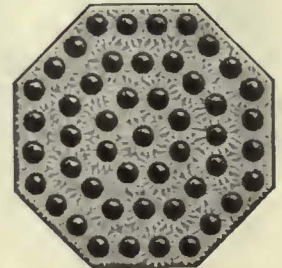
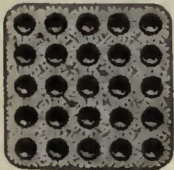
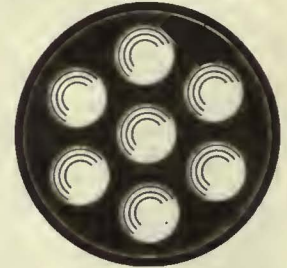
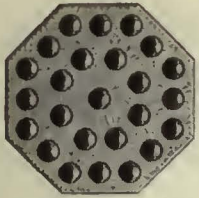
**RAILWAY UTILITY
COMPANY**

2241-47 Indiana Ave., Chicago
J. H. DENTON, Eastern Mgr.
1328 Broadway, New York



REFLEX SIGNS AND SYMBOLS

are used on steam and electric roads
advantageously



Crossing Signs; Switch Lamps; Bus Markers;
Safety Isle Markers, Etc.

They save you money

Ask for Bulletin 23-A

LOUISVILLE FROG, SWITCH & SIGNAL CO.
LOUISVILLE, KENTUCKY

COMMONWEALTH TRUCKS

"SWING MOTION TYPE"

**Structural
Simplicity
and
Strength**

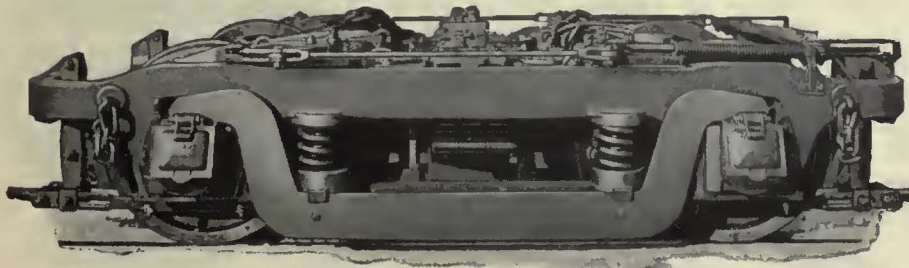
Commonwealth Trucks are backed by an engineering and designing skill of such high grade as to assure perfect products. They reduce noise. They eliminate to a great extent repair and maintenance costs. Their daily performance demonstrates why they are standard equipment on many railroad cars and locomotives.

GENERAL STEEL CASTINGS CORPORATION
GRANITE CITY, ILL. EDDYSTONE, PENNA.

Frame including
Cross Transoms
and Pedestals
an integral
steel casting



PEDESTALS MACHINED
INSURING PERFECT
ALIGNMENT

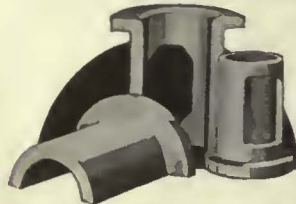


Write for full
information,
then make your
own
comparisons.

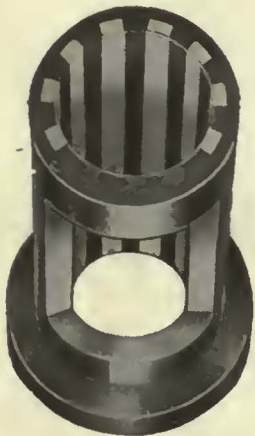
NATIONAL ELECTRIC RAILWAY SPECIALTIES



"More-Jones" Trolley
Wheels and Harps



"Tiger" Bronze Axle and
Armature Bearings



The "Vigne" Bimetallic
Armature Bearing



"Armature" Babbitt Metal

NATIONAL Bearing Metals Corporation

ST. LOUIS, MO.

New York, N. Y.
Meadville, Pa.

Jersey City, N. J.
Portsmouth, Va.

Pittsburgh, Pa.
St. Paul, Minn.

The
Continuous
Approval
Given These
PRODUCTS

tells the story of a long
and successful service
record.

∞

Our experience may
be of value to you.
Submit your problems
to us.

INTERNATIONAL Car and Bus REGISTERS

Give you more net profits

They are accurate, handsome and long lasting. When you standardize on them you eliminate errors, disputes and reduce fare losses to a minimum. *At small cost they bring large profits.* Write for catalog and our free trial offer.



INTERNATIONAL
REGISTER COMPANY
17 South Throop Street
CHICAGO

Glass does not age

After 40 years of known service glass insulators have been found entirely free from any signs of age or deterioration.



One of five good reasons for using Hemingray Glass Insulators. Get all the facts—write for our catalog.

HEMINGRAY

HEMINGRAY GLASS COMPANY
General Offices and Factory Muncie, Indiana

STOP
Car Turns Right

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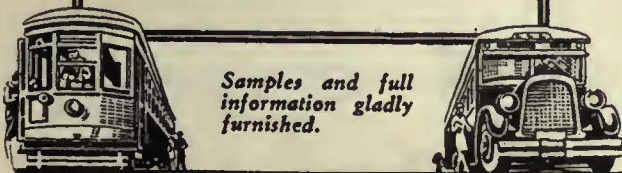
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in ample time so changes or
corrections may be made if
desired.

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brief, late news flashes for the electric railway industry



To supplement the service of the regular monthly issues of *Electric Railway Journal*, a separate NEWS service appears on thirty-nine Saturdays during the year. This supplement keeps you in touch with court decisions . . . fare increases . . . new ordinances . . . association meetings . . . financial statements . . . equipment purchases.

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FOR EVERY
BUSINESS WANT

"Think Searchlight First"

G-3

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STEEL POLES

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for the cactus country . . .

but we make a
**SPECIAL
GASOLINE
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In developing this gasoline, Socony Engineers considered the climate, the temperatures, the hills and roads of Soconyland, and *only* Soconyland. They tested this gasoline—and *proved* it—in a fleet of Socony Test Cars traveling from the tip of Maine to the toe of Long Island—under the same operating conditions you *yourself* encounter.

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It's *your* gasoline—"tailor-made" for just you!

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STANDARD OIL COMPANY OF NEW YORK

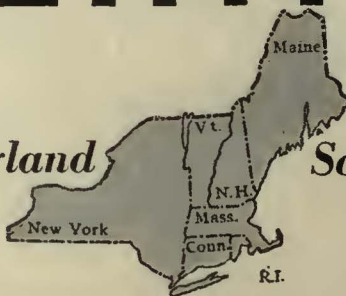


SOCONY SPECIAL

plus **ETHYL**



"Tailor-made" for Soconyland



Socony is "Standard"

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Chicago continues to show confidence in

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136 ELECTRIC-DRIVE BUSES OPERATE FOR 30 CENTS PER BUS MILE



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Power	4.50
Operation	10.74*
Traffic	0.08
General and Misc.	
Including Depreciation	6.28
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*Employees of this company are among the highest-paid in the industry

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390-75

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