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ELECTRIC RAILWAY JOURNAL



Public Service purchases 50 more WHITE BUSES

Electric railways continue to show their preference for White Bus equipment for co-ordination with rail service. The Public Service Transportation Co., of Newark, N. J., has just placed an order for 50 more White Model 50-A busses of the pay-enter type to be used in city service. This purchase gives the Public Service Transportation Co. a total of 144 White Busses.

Numerous other electric railways in all sections of the country have profitably co-ordinated bus and rail transportation. The outstanding preference for White equipment is shown by the fact that 37 electric lines are now using 783 White Busses in fleets of five or more. According to a survey made by A.E.R.A. 42 per cent of all the busses operated by electric railways are Whites.

THE WHITE COMPANY
Cleveland

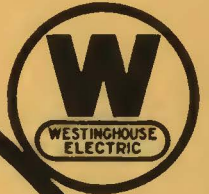
WHITE BUSES

Contributions to Electrification During 1924



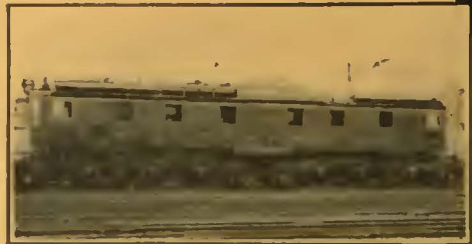
Norfolk & Western Railway.

The Norfolk & Western Railway extended its electrified zone 20 miles during 1924, and placed orders for a further extension of 48 route miles. Four new 414-ton, 4750 hp., 11,000 volts, A-C. Locomotives, consisting of two motive-power units, are now being placed in service.



Pennsylvania Railroad

204.3-ton, 3300 hp., 11,000 volt, A-C. Locomotive. The Pennsylvania Railroad has placed in service three new electric locomotives. Two of these are operating in passenger service on the New York Division, and the third in freight service on the Philadelphia electrified zone.



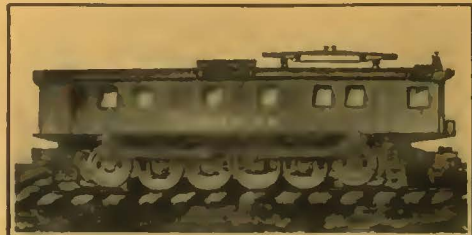
New York, New Haven & Hartford R. R.

179-ton, 2508 hp., A-C. Passenger Locomotive. To maintain 100% electric service, between New York and New Haven, the N. Y., N. H. & H. R. R. received during 1924 twelve high-speed passenger locomotives. Further extensions to their electrified zone are under way.



Long Island Railroad

54.5-ton, 430 hp., Multiple-Unit Cars. In order to more efficiently handle New York's heavy suburban traffic, The Long Island R. R. is extending its electrification to Babylon, L. I., a distance of approximately twenty miles. Forty additional multiple-unit equipments are on order.



Virginian Railway

The thirty-six, 200-ton, Alternating-Current Motive-Power Units, for operation over the 213 route miles of the Virginian Railways Electrification, are nearing completion. Electric operation will be inaugurated during the coming year.



Detroit & Ironton Railroad

340-ton, 4200 hp., 22,000-volt, Alternating-Current Locomotive. The Motor-Generator Locomotives, a new development in electric-motive power, now under construction at the Ford Motor Company's plant for the Detroit & Ironton Electrification, are expected to be placed in operation the early part of this year.

Westinghouse Electric & Manufacturing Company.
East Pittsburgh, Pennsylvania
Sales Offices in All Principal Cities of the
United States and Foreign Countries.

Westinghouse

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ELECTRIC RAILWAY JOURNAL

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Associate Editor

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Not Decorating but Working

A SHORT while ago, when visiting a prominent electric railway man, a representative of this paper had to wait a few minutes in the reception room. Naturally he looked at the magazines neatly displayed on the table. He was somewhat surprised to find that ELECTRIC RAILWAY JOURNAL was not among them, although most of the other engineering and trade papers were there.

On entering the private office the reason was at once apparent. A table was piled high with files of the most used publications. Among them was the JOURNAL, and the current issue lay on the railway man's desk, open, giving mute evidence of its use as part of his working equipment. A few moments conversation showed that he was thoroughly familiar with the recent happenings in the field as published in the JOURNAL.

The paper was doing its double duty—first, as a chronicle of the latest news; and second, as a working tool for supplying needed technical information.

McGraw-Hill Company, Inc., Tenth Ave. at 36th St., New York

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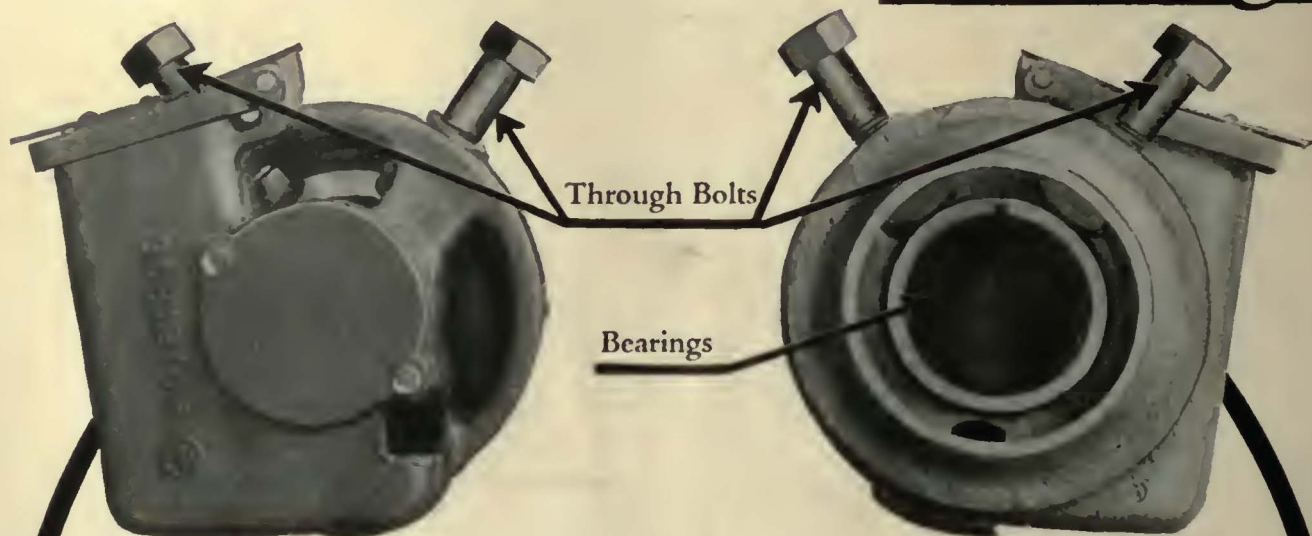
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The annual subscription rate is \$4 in the United States, Canada, Mexico, Alaska, Hawaii, Philippines, Porto Rico, Canal Zone, Honduras, Cuba, Nicaragua, Peru, Colombia, Bolivia, Dominican Republic, Panama, El Salvador, Argentina, Brazil, Spain, Uruguay, Costa Rica, Ecuador, Guatemala and Paraguay. Extra foreign postage to other countries \$3 (total \$7 or \$9 shillings). Subscriptions may be sent to the New York office or to the London office. Single copies, postage prepaid to any part of the world, 30 cents.
Change of Address—When change of address is ordered the new and the old address must be given, notice to be received at least ten days before the change takes place.
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Published weekly. Entered as second-class matter, June 23, 1909, at the Post Office at New York, under the Act of March 3, 1879. Printed in U.S.A.

Railway

Renewal

Housings



Westinghouse Renewal Housings, which embody most of the characteristics found in the housings of modern Westinghouse Railway Motors, have been developed for many of the older types of Motors.

Be sure that the Renewal Housings you buy embody the following points:

**Through Bolts—Proper Bearing Fit—
Material which may be easily repaired.**

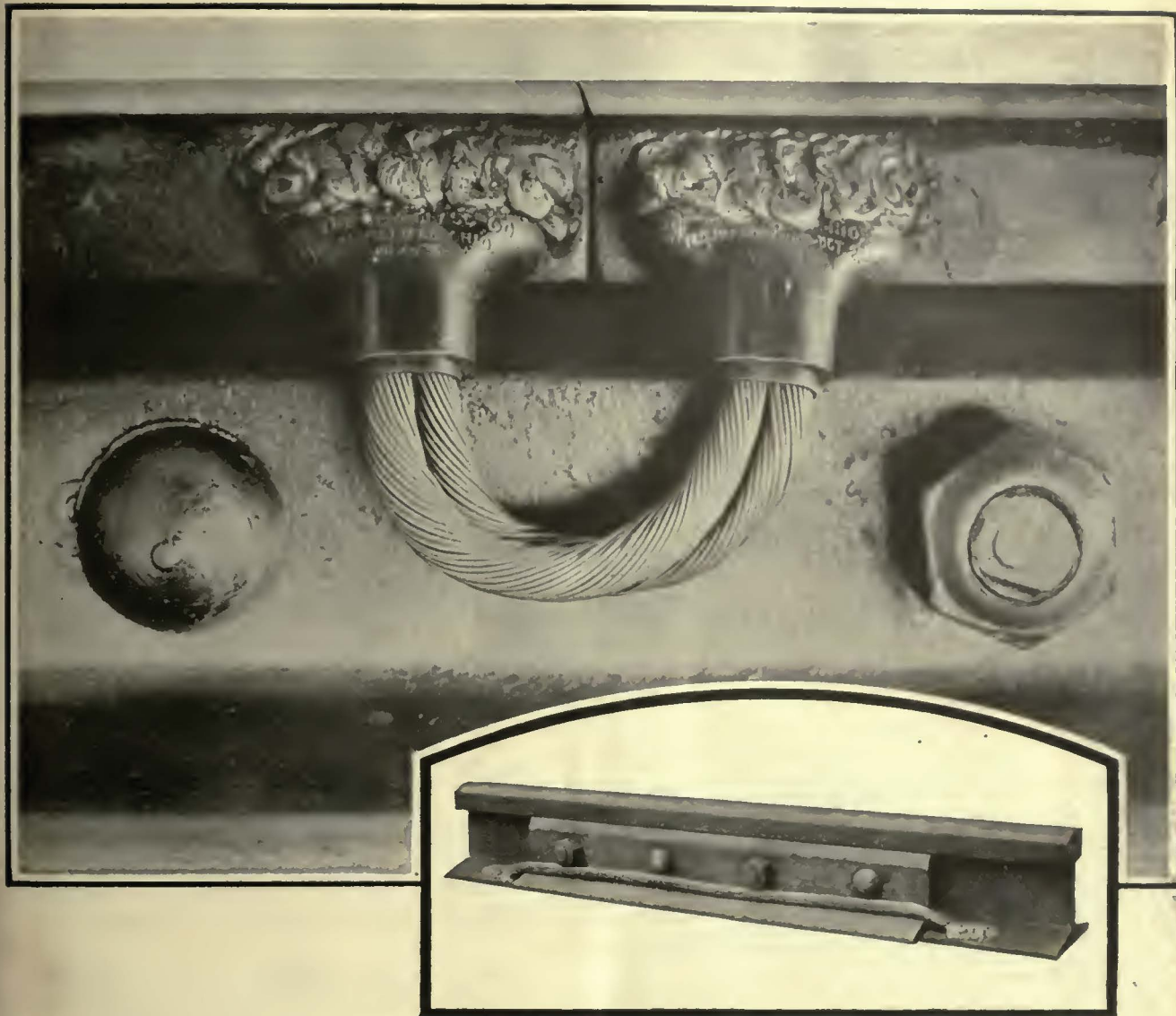
Cast-Steel Housings are the best. Malleable Iron has very good wearing qualities.

Both standard and over-size housings can be furnished: Standard size for unworn frame fits. Over-size for worn frame fits which must be bored out.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of the
United States and Foreign Countries.



Westinghouse



Give Confidence to the Welder

O-B Arc Weld Bonds give confidence to the welder because he quickly learns how easy they are to weld—*steel* terminal to *steel* rail with *steel* welding rod. This confidence and ease of application insure a high percentage of 100% joints.

The Ohio Brass Co.
Mansfield, Ohio

B
PRODUCTS



Economy—

the prevention of loss through theft and vandalism — prompts you to fence your property. Why not get the maximum economy by installing Cyclone "Galv-After" Chain Link Fence? Lasts years longer. Provides economical, enduring protection for power plants, rights-of-way, storage yards, car barns. Effectively safeguards the would-be trespasser. Specially built in removable panels for transformer station enclosures.

We also manufacture Iron Fence for industrial uses. Appropriate designs for intertrack, park and other property fencing.

Write nearest offices for complete information.

CYCLONE FENCE COMPANY

Factories and Offices:

Waukegan, Ill.	Cleveland, O.
Newark, N. J.	Fort Worth, Tex.

Western Distributors:

Standard Fence Co., Oakland, Calif.
Northwest Fence & Wire Works, Portland, Ore.

The Mark of Quality

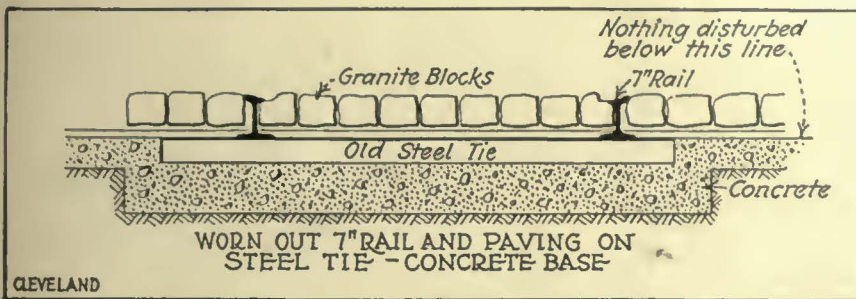


Fence and Service

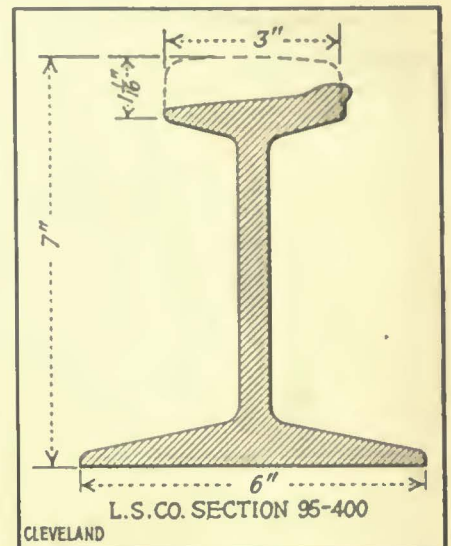
Cyclone Fence

"Galv-After" Chain Link

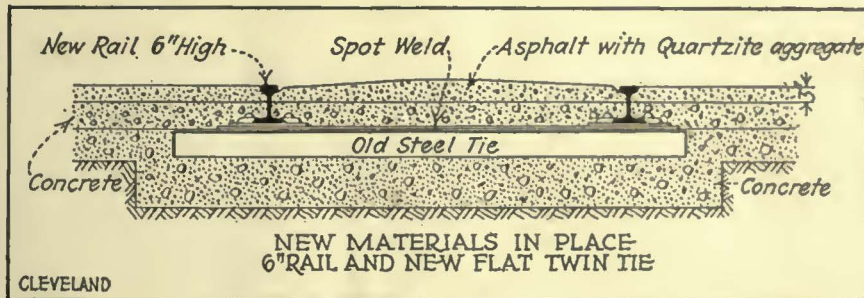
PROPERTY • PROTECTION • PAYS



Cross Section Showing Details of Track Construction on Euclid Avenue, Cleveland. Rail Worn Out, Concrete Base Still in Good Condition.



Cross Section of Rail on Euclid Ave., Cleveland, Showing Wear on Ball of Rail



Details of method of Replacing Rail on Old Concrete Base, Using Special Flat Steel Twin Ties.

Low Cost Construction that Outlasts the Rail

The most startling development in track construction for paved streets has been successfully worked out during the past two years in the renewal of rail and paving on a Steel Tie Concrete Base.

Planning your new paved track for renewal by using Steel Twin Tie Construction will require no large investment in initial cost. Our definite cost records for 1924 show costs as low as \$8.35 per single track foot for the track complete, including removal of the old construction and concrete paving surface.

For conservative-minded executives who have questioned the comparative life of concrete construction there is a complete answer in the reconstruction of such track at the end of a satisfactory rail life in Cleveland and elsewhere.

In planning 1925 paved track construction investigate the low cost paved track construction that outlasts the rail with all assurance that asking us to present all the data by personal call or in the mail will involve no persistent or annoying solicitation.

The International Steel Tie Co., Cleveland, Ohio

Steel Twin Tie Track

Renewable Track . . . Permanent Foundation

→ Before you buy **POLES** — See **Weyerhaeuser** ←

A Pole Selling Policy That May Fit Your *Buying* Needs

WHEN Weyerhaeuser enlarged its pole service it wasn't the intention to scoop up orders as fast as stocks accumulated. That is not the way Weyerhaeuser does business.

The Weyerhaeuser policy has always been to take good care of a group of permanent customers, to ascertain their needs and to meet their requirements as they arise.

Weyerhaeuser men do not claim to make all the good poles. However, this organization does maintain a high standard in the selection of pole timber which results in uniformly good poles. Timber not meeting this standard goes to the saw mill where it is cut into material for which it is suited.

Weyerhaeuser poles formerly sold through jobbers are now being marketed direct to users as announced a short time ago in this publication. A clientele of permanent customers is being built up. Quite a few pole users say our policies and service are just what they have been looking for. Perhaps you will feel as they do. The next time you are in the market for treated or untreated poles or piling give this specialized service a tryout. Prices by mail or wire.

WEYERHAEUSER SALES COMPANY

Distributors of

WEYERHAEUSER FOREST PRODUCTS

General Offices: SPOKANE, WASHINGTON

Branch Offices

ST. PAUL CHICAGO BALTIMORE NEW YORK
2694 University Ave. 208 S. La Salle St. 812 Lexington Bldg. 220 Broadway

F. H. Burke, Chicago Office, Manager of Cedar Pole Sales
R. L. Bayne, Spokane Office, Manager of Cedar Pole Service

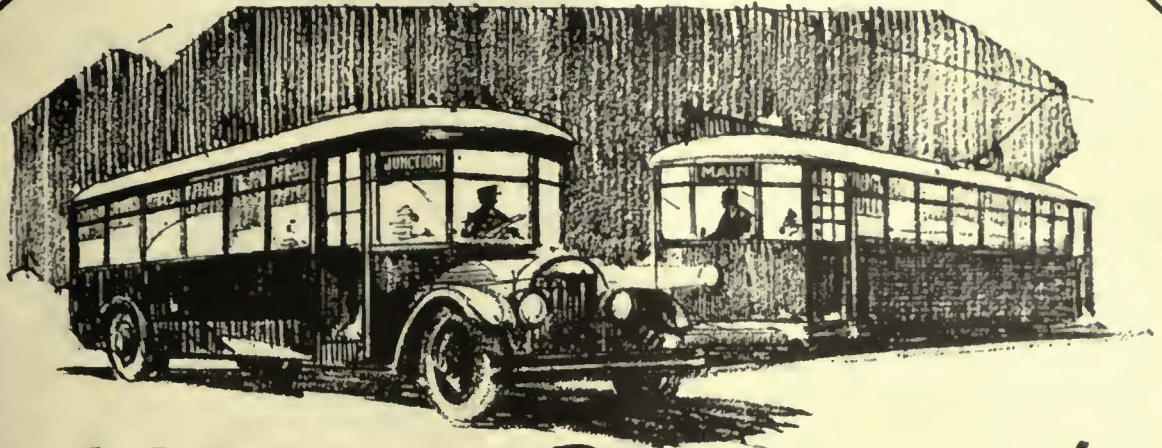


Weyerhaeuser Idaho Red Cedar Poles in the lines of the Beloit Water, Gas and Electric Company, Beloit, Wisconsin



Weyerhaeuser Idaho Red Cedar Poles





Well lighted Buses — also!

Lessons learned from street car operation apply to buses too. You've found that the brightly lighted trolley car attracts and satisfies patrons. Same thing applies to buses. Patrons won't ride in the dark. You can't expect them to be satisfied with dim and flickering toy lights.

Brightly lighted buses, where reading can be done in comfort will attract more traffic.

The famous Keystone Line includes



BUS LIGHTING FIXTURES



These fixtures enjoy a high-standing with leading bus manufacturers and operators. They are built around the standard Mazda C 21 c.p. lamp. It is up-

to-date, efficient and thoroughly satisfactory. Two leading models illustrated, one for street car type buses, the other for low head-room deluxe type coaches.

ELECTRIC SERVICE SUPPLIES Co.

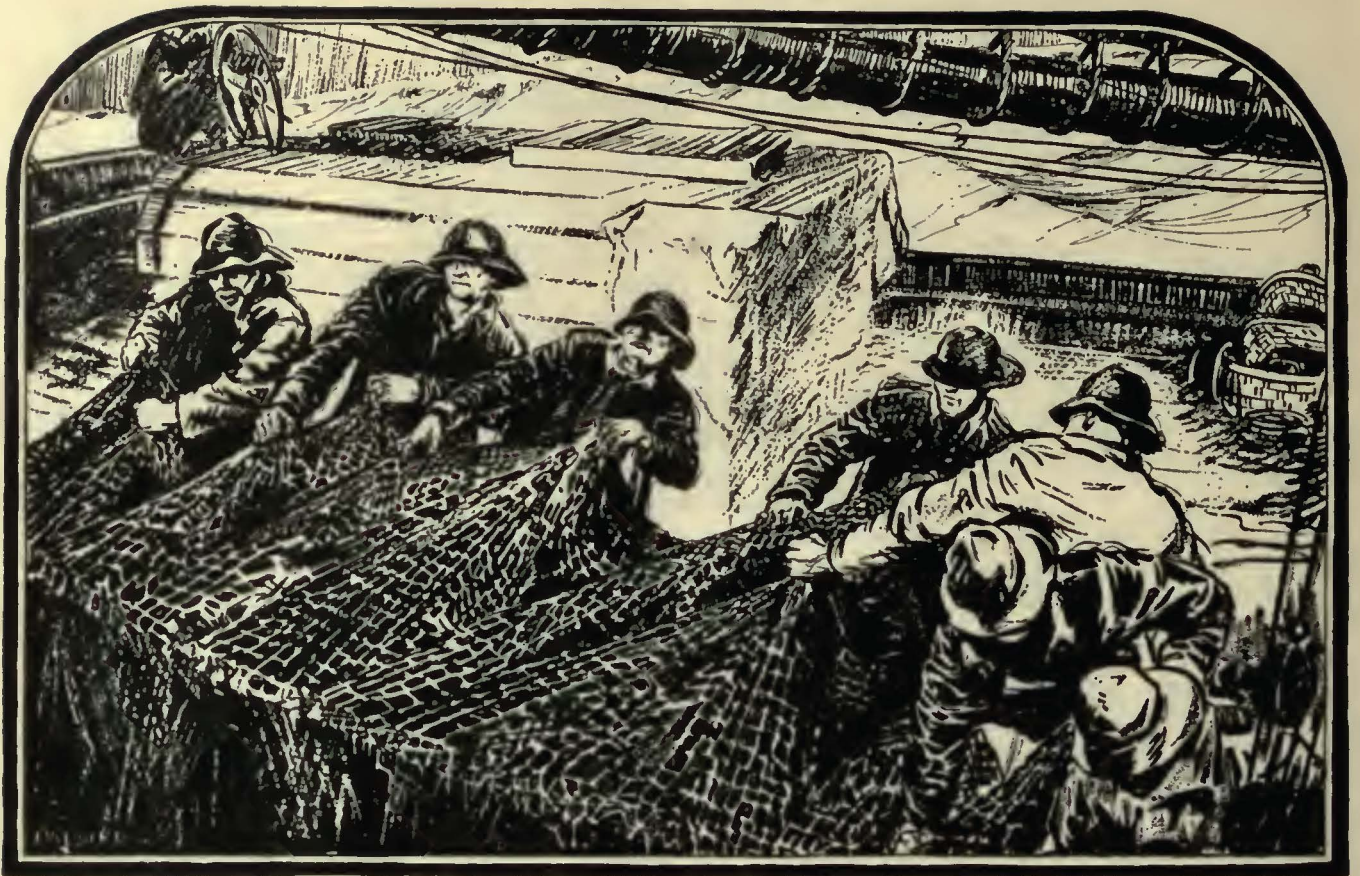
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17th and Cambria Sts.
PITTSBURGH
829 Oliver Building

NEW YORK
50 Church St.
SCRANTON
316 N. Washington Ave.

CHICAGO
Monadnock Bldg.
BOSTON
88 Broad St.

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver





Comradeship of Purpose

BEHIND each major industry are its supporting industries. Great businesses founded for vital service. Like the foundations of imposing buildings—out of sight, perhaps, but underlying and supporting the main structure.

The car-building and car-repairing industry represents one great pillar supporting the railroads. Acres, miles and millions are involved. The work is carried on in a hundred different centers—strategically located. The plants cover thousands of acres. The bare investment in buildings and equipment is many millions of dollars. The men employed number more than one hundred thousand.

All this for one result: the ability to deliver within one year four hundred thousand new and rebuilt freight cars, plus thousands of other cars for passenger

trains and other thousands for electric railways.

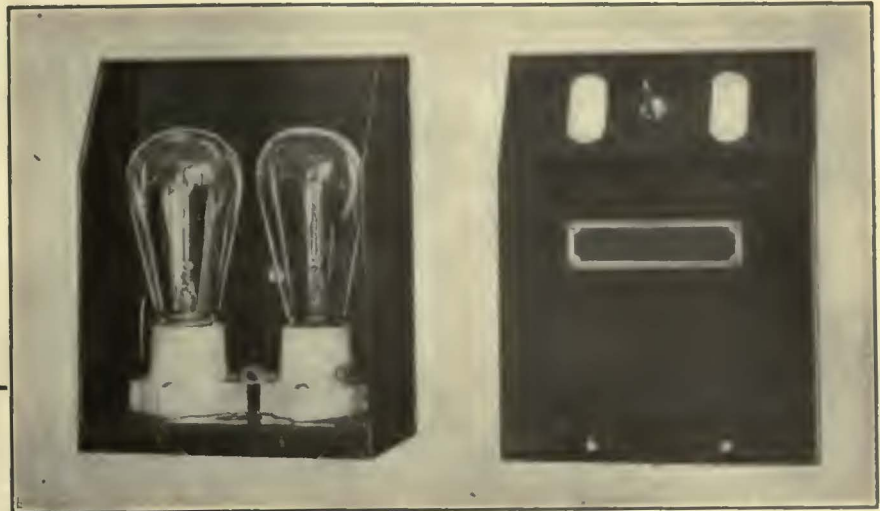
A tremendous industry created to fill the needs of the railroads. Growing with the railroads. Refining and improving its equipment and procedures in the interest of greater economy.

From the beginning this supporting industry has relieved the railroads from diverting transportation minds and money into manufacturing enterprises.

Now the car builders and car repairers have buttressed their supporting position. They are ready for the additional task of tomorrow—rebuilding the steel cars which time has marked. They are ready with man-power, with equipment and with capital. Therefore the railroads need not swerve from the task of furnishing transportation—work which they alone can do.



"Comradeship of Purpose" is one of a series of advertisements being published by the Railway Car Manufacturers' Association with the expectation that the facts they present will be mutually serviceable to the railroads and to their supporting industries.



An Improved Type of
Motorman's Signal Light
It tells the traffic officer, also!

Here is a cab signal light which informs the "traffic cop" on the crossing as well as the motorman, when the doors are closed and car is ready to start. Secures traffic co-operation to prevent unnecessary delays. The box is installed so that holes in back of box come just above the window ledge, and the light shines out in front.

Every improvement included. There is an adjustable dimmer which protects the motorman from glare at night. Duplicate lamps provide against failure through burnouts.

You need this kind of time-saving equipment on modern city cars.

Write for full details.

National Pneumatic Company, Inc.

Originators and Manufacturers

EXECUTIVE OFFICE: 50 Church St., NEW YORK

Philadelphia—1010 Colonial Trust Bldg.

Chicago—940 McCormick Bldg.

General Works—Rahway, New Jersey

Manufactured in Canada by

Dominion Wheel & Foundries, Ltd., Toronto, Ont.

**NATIONAL
 PNEUMATIC
 EQUIPMENT**

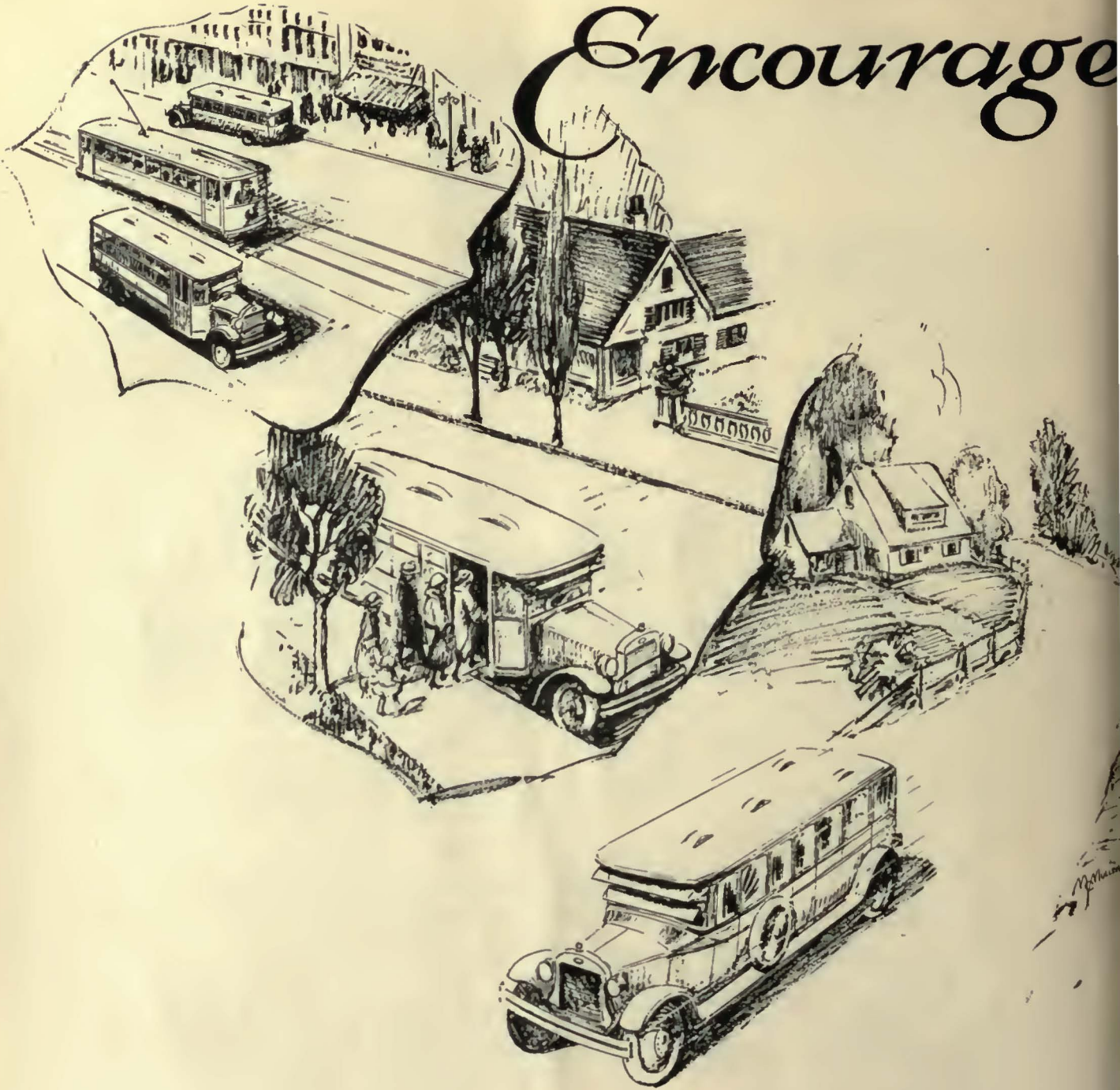
DOOR ENGINES

DOOR AND STEP
 CONTROL

OPERATING
 MECHANISMS

MOTORMAN'S
 SIGNAL LIGHTS

Encourage




 1900 1925
 For a full quarter
 century Mack interests
 have been centered
 on the
 manufacture of
 transport vehicles

the riding habit with Mack Buses

Take the case of Smith, a farmer living five miles from town!

Or of Mrs. Brown living in an exclusive suburb!

Or of any man or woman faced with the problem of "getting aboard" at a crowded city terminal!

To each of them daily transportation has become a serious personal problem. And they travel just as infrequently as possible.

Yet they are all prospective patrons for a speedy, comfortable Mack Bus service.

Mrs. Brown and Smith are among the hundreds who would travel to town more frequently on suburban or interurban buses connecting with car lines.

Mack Buses stopping right at the doors of such people will bring them more often to the shopping centers—or to the car terminals.

Mack Buses on a local schedule supplementing

ordinary or express car service net big profits from short haul riders.

The highest degree of mechanical efficiency is found on all Mack Buses.

Chassis frame, including clutch, transmission, and engine floats on eight cushions of live resilient rubber in which the long flexible springs are embedded.

The long wheelbase assures ease of riding and the wide front axle insures stability and permits of short turns. Dual reduction rear axle is strictly a bus axle, designed to give maximum ground and underbody clearance with straight-line transmission.

Mack Bus engineers will explain the rest and assist in working out your operating plans.

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 BROADWAY NEW YORK CITY

Eighty-three direct MACK factory branches operate under the titles of: "MACK MOTOR TRUCK COMPANY" and "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION."

The Mack Bus



Sedan Type Bus

Performance counts!



2045 Variable Load Brakes

The Westinghouse Variable Load Brake has now been applied to 2045 surface cars by 14 different street railway companies.

It has filled a definite need for adequate control of modern light-weight cars, by providing for uniform retardation under widely varying load conditions.

The consistently short stops which it makes possible, means a saving in time that reflects itself in longer periods of peak-speed operation, and a general speeding up of traffic movement.

The Variable Load Brake will increase the earning capacity of your rolling stock.

Westinghouse
Variable Load
Brakes are in use on
14 prominent railway
properties.



WESTINGHOUSE TRACTION BRAKE CO.

General Office and Works: WILMERDING, PA.

WESTINGHOUSE TRACTION BRAKES



Station CCH Broadcasting CAR SIGNALING DEVICES

This is station CCH the Consolidated Car Heating Company broadcasting direct from its factory at Albany.

Specify Consolidated and Be Sure

WHEN it comes to the latest and best in car-signaling equipment, come to Consolidated.

For years, Consolidated High Voltage Systems have been blazing the trail toward better service. Consolidated was the first in the field to institute and develop a high-voltage buzzer system. Gone is the old bell cord, pulled by hand and the make-shift dry-battery bell system.

Consolidated co-ordinated car signaling systems stand for the ideal method. Buzzers,

single-stroke bells, push buttons, motorman's signal lights and accessory equipment such as resistances, fuse boxes, etc. The latest Consolidated development is the combination in one small compact box of the interrupter, the resistance, and the fuse used in the high-voltage buzzer system.

Specify Consolidated and be sure!

Station CCH now signing off until next week, when it will resume the broadcasting of its regular weekly programs.

Good day!



CONSOLIDATED CAR HEATING COMPANY
ALBANY, N. Y.

HASKELITE

the



A year ago Pittsburgh Railways put in service forty new cars using HASKELITE for headlinings. Twenty five more cars also using complete HASKELITE linings were built during the year. Work has just started on 225 more cars of this type. The new type gives a clean white coal main

Pittsburgh Repeats on HASKELITE for HEADLINING

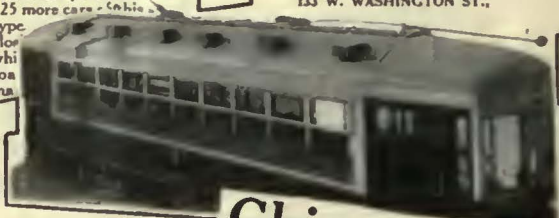
This and many other prominent car companies throughout the country have found in HASKELITE the ideal construction material.

HASKELITE MANUFACTURING CORPORATION
133 W. WASHINGTON ST., CHICAGO, ILL.



HASKELITE ROOFS

on Detroit Municipal Light Weight Cars
Built by New and Better Method



Chicago Surface Lines

have placed orders for 103 cars to be equipped with

HASKELITE ROOFS

Clippings from several of the advertisements which appeared in this Journal during the year 1924.

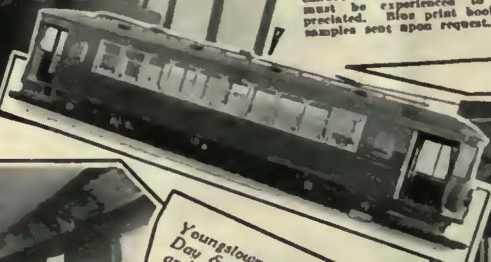


The new cars built by J. G. Bell Co. for the York Railways, operated by Day & Zimmermann, Inc., are typical of what is possible through the use of these superior materials. Note the absence of headlinings and the handsome exterior wall linings, the handsome exterior and interior. The big improvement in operating and maintenance costs must be experienced to be appreciated. Also print booklet and samples sent upon request.

HASKELITE

Headlinings again specified

Milwaukee Electric Railway and Light Co. places in service 35 new cars built by St. Louis Car Co. with Haskelite headlinings and interior trim.



Youngstown and Suburban Railway operated by Day & Zimmermann, Inc. use HASKELITE roofs and PLYMETL sides without head linings or side linings. Cars built by G. C. Kuhlman Car Company.

HASKELITE



and **PLYMETL**

Outstanding Construction Materials in 1924

Important Users of HASKELITE and PLYMETL in 1924

City of Detroit,
Dept. of Street Railways,
Detroit, Michigan.

50 HASKELITE roofs.

Pittsburgh Railways,
Pittsburgh, Pa.

225 cars with HASKELITE headlinings.

Chicago Surface Lines,
Chicago, Illinois.

103 cars with HASKELITE roofs and bulkheads.

Municipal Railways of San Francisco,
San Francisco, Calif.

HASKELITE roofs.

Milwaukee Elec. Ry. & Light Co.,
Milwaukee, Wis.

35 cars with HASKELITE headlinings and interior trim.

Cataluna Railways,
Barcelona, Spain.

PLYMETL sides.

Denver Tramways,
Denver, Colo.

HASKELITE exterior side panels and letter boards.

Twin City Rapid Transit Co.,
Minneapolis, Minn.

HASKELITE headlinings, interior linings and outside panels.

Columbus, Newark & Zanesville
Elec. Co.,

Day & Zimmerman, Inc., operators, Zanesville, O.
20 cars with HASKELITE roofs and PLYMETL sides.

York Railways.

Day & Zimmerman, Inc., Operators, York, Penna.
5 cars HASKELITE roofs and PLYMETL sides.

Duluth Street Railways,
Duluth, Minn.

HASKELITE headlinings roofs and interior and exterior side panels.

Los Angeles Street Railway,
Los Angeles, Calif.

60 cars with PLYMETL sides.

Detroit United Railways,
Detroit, Michigan.

20 city cars with PLYMETL sides.
10 interurban cars with PLYMETL sides and HASKELITE roofs.

United Traction Co.,
Albany, N. Y.

4 trackless trolley cars with PLYMETL sides.

Illinois Traction System,
Chicago, Illinois.

17 cars with HASKELITE roofs, floors and truss planks.

THE YEAR 1924 was marked by an extensive program of new construction over the country generally, and by considerable advance in features of design and construction making for lowering of maintenance and operating costs, and increasing passenger comfort. The "light weight" idea took great strides forward, being established as the aim of car designers and builders quite generally. A large share of the development of the car of today, and tomorrow, comes about through the use of HASKELITE and PLYMETL. These materials are becoming standard materials in the street car and bus body field, with a larger number of builders and operators every year. Their unusual characteristics of light weight and great strength have made them the choice of progressive engineers and have actually resulted in the development of a new form of construction. The progress made by HASKELITE and PLYMETL as construction materials in the street car field was demonstrated in the Atlantic City exhibit when fully 80% of the street cars and buses on exhibition had HASKELITE products. It is not too much to say that this year will see an increasing number of HASKELITE and PLYMETL cars placed in service.

An interesting and valuable booklet of blue prints and engineering data on the methods and advantages of using HASKELITE and PLYMETL will be available to every interested car builder or operator. May we send your copy today?

HASKELITE

MANUFACTURING CORPORATION

133 W. Washington, St., Chicago, Ill.



Your Text Book on Equipment Standards



General Electric Company
Schenectady, N. Y.
Sales Offices in all Large Cities



They help you save

Why not duplicate the armature insulation put in new G-E Motors by the winders in the factory?

You can do it exactly with G-E ready-to-use Insulations. They come cut to fit, just enough in a package for one motor.

This saves your winder's time for cutting—avoids waste—is very convenient—and guarantees original quality of insulation in making repairs.

Many other short-cuts to economy are found in your G-E Catalog. Use it constantly.

GENERAL ELECTRIC

New York, Saturday, January 10, 1925

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HARRY L. BROWN, *Editor*

Volume 65
Number 2

Municipal Subways Not Favored at Transit Hearings

NEW YORK'S transit inquiry ended with the testimony of Mr. McAneny of the Transit Commission last Thursday. Judge McAvoy, who has been conducting the case as the representative of the Governor, retires with several trunk loads of testimony and exhibits to try to fix the responsibility for seven years of delay in providing more rapid transit facilities. While there is no real reason for prejudging the case, several things do stand out in bold relief. Hylan proved himself to be even more impossible on the stand than he does as Mayor. On the other hand, Comptroller Craig showed the real grasp that he has of the questions affecting the finances of the city. Public necessity apparently compels him to sit with the Mayor on the handling of city matters, but he doesn't relish the association. That is quite plain. If there was a star witness at the hearing it was he. Even Counsel Sherman couldn't hold him in check. He quite ran away with Mr. Sherman on several occasions. Mayor Hylan caused a laugh because he knew so little; Mr. Craig caused a laugh because he knew so much.

The inquiry did not bring out anything startlingly new in the way of evidence. It did, however, accomplish a great public service in that it made more clear to the public some of the principal reasons for the traffic crowding in the New York subways. It also showed the futility as a remedial measure of Mayor Hylan's proposed independent subway system to be municipally owned and operated.

The present-day high cost of building subways was strongly emphasized in much of the testimony presented. The figures given in this connection confirm those printed in this paper at the time the routes of the proposed municipal subway were announced about a month ago, namely, that subway construction costs have more than doubled during the last 15 years. An estimate was given at the hearing by Commissioner Harkness that even with traffic as dense as that on the present subway lines, a fare of 8.45 cents would be required to make the undertaking self-supporting with this higher investment cost and greater fixed charges necessary. Commissioner O'Ryan, the following day, expressed the belief that the fare would have to be 10 cents. These statements must have been sad news to the Mayor, because the State law empowering the city to operate rapid transit lines definitely directs that after the first three years of operation the fare must be such as to pay interest and sinking fund charges on the investment, besides the cost of operation and other expenses.

Finally, Comptroller Craig, in other testimony this week, said the city had nowhere near enough margin over its constitutional borrowing limit to build a subway and that the suggestion that the construction might

be paid for in part by local assessment bonds was impracticable, even if such bonds could be issued constitutionally. In his opinion this could not be done. Other testimony clearly places the blame for the overcrowded conditions on the present municipal officials for their refusal to approve necessary extensions or appropriate money to build adequate shop facilities to keep the equipment in good condition.

Altogether the result of the hearing so far has been still further to discredit the municipal subway plan as a relief for present conditions.

Retaining Essential Transit Facilities

THE abandonment of various unprofitable electric railway lines in the past few years does not mean that there is no demand for them. In nearly every case citizens have voiced their opposition to cessation of service, and the step has been taken in spite of their protests. The reason for abandonment has been that an insufficient number of such persons have patronized the railways to let them earn their expenses.

Coupled with the small amount of traffic there have been various restrictions imposed by the municipalities through which the lines ran, as well as taxes of every sort and description that could be levied on the properties.

A law enacted in Massachusetts some years ago, but not invoked until last March, permits the communities themselves to acquire and operate such unprofitable lines through public trusteeships. In the article in this issue on publicly-owned transportation areas, it will be seen that some bankrupted electric railways have not been allowed to fall wholly into the hands of the junk man. Towns like Greenfield with 15,500 inhabitants, Montague City with 7,600 and Athol with 10,000 have lately taken advantage of the transportation area statute of 1920 by purchasing as much of the bankrupted local railways as was suited to their needs.

Inasmuch as these properties were acquired on "actual value at the time of appraisal and not on the cost of replacement," the investment in each instance is so small that the expense of running the properties could be made less than the cost of an equivalent motor-bus service. Operation also was simplified through the purchase of power. Taxes are sure to be less.

In spite of these advantages, it is not to be taken for granted that operation will be profitable. The traffic in Greenfield, for instance, is only one-third of what it was in 1917. The causes for the decrease include higher fares in a community where most people can walk, the great increase in private automobiles and a more exact-

ing demand for shorter headways and higher speed service than that which the railway had been providing.

Since the trustees have started with the same fares and service as the predecessor company, it is obvious that they are not banking on a return to old riding habits. The action of the citizens in voting to buy and continue the operation of the most essential portions of the electric railways in their territory can have only one meaning—that although the private automobile may decrease riding to an extent which makes operation for profit impossible, there is still sufficient need for a public utility system to provide a dependable means of transport throughout the day and most of the night for those who have no personal vehicles available. These long-headed New Englanders realized that their towns would suffer in business, pleasure and general civic activities if the woman who wanted to shop, the boy who wanted to go to the films and the elderly woman who wanted to go to the sewing circle were deterred from doing so because someone else in the family was out with the "car." Their example in establishing these transportation areas may well be cited by the harassed operator as proof that, in spite of millions of privately owned Fords, public transport systems are still a necessity.

Operating Men Realize Their Obligations More Clearly than Do the Bankers

ALTHOUGH the phrase "moral obligation to render service" is still distasteful to some of the older generation of railway men, the importance of fulfilling this obligation is clearly recognized by a large majority of the managements. The financial interests connected with the railways, however, do not always see the value of this policy and are sometimes inclined to condemn those phases of railway operation which do not show a direct profit.

However reasonable this attitude may have been years ago, recent developments have made the theory untenable. The advent of the bus made possible the establishment of a certain measure of transportation service without any large initial investment. Every one knows how this opportunity was availed of in many places to skim off the cream of the traffic and make a quick profit. To meet this situation, it has been, and still is, the contention of the existing transportation companies that needless duplication of service should not be allowed. More and more this proposition is being accepted by the general public.

But the acceptance of this proposition by the public carries with it an obligation upon the railway. If the railway claims the right to be protected where it is already furnishing adequate service, it must also undertake to furnish whatever service is required. In other words, when the public is willing to forego the temporary advantage of duplicate service, the railway ought in return to provide facilities wherever needed, even if necessary to forego immediate profits on such extension of service. If the traffic is light in such cases this may perhaps entail a loss that looks bad on the balance sheet. The experienced operating man, however, who is usually in closer touch with public feeling than are directors of the company, knows that the railway can well afford to stand this small loss if giving service in one place keeps out competition in another.

Prompt Publication of Statistics Supplies a Distinct Need

IT IS but natural that events which occur regularly become commonplace after a while and are accepted as a matter of course. In a sense this may have been the feeling with which many of the readers of this paper received the Annual Statistical Number of ELECTRIC RAILWAY JOURNAL, published last week. Such a number, issued on the first Saturday of each January, has been a feature of this publication since 1908. Each year the principal statistics indicating the advance of the industry during the previous 12 months have been compiled through correspondence and in other ways and are made available through the JOURNAL for immediate use of its readers.

Obviously, much of this information has to be collected before the close of the year, and a great deal of it is based on data collected and filed from January to December of the year just closed. During the last few weeks of December, all of this information is collated, digested and supplemented by last-minute telegraphic advices to complete the tables and statistical information, and to form a basis for the articles and editorials in the statistical issue. From time to time some new feature of an appropriate nature has been added to the series of statistical issues, so that now much more complete data relative to the electric railway industry are printed, and on a wider range of subjects, than it was attempted to cover in the early numbers of this kind.

The execution of such an undertaking would be impossible without prompt and cordial responses of the various electric railway companies to requests for information from the editorial staff. The editors take this occasion to express their sincere thanks for this co-operation and for its practically unanimous nature. A large number of questionnaires were sent out to large and small companies alike, and in some cases to companies which had ceased operation. Despite this, replies were received promptly to each list of questions from many more than 90 per cent of the properties addressed. It is doubtful if any other industry has ever shown such a large proportion of replies in so short a time to such extended lists of questions. Yet this experience is repeated year after year with the statistical issue of this paper.

The extent to which the statistics published in the JOURNAL annually in this way are quoted in and out of the industry justifies the publishers of this paper in believing they are performing a needed service. So many requests for copies of the Statistical Number were received last year that the issue was soon exhausted, even though the precaution had been taken to print an extra large edition. Certainly if this work was left to be performed by the government, the figures would not be available three days after the close of the year. The reports of the Census Bureau are models of accuracy and completeness, but they are not noted for the promptness of their publication. The census of the electric railway industry, taken by the Census Bureau in 1922, has still to be made available to the public in complete form. While the elaborate figures issued by the government have their place, it is to supply the obvious need for a more rapid survey that the Statistical Number of ELECTRIC RAILWAY JOURNAL has been published year after year.

I.T.S. Buys Observation Interurban Cars

Light-Weight, One-Man Interurban Cars for Illinois Traction System Have the Main Passenger Compartment at the Front End with Smoker and Baggage Space at the Rear—
They Are Arranged for Single-End Operation, with a Back-Up Device for Switching and Reversing at Terminals



Double-Arched Windows Give the Exterior an Attractive Appearance. The Rear Folding Doors Are Used for Loading Baggage, but a Step Is Provided so that Passengers at Busy Terminals May Board or Alight at Both Ends

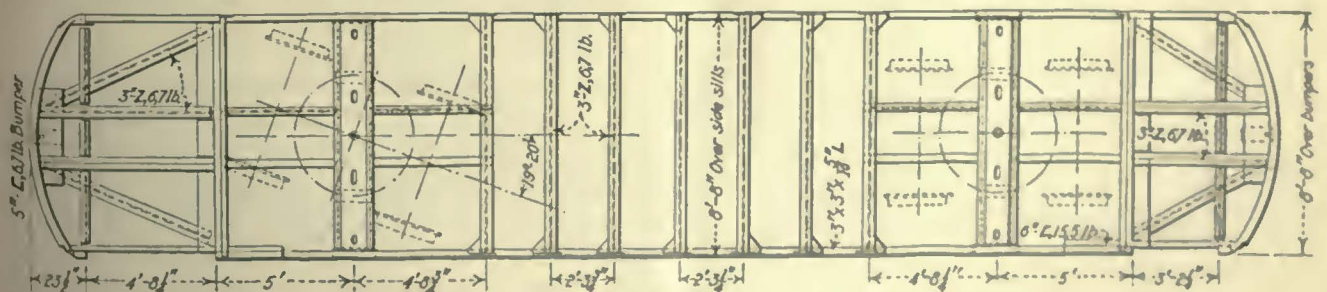
SEVENTEEN light-weight, one-man, double-truck interurban cars recently were placed in service on the Illinois Valley division of the Illinois Traction System. They embody a number of novel features of design for this class of equipment, which have attracted increasing attention from interurban operators interested in improving the quality and frequency of service while at the same time holding operating costs to a minimum. These cars were developed with the idea of providing a type of equipment which would attract increased patronage by affording greater convenience and comfort to passengers and also present that appeal to the prospective rider which is made by an attractive and inviting general appearance.

OBSERVATION COMPARTMENT AT FRONT END

These cars were built by the St. Louis Car Company, and are designed primarily for single-end operation, thus making a substantial saving in weight and cost, and at the same time increasing the seating capacity.

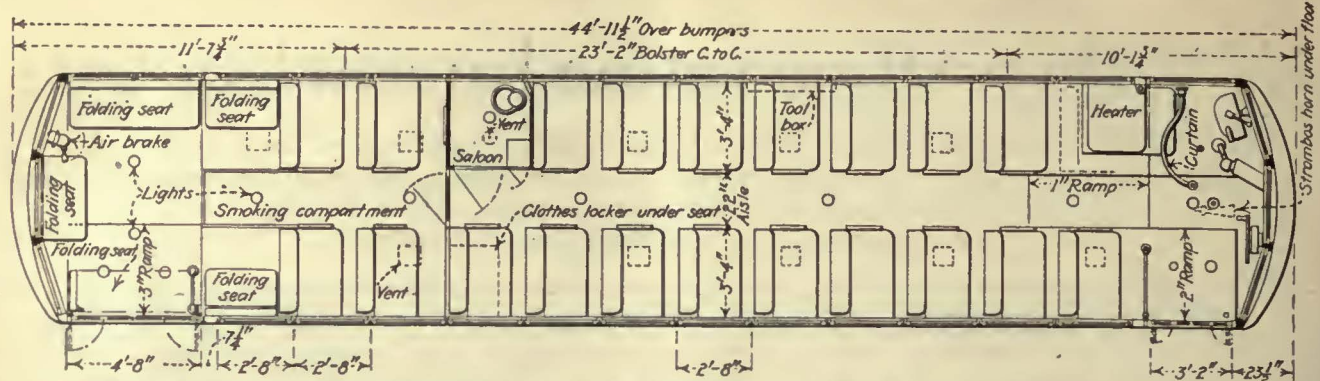
Further advantage is taken of this method of operation to arrange the main passenger compartment as an observation section, giving an unobstructed view of the track and landscape ahead. Careful consideration of the factors which affect the pleasure of a ride in any vehicle led to this step, and it is held to be an important feature in the merchandising value of the design. It has been pointed out that the pleasure of an automobile ride would be almost entirely lost for the passengers in the rear seat if a curtain were mounted back of the driver so that they could not see out the front end of the vehicle. Putting the main passenger compartment at the front end of an interurban car was therefore held to make the ride much more pleasant, and from that standpoint the arrangement was considered to have a material merchandising advantage.

Although the cars are designed for single-end operation, a back-up device allows the cars to be controlled from the rear end for switching purposes at Y terminals. This is accomplished by means of a three-way



Truck shown on 35' Road curve

The Vestibule Floors Are Carried Across Flush with the Body Floor, Giving a Strong Underframe.
A 3-In. Z-Section Is Used for Cross Sills



The Main Passenger Compartment of This Illinois Traction Car Is at the Front End to Give Passengers a Clear View Ahead. The Car Seats 52 in Winter and 54 in Summer. A Slight Ramp Decreases the Step Heights

switch at each end of the car. The arrangement allows the controller to be put on the first point in the reverse position with the switches off, while the operator changes to the rear end. He then runs the car in the reverse direction by turning the switch at that end on and off as required, which is equivalent to operating on the first notch of the controller, since the controller is left on the first point in the reverse direction while the operator changes ends. A special controller handle

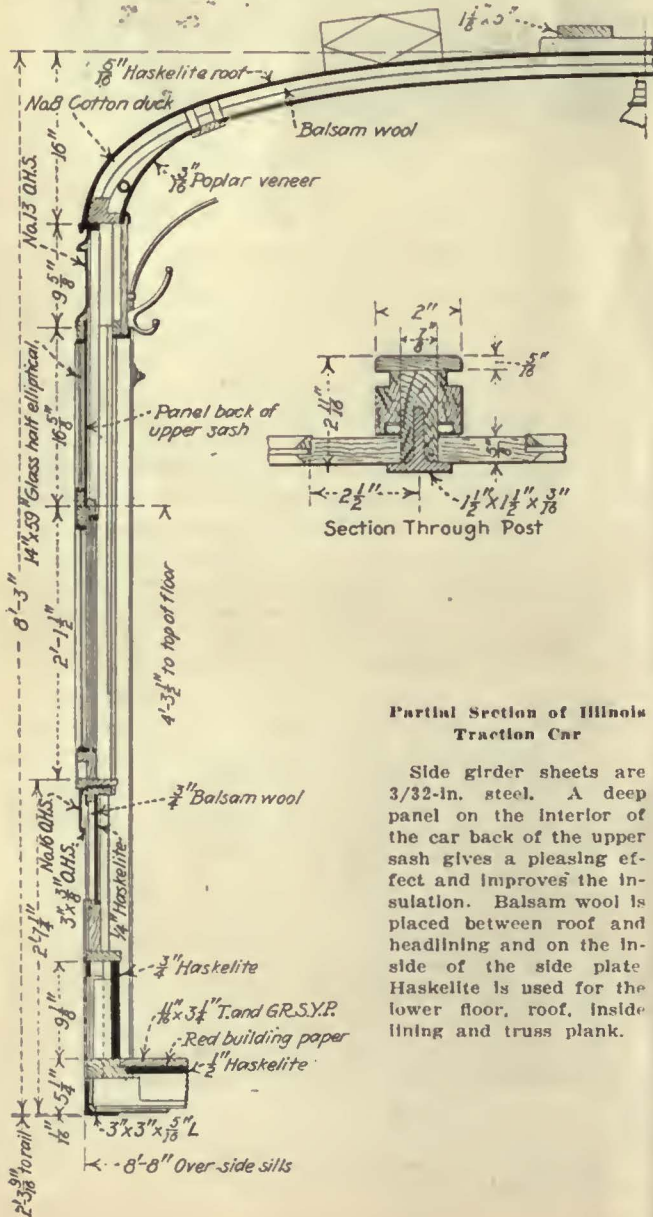
is also carried on each car, with which the dead-man release feature on the controller is made inoperative for this rear-end switching. A brake valve is installed at the rear end for the reverse movement, and the same valve is used for operating the door at that end for loading baggage, etc.

Full safety car devices are included in the equipment. The front doors are opened and closed from the brake valve in the same way as on other one-man equipment. The rear doors, opening into the baggage compartment, can, as explained above, be opened from the brake valve at the rear end of the car, or they can also be operated from an outside valve conveniently located for a baggage man or station agent. These rear doors, like those at the front, are of the folding type, and steps are provided at this location so that passengers can be loaded at both ends of the car at terminals, amusement parks or other points where heavy passenger interchange takes place.

The cars are 44 ft. 11½ in. long over the bumpers, and are 8 ft. 8 in. wide over the side sills. The height over the roof was made 10 ft. 6½ in. and was purposely kept as low as possible to give the cars a long, rakish appearance. The height from rail to top of the body floor is 2 ft. 8⅓ in. when the car is mounted on 26-in. diameter wheels. This floor is carried continuously across the vestibules, with a 1-in. ramp from the bolster to the end sill at the front end and a 2-in. ramp from the center line to the edge of the step, so as to give step heights of 15½ in. and 14⅝ in. respectively.

Sixteen cross seats in the main passenger compartment provide for 32 passengers. The smoking compartment at the rear is separated from the main compartment by a bulkhead with swinging door. It has four cross seats and two folding longitudinal seats, giving additional capacity for 12 passengers. Folding seats in the rear baggage section will seat eight additional, making a total seating capacity of 52. When the stove is removed in summer, space is available for an additional cross-seat in the main compartment, increasing the seating capacity to 54.

Cross seats are 38 in. wide from the inside lining over the aisle plates, leaving a 22-in. aisle. Particular attention was paid to providing a type of seat that would give the maximum in comfort. These were made by the St. Louis Car Company and are non-reversible. Those in the main compartment are upholstered in plush with a high back and head roll. Seats in the smoking compartment are upholstered in genuine leather. The cushion springs are of the double-deck type, the bottom layer of springs being stiffer than the top layer, so as to take care of a light passenger and a heavy one side

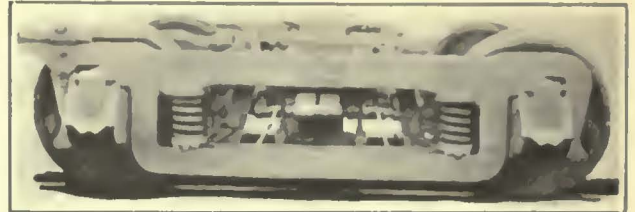


Partial Section of Illinois Traction Car

Side girder sheets are 3/32-in. steel. A deep panel on the interior of the car back of the upper sash gives a pleasing effect and improves the insulation. Balsam wool is placed between roof and headlining and on the inside of the side plate. Haspelite is used for the lower floor, roof, inside lining and truss plank.

by side with comfort. The arrangement of springs prevents a heavy passenger from dislodging a lighter passenger seated on the same cushion. These cushions are 7 in. thick. The seats are quite low, the over-all height from the floor to the top of the cushion being only 17 in.

The steel framing construction is more or less standard, but the design was worked out with a view of obtaining minimum weight consistent with proper strength and safety. The side girder sheets are



The Cars Are Mounted on St. Louis Cast-Steel Frame, Equalized Trucks of 5-Ft. 9-in. Wheelbase with 26-in. Diameter Davis Cast-Steel Wheels

SOME OF THE PRINCIPAL ITEMS OF EQUIPMENT

Warning signal.....	Strombos horn
Water cooler.....	Dayton No. 320
Ventilators.....	St. Louis Car Company, Peerless
Trolley retrievers.....	Ohio Brass
Destination signs.....	Hunter No. 8
Step safety treads.....	Feralun
Sash fixtures.....	O. M. Edwards
Headlight.....	Crouse-Hinds
Heaters.....	Peter Smith hot air No. OP-1
Back-up equipment.....	General Electric
Meters.....	Economy, with inspection dials
Door engines.....	Universal
Curtain fixtures.....	Curtain Supply Company No. 88 pinch handle
Curtain material.....	Double-faced Pantasote
Signal system.....	Faraday
Hand brakes.....	Peacock staffless
Roof covering.....	No. 8 cotton duck
Trolley base.....	Ohio Brass
Rails and stanchions.....	Aluminum
Trimlings.....	Bronze, polished and lacquered
Dry hopper.....	Dayton

straight and are made of 3/8-in. steel. The lower floor is 1/2-in. Haskelite, covered with 3/8-in. tongued and grooved yellow pine. This floor construction is expected to add materially to the stiffness of the body. In the aisles, the wood flooring is covered with 3/8-in. brown battleship linoleum.

Formed Haskelite in large panels is used for the roof. The hoods are made of two-ply poplar slats, and the headlining is three-ply poplar veneer. Between the side girder sheet and the inside lining, and also between the roof and headlining, Balsam wool is used for insulation. Between the side sheets and inside lining there is one layer of 1-in. insulation, while two layers of 1-in. material are used between the roof and headlining.

The interior is finished in mahogany, including doors and sash. Both inside lining and truss plank are made of Haskelite, the former being 1/2 in. thick and the latter

3/4 in. Continuous Gothic sash between the letterboard and the lower sash are permanently fastened in place, and a removable panel is fastened back of the sash on the interior of the car so as to give a deep paneled effect on the interior, while providing better heat insulation. Storm sash for the lower windows are provided for winter use. At the front end the vestibule is glazed with 1/2-in. non-shatterable glass.

The complete weight ready for service is 36,840 lb. The cars are mounted on St. Louis Car Company equalized cast-steel frame-type motor trucks of 5-ft. 9-in. wheelbase, with 26-in. Davis cast-steel wheels having 3 1/4-in. threads. Axle diameters are 4 1/2 in., with 3 1/2 x 7-in. journals. The motive power consists of four GE-265 motors, rated at 35 hp. each. The control is K-35 KK. Air-brake equipment is Westinghouse single-end, with a DH-16 compressor, and full safety car equipment of the Safety Car Devices Company. Some of the other principal items of equipment are given in the accompanying table.

Portable Substation Operates at Different Voltages

A PORTABLE substation, designed to operate at either 13,200 volts or at 6,600 volts, has been built by the Bangor Railway & Electric Company. Some time ago, when changes were being made in the city substation of the railway, trouble was experienced at an outlying substation. A rotary converter was placed on a freight car and taken to the point of trouble to replace the disabled machine. The latter was then



An Observation Section and a Baggage Compartment Are Provided in the I. T. S. One-Man Interurban Car

The observation feature is obtained by placing the main passenger compartment at the front end of the car. Aluminum coat

hooks instead of the more usual baggage racks help to give the interior a clean-cut appearance.

In the baggage compartment at the rear, upholstered folding seats provide for passengers when required.



All of the Apparatus of This Portable Substation Has Been Placed Inside of the Car Body

brought back and repaired. It was decided, however, that instead of installing the machine in place of the one which had been moved to the outlying substation, it should be left on the flat car for use as a portable substation in case of emergency.

A body was built on this car at the railway shops and the necessary equipment was installed. Live line grippers are used to connect with the transmission lines. These take the high-tension current to a change-over switch which is interlocked with the oil switch. Ample transformer capacity is provided for either voltage. Direct current for railway operation is supplied by a 500-kw. rotary converter.

All the apparatus has been placed inside the car. The converter occupies the opposite end of the car from the transformer and switches. It has been mounted on a platform which is adjustable so that the converter will stand level no matter what the slope of the car floor may be. The expenditures made to construct this portable substation were very moderate and it has proved extremely useful, obviating the necessity of buying stand-by equipment for several permanent substations.

Special Bus for Inspection Trips

FOR the use of officials of the company making inspection trips to points not easily reached by rail the Public Service Railway, Newark, N. J., has purchased a specially equipped Fageol bus. A leather topped table which jack-knives and folds down against

the wall has been provided so that the bus can be used as an office while en route. When the table is folded, all chairs, which are independent and movable, can be faced forward. Seating capacity for 18 persons is provided in individual wicker chairs.

An electric fan has been mounted on the partition in back of the driver's seat and is operated from the car's 12-volt storage battery. Another feature of the equipment is a telephone from the center of the main compartment to the driver. Baggage space is provided in compartments beside the driver and at the rear of the bus.

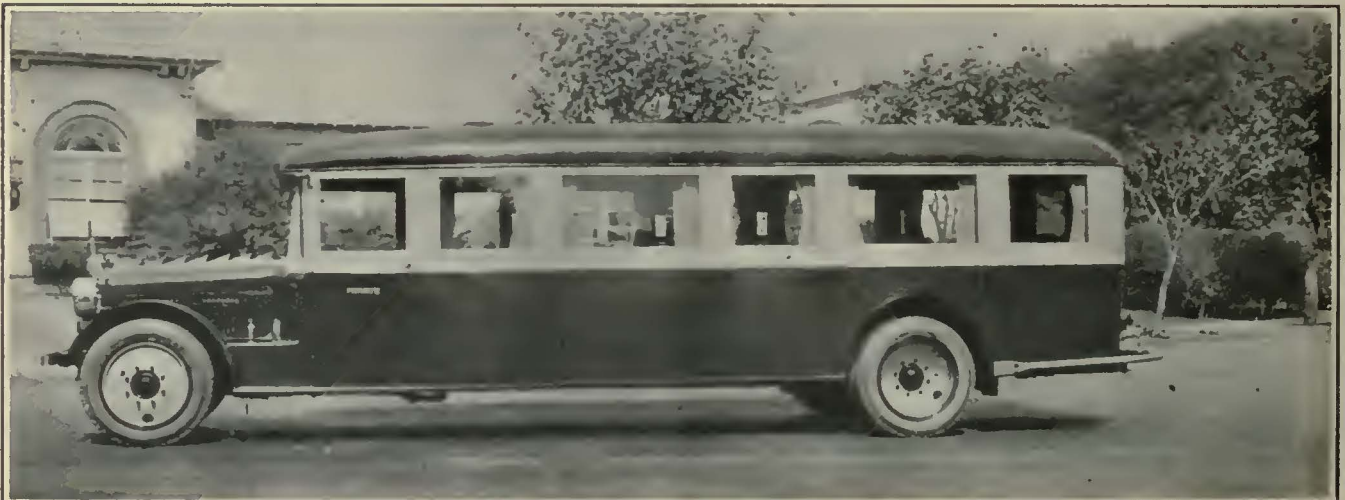
The interior is attractively finished in gray silk mohair plush. Upholstery is done in green colonial grain leather. The floor is covered with a heavy velvet carpet. Mirrors, ash receivers, nicked hardware, and hand-rubbed mahogany window trim add to the con-



A Folding Table Makes It Possible to Utilize This Bus as an Office While en Route

venience of the passenger and the appearance of the vehicle.

Many of the stations of the Public Service Electric & Gas Company are not located on the lines of the Public Service Railway. Moreover, a number of bus routes operate over highways remote from the rail lines. The bus will afford a convenient means for officials to reach points away from the rail lines, but will not supplant the parlor car heretofore used for inspections of the railway property. It is planned to rent this vehicle, when not otherwise in use, to persons desiring to arrange special parties.



Bus Used by Railway Officials in Making Inspection Trips to Points Away from Tracks

Atlanta Improvements to Cost \$9,000,000

Changes Recommended in Beeler Report Include Rerouting of Cars, Elimination of Jitneys and Establishment of Bus Service by the Railway, Widening of Streets and Construction of New Viaducts—Underground Moving Sidewalks Proposed for the Business District—City Is to Bear 75 per Cent of the Total Expense

WHAT amounts virtually to a revised city plan for Atlanta, Ga., with many extensive changes in streets and transit facilities, is recommended by the Beeler Organization, New York, in a series of eight reports recently presented to the special traction committee of the Council. Study of this subject was undertaken early in 1924 as the result of a petition in which the Georgia Railway & Power Company stated that the credit of the railway department was exhausted and that relief was imperative if it was to continue to function and serve the community properly. At that time the company asked for the elimination of jitneys from streets on which the cars operate, a revision of its routes and the abolition of unnecessary stops. Some relief from paving burdens and a higher fare also were desired by the railway.

In general, the Beeler report upholds the position taken by the company and recommends the elimination of jitneys, rerouting and relocation of stops on all car lines. Relief from paving burdens is also recommended, but a ticket rate of four for 25 cents is held to be preferable to that of three for 20 cents as requested by the railway. Thus the price of a single ticket would be 6½ cents as against 6⅔ cents. The petition and the report are in accord in fixing the cash fare at 10 cents.

Together with these changes it is proposed that new viaducts be constructed, that certain streets be widened and some new streets cut through, and that an underground moving sidewalk be built. Bus service operated by the railway in conjunction with its car service is suggested. According to the report these changes should result in increasing the company's net revenue from \$500,000 to \$1,200,000. Financial aspects of the report are dealt with in this article. Readjustment of service and routes as well as the new construction necessary to put this plan into effect will be described in later articles.

Atlanta is a young city that has grown beyond the wildest dream of its founders. From 1860 to 1870 it increased 128 per cent; from 1880 to 1890 it increased 77 per cent, and from 1900 to 1910 it maintained practically the same rate of growth. The present tendency is to build up the territory immediately beyond the city faster even than the city itself. Population figures for the city and the 7-mile zone are given in an accompanying table.

In all questions pertaining to transit in Atlanta the

POPULATION OF ATLANTA AND SUBURBS, 1850-1940

Year	City of Atlanta	7-Mile Zone
1850	2,572	
1860	9,554	
1870	21,789	
1880	37,409	
1890	66,533	80,972
1900	89,672	112,798
1910	154,839	172,613
1920	200,616	228,782
1930 (estimated)	263,000	324,333
1940 (estimated)	325,000	425,000

race problem must be considered. At present the population of the city is divided between whites and colored in a proportion of approximately two to one. Of the colored residents 90 per cent live within a radius of 2 miles from the business center. They are generally grouped in the valleys. Due partly to topography and in some instances to lack of adequate transportation facilities there are a number of districts comparatively close in where little or no development has occurred.

The city system of the Georgia Railway & Power Company comprises 81.92 miles of double track and 56.116

PASSENGER STATISTICS BY YEARS, 1910-1924

Year	Revenue Passengers	Transfer Passengers	Free Passengers	Total Passengers
1910	44,908,137	9,918,969	697,331	55,524,437
1911	50,235,340	11,274,778	736,619	62,246,737
1912	54,345,498	12,119,284	871,345	67,336,127
1913	57,400,821	13,008,050	994,580	71,403,451
1914	56,643,974	12,799,194	873,347	70,316,515
1915	52,649,629	12,449,576	4,402	65,103,607
1916	53,684,771	12,831,650	3,629	66,520,050
1917	59,228,227	14,155,060	3,606	73,386,893
1918	70,573,593	14,830,912	74,999	85,481,204
1919	76,804,565	16,704,145	87,346	93,596,056
1920	77,284,154	17,359,439	None	94,643,593
1921	73,611,786	17,746,693	None	91,358,479
1922	73,253,211	18,917,453	None	92,172,664
1923	75,518,211	19,838,406	None	95,357,117
1924*	73,413,026	19,967,263	None	93,380,291

*Estimated

miles of single track. Of this, about 210 single track miles are used for passenger car operation. The 23 car lines reach practically all of the developed portions of the city and its suburbs within the 7-mile zone. Week-day schedules require 187 cars during the day and 330 during the rush hours.

A complete survey was made by the Beeler Organization of the routes of the railway. This included traffic checks, riding logs and general observations. Passenger counts covering a period of two days were taken at the peak points of all the lines. One-day counts were taken at the short line points and other places concerning which information was desired. In all 45 locations were checked from 6 a.m. until midnight. Loading characteristics of the various lines were analyzed from data gathered on 150 round trips. Each trip record shows all stops, the location and volume of passenger interchange, length of stops, any delay and its cause. Similar observations were made also of the jitneys to determine their effect on the problem. Special studies were made of vehicular movements and pedestrian traffic.

RAILWAY TRAFFIC IS DECREASING

From 1910 to 1920 the number of revenue passengers carried by the railway increased. At the beginning of this period the railway was carrying 45,000,000 passengers a year while at the end of the decade the total reached more than 77,000,000. Since 1920 the tendency has been downward. Preliminary estimates are that only 73,400,000 passengers were carried during 1924. The revenue rides per capita show a similar fluctuation.

The peak was reached in 1919 with 344. The present trend is downward and indications are that the figure for the year just ended will be about 277. Detailed figures are given in an accompanying table.

During the last 4 years the railway has had to meet increased operating expenses while its revenues have been depleted by unregulated and pernicious jitney competition, the month of September showing a loss of nearly 670,000 revenue passengers as compared with the year before. Net earnings are so low that they fail to attract the necessary new capital to make the desired changes and improvements in equipment and service.

Various causes are given for this falling off in street car riding habit. The great growth in the use of the private automobile, taxicab and jitney are factors. The latter, of which there are now some 275 licensed, are by far the most serious form of competition. They operate directly upon and along the tracks of the best lines where the population is dense and short-haul traffic exists. If the 7,750,000 jitney bus passengers now carried annually were transported by the railway, the revenue rides per capita per mile of track would be 1.46, which is about what it should be under existing business conditions.

Careful computation shows that the number of passenger vehicles in use on Atlanta's streets as of January, 1924, were as follows: Street cars, 330; private automobiles, 27,540; jitney buses, 136, and taxicabs, 147. In round figures the passengers carried per annum were as follows: Street cars, 75,500,000; automobiles, 54,000,000; jitanes, 4,500,000, and taxicabs, 1,300,000. The passengers per trip were as follows: Street cars, 35.3; automobiles, 1.8; jitanes, 3.6, and taxicabs, 1.4. Cost to the passenger of the various kinds of ride, in cents per mile, averages as follows: Street car, 2; automobile, 5.16; jitney, 4.26, and taxicab, 32.18. The apparent high rate charged by the taxicab is because nearly one-half of its mileage is while vacant.

The total cost to the users in the 7-mile zone of the various services is as follows: Street cars, \$5,139,000; automobiles, \$16,391,000; jitney buses, \$417,000, and taxicabs, \$742,000, or a total of \$22,689,000. Those who employed private automobiles paid three times as much, not including interest, for their 54,000,000 rides as it cost the 75,000,000 railway riders. This demonstrates two important points—first, the great demand for transportation, and, second, a willingness on the part of the public to pay well for the desired service.

A recent check in the business district showed 2,360 automobiles parked on the streets, 814 in open lots, and 1,478 in garages. Out of a total of 4,652 automobiles, slightly more than one-half were parked in the streets. With the acute congestion now existing it is evident that if the present business district is to retain its prestige, relief must be afforded, the capacity of its arteries increased, and its development expanded to meet the new requirements of a comprehensive co-ordinated plan of local transportation. Prompt and drastic action is necessary to afford the railway relief from its present plight and permit it to make extensions and improvements.

COST OF OPERATION

To ascertain the operations by individual lines, the total operating revenue was distributed proportionately to the passenger revenue, and the cost of operation, including taxes and renewals, was distributed on a basis

of passenger car hours operated, taking into consideration the car types.

Figures showed that 11 of the 23 lines failed to earn sufficient to cover even the operating deductions. A number of the others were perilously near a similar condition. The average of all the lines in 1923 showed a net earning of only about 5 cents per car-mile available for interest on the investment. Besides jitney competition the low average earning rate in Atlanta is due to duplication of service, slow speeds, congestion, unbalanced through routes, and long-haul suburban service, at low fare rates.

A comparison of the general operating statistics for the year 1924, partly estimated, as compared with those for 1923, is as follows:

STATISTICS FOR 1923 AND 1924, GEORGIA RAILWAY & POWER COMPANY—RAILWAY DEPARTMENT

	Year Ended Dec. 31, 1923	Year Ended Dec. 31, 1924
Population served (estimated)	257,477	267,042
Total operating revenue	\$5,244,205	\$5,057,704
Total operating deductions	\$4,505,248	\$4,491,346
Operating ratio, per cent.	85.80	88.60
Revenue per car-hour	\$3.49	\$3.40
Operating expenses per car-hour	\$3.00	\$3.03
Revenue per car-mile, cents	38.17	36.29
Operating expenses per car-mile, cents	32.79	32.23
Revenue per mile of track (gross)	\$25,213	\$24,084
Passenger car-hours operated	1,499,223	1,486,543
Passenger car-miles operated	13,721,310	13,922,372
Revenue passengers	75,518,711	73,413,026
Transfer passengers	19,838,406	19,967,265
Total passengers	95,357,117	93,380,291
Ratio transfer passengers to revenue passengers, per cent.	26.25	27.20
Ratio transfer passengers to total passengers, per cent.	20.82	21.36
Revenue passengers per car-mile	5.51	5.26
Rates of fare—Cash	7 cents	7 cents
—Tickets	3 for 20 cents	3 for 20 cents
Average fare per revenue passenger, cents	6.81	6.76
Car-miles per car-hour	9.16	9.37
Miles of track operated	218	220

The above shows a decrease of over two million revenue passengers carried with an increase of 200,000 car-miles operated, or more transportation with less riders. The shrinkage in the volume of business is shown by the decline in the operating revenue of \$188,000, reducing the revenue per mile of track from \$25,213 to \$24,084. These low earnings per mile of track are an outstanding feature of the present unsatisfactory situation.

SUMMARY OF IMPROVEMENTS

To provide the city with adequate modern transportation facilities, many far-reaching changes will have to be made. One of the recommendations of the Beeler report is the construction of viaducts over two important downtown streets. These will then be two-level streets for short distances. It is proposed to cut through a new street for a distance of about three blocks, and to extend another for four blocks. Two connecting streets are to be widened to form a convenient route bypassing the so-called Five Points, the most congested intersection.

Sidewalk congestion is to be relieved by the construction of moving platforms underneath the present sidewalks on the most important north and south street as well as the most important east and west street. These moving sidewalks will be virtually subways without trains. From a stationary sidewalk underneath existing sidewalks pedestrians will step to a platform moving continuously at a speed of 2 m.p.h., then to a platform moving at a speed of 4 m.p.h. and, if a greater speed is desired, to a sidewalk equipped with seats and moving at 6 m.p.h.

One responsible agency to conduct a systematic plan

of co-ordinated local public transportation including street cars and high-grade bus service is recommended. To accomplish this it will be necessary for the Georgia Railway & Power Company to make extensive changes in present car routes. Segregation of street cars away from the principal vehicular traffic lanes in the downtown section will leave these streets free for vehicular traffic. Schedules should be revised and new cars purchased. For the present it is recommended that the railway establish two bus lines. Others can be added to meet the growing transportation needs of the city.

The total cost of all these improvements will be close to \$9,000,000. This will be divided roughly as follows:

Street openings and widening projects.....	\$2,500,000
Moving underground sidewalks.....	3,000,000
Viaducts and approaches.....	2,000,000
New track construction.....	500,000
Fifteen standard double-truck cars.....	210,000
Thirty double-truck one-man cars.....	360,000
Power-saving devices.....	25,000
Fifteen buses and garage.....	350,000
Total.....	\$8,945,000

Including the railway's share of viaduct cost amounting to about \$500,000, the company will be called upon to spend in the neighborhood of \$2,000,000. All of these expenditures will be of direct benefit to the car rider and will place the railway in a position to render service more efficiently than heretofore.

The railway's revenues are derived almost wholly from passenger receipts. Prior to April 14, 1919, the rate of fare was 5 cents. On that date it was increased to 6 cents and on Oct. 1, 1920, to 7 cents cash with 15 tickets for \$1. On July 1, 1923, the ticket rate was changed to three for 20 cents. This fare is still in effect except on two lines where a special 5-cent fare is charged. With these fares under present operating conditions 11 of the 23 lines are not making sufficient to pay operating expenses.

A number of important economies can be made without impairing the quality of service. By rerouting and rescheduling a daily saving of 447 motor car-hours, amounting to \$262,000 a year, can be effected. By substituting 74 trailer car-hours for motor car-hours an annual saving of \$13,500 will be made. One-man operation of 381 daily car-hours would save \$102,000. By the use of power-saving devices a reduction of \$75,000 in power cost can be made. These total slightly more than \$450,000.

Railway taxes should be readjusted. Paving assessments should be made only for the increased cost of the pavement, if any, on account of the presence of the track. Since 1902 the company has paid the city \$1,717,973 for paving charges, or an average of \$78,000 annually. Since 1920, with the higher prices and a rapid extension of the paving program, the average annual expenditure has been \$140,000. The outlay for 1924 is estimated to exceed \$200,000. These expenditures are constantly increasing the company's capital account, which results in additional charges for interest and renewals. At present the average annual cost of paving renewals is \$68,000 and the annual interest charges on paving are approximately \$120,000. There should be no gross receipts or special license taxes for the street car rider any more than for other riders. The abolition of the gross receipts tax will save about \$100,000 annually.

Under the new plan, with more efficient operation and unfair jitney competition eliminated, it is estimated

that the revenue will increase \$200,000. This coupled with the savings already referred to should increase the net earnings from about \$500,000 to \$1,200,000. Even at that, however, the railway will hardly earn sufficient to pay a fair return on its then value, which will be in the neighborhood of \$18,200,000. No provision is made by which the company recovers any past losses.

It is hoped, however, to secure additional traffic by changing the fare. A flexible service-at-cost plan is proposed. A barometric fund having its normal sum at about 5 per cent of the present annual gross revenue, or \$250,000, should be provided. Whenever the cost of service exceeds the gross revenue by more than 20 per cent of this fund, namely, \$50,000, reducing the sum to \$200,000, the next higher rate provided in the schedule should automatically become effective on the first day of the next calendar month and continue in effect for at least one month. Should the barometric fund exceed the normal sum by more than 20 per cent, the next lower rate should automatically become effective. In no event should the fare be changed more than once in 30 days and with not less than 5 days' notice. A table of possible fare plans follows:

	A	B	C	D	E	F	G	H
Cash fare.....	5	5	5	10	10	10	10	10
Token rate.....	6@25	6@25	P	4@25	4@25	3@25	3@25	P
Transfers.....	F	C	P	P	C	F	C	P
Children under 12 and school children	3@10	3@10	3@10	5	5	5	5	5

F = Free. C = Free only with cash fare.

It is recommended that the new plan be inaugurated with Schedule D. This will give the regular rider an immediate reduction from 6½ cents to 6¼ cents, which is equivalent to 7 per cent. Transfers between car lines should continue free as at present. It is estimated that this schedule will afford the railway an average rate of fare of 6.64 cents as against the present 6.76 cents.

To provide a permanent incentive for efficient and economical operation, it is proposed that the allowable rate of return on the value of the railway be adjusted so as to penalize the company when the fares are raised by diminishing the rate of return and rewarding it when the fares are lowered. A sliding rate of return is proposed to accomplish this, as follows:

Fare Schedule	A	B	C	D	E	F	G	H
Allowable rate of return:								
Maximum per cent.....	9	9	8½	8	7½	7	6	5
Minimum per cent.....	..	8	7½	7	6½	6	5	..

With the adoption of Schedule D the allowable rate of return will be a maximum of 8 per cent, with a minimum of 7 per cent. Should the railway fail to earn the minimum rate under Schedule D, and Schedule E be adopted, the allowable rate of return would be reduced automatically to a minimum of 6½ per cent with a maximum of 7½ per cent, and so on. On the other hand, when the volume of traffic and greater efficiency of operations permit the adoption of a lower fare such as Schedule C, the allowable return would be increased to a maximum of 8½ per cent with a minimum of 7½ per cent, and so on.

Thus in the event that higher rates are necessary the railway will receive a lower rate of return. When lower rates of fare are brought about the allowable rate of return will be raised.

London Tries New One-Man Car

Single-Deck Type, with Automatic Exit Door,
Similar to Those Now Used in America,
Is an Innovation in England

A SINGLE-DECK one-man tramcar was demonstrated on Nov. 3 to representatives of the engineering press by the London United Tramways. Safety and increased speed are two main factors which were considered in the new type cars.

In 1922 C. J. Spencer, general manager, after a visit to America, where he inspected one-man cars, began experimenting with a car of that type on a cross-country route about 2 miles long between Brentford and Hanwell, on the western outskirts of London. The experiment proved satisfactory, though the car worked in with double-deck ones on the same route. As a result an improved type has been designed. Five cars are now being built for service on the same route, which connects at each end with main routes. No double-deck cars will be used on this route. Shuttle service will be maintained, with a much closer headway than that of the double-deck cars. Except on the lines of the London United Tramways, one-man tramcars have not been tried in Great Britain.

The car has many ingenious mechanical devices, which are common in America, but have not been widely adopted in England. The doors are operated pneumatically and work in unison with the steps. Passengers board at the front end of the car and leave at the rear, an automatic treadle controlling the action of the exit door and preventing passengers from entering there, the door closing automatically as soon as the passenger has stepped down and takes his foot off the step.

The doors are prevented from opening while the car is in motion by means of a valve which shuts off the air supply except when the car is practically stationary. A dead man's handle is used on the air brake control lever. When the motorman removes his hand the brakes are applied automatically and the power shut off, irrespective of the position of the controller or brake handle.

Fares are paid by the passengers upon entering the



This New Single-Deck One-Man Car Is Being Tried Out on the London United Tramways

car, the regular rates being established at 1d for a short haul and 2d for the whole run. The coin is dropped into the fare box and the operator issues the ticket, which is canceled by a foot-operated punch. A change-giving machine further expedites the issue of tickets. Fare collection takes about 3 seconds per passenger. A special ticket machine is now being designed which will speed up fare collection still more.

The interior of the car is enameled white and an improved system of illumination which distributes the light more evenly gives the car a very bright and attractive appearance. Comfortable spring seats are covered in brown leather. White washable hand straps are used, and in place of the usual bell cord, extending the length of the car, a number of mechanical push bells are provided.

The driver is furnished with a seat and two large window wipers insure clear driving vision. A further improvement is a lamp fitted immediately over the ticket issuing equipment, which is automatically lighted when the entrance door is open, and switched off when it is closed, so that at night the driver is not inconvenienced by reflection on the windshield.



At Left, the Car Interior Resembles Those in Use on American Street Railways. At Right, Automatic Devices Used Include an Unlocking Exit Door, a Dead Man's Handle for the Brakes and a Ticket-Issuing Machine

Massachusetts Towns Provide Their Own Transportation

The Towns of Athol, Orange, Greenfield and Montague Take Over Lines Abandoned by Original Owners, Forming Two Transportation Areas Under Act of 1920—One System Abandons Alternative Bus Line in Favor of Trolley—Some Details of the Enabling Legislation

THE first "Transportation Area" formed under the statute passed by the State Legislature of Massachusetts in 1920 was created in March, 1924, from a portion of the Northern Massachusetts Street Railway. Although the statute referred to sale or lease only by a majority of a board of directors, Justice Braley of the Massachusetts Supreme Court interpreted the statute as granting the same powers to a receiver. Justice Braley therefore authorized D. P. Abercrombie, the receiver of the company, to wind up its affairs to the best advantage.

As shown in the accompanying map, the greater part of the trackage in the less settled districts was abandoned and sold for junk. The most worth-while section was a route 6.76 miles long between Athol (population 10,000) and Orange (population 5,400). This was purchased for \$18,484 by the town of Athol following ratification by the voters on Feb. 4, 1924. Operation by the board of trustees, comprising five members, was begun on March 24, with W. W. Woodward as chairman. George Donley, assistant superintendent of the predecessor company, was chosen superintendent. A supplementary act had to be secured from the Legislature to permit Athol to operate the portion of the road which lies within Orange. The trustees have retained the cash fare of 10 cents and the token scheme whereby 12 tokens are sold for 50 cents, but with a minimum fare of two tokens for the first of the four zones.

It is obvious from the price paid for the property that the trustees will not have to worry much about overhead charges, although the sale did not include power equipment, inasmuch as the railway had been purchasing power for some years in this hydro-electric territory. The title of the undertaking is "Athol & Orange Transportation Area."

SECOND AREA IN GREENFIELD AND MONTAGUE CITY

The second and more important transportation area had its inception on May 24, 1924, when the citizens of Greenfield (population 15,500) and Montague City

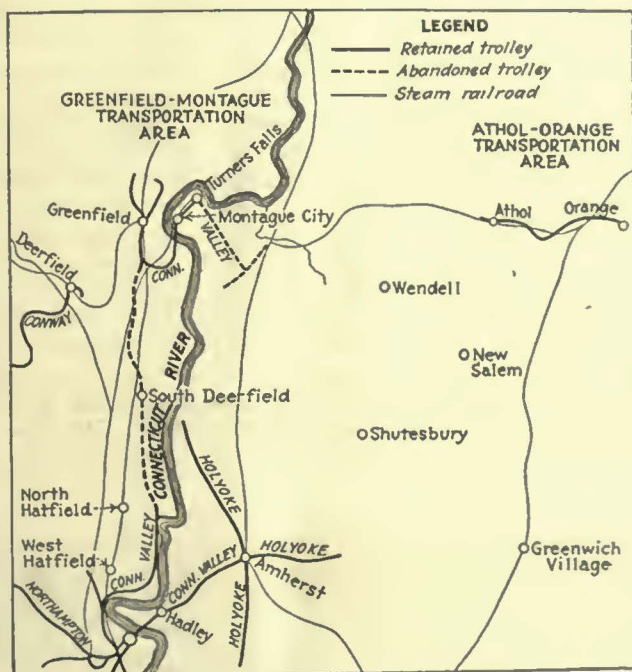
(population 7,600) voted at special town meetings to purchase 8.7 miles of track with cars and repair facilities for \$62,000 from the Connecticut Valley Street Railway. Of this sum, Greenfield paid \$42,966 and Montague \$19,034. Operation was begun by the Greenfield & Montague Transportation Area on Aug. 1, under a board of trustees comprising George W. Cary, chairman; Charles F. Mosher, secretary; J. B. Kennedy and Stuart Winch. As superintendent this board appointed F. A. Persons, who was formerly connected with the predecessor company.

The Greenfield-Montague board has retained the fares of 10 cents cash and 12 tokens for 50 cents, with a minimum fare of two tokens in the initial zone of this four-zone system. At one time, tickets brought 30 per cent of the revenue, but owing to the decrease in steady riders this ratio has dropped to approximately 5 per cent.

In this case the receiver obtained a price somewhat better than that for scrap because the portion taken over showed an operating surplus in 1923 of about \$12,000. In view of the small overhead charges, therefore, this transportation area has possibilities as a going concern. Outside of repainting the cars to an inviting orange yellow, the trustees have made but one other change of importance, viz., the abandonment of the alternative

motor-bus route to Turner's Falls. A word or two on this is in order.

The trackway distance to Turner's Falls is 4.8 miles, but the highway distance is only 3.14 miles. Advantage of this was taken by jitney operators as early as 1914, but it was not possible for the Connecticut Valley Street Railway to counter the move until November, 1919, following the passage of a law in 1918 which permitted street railways to operate motor buses. The installation of a reliable hourly and half-hourly service by Mr. Abercrombie disposed of this jitney competition and also permitted a cut in car-miles. This operation eventually resolved itself into a joint 30-minute headway by motor bus and trolley with the same fare schedule on the buses between terminals. The higher



Publicly Owned Transportation Areas Formed from Former Private Companies. The Track Abandoned Is Also Shown

intermediate fares were justified because of faster operation and the higher cost per seat-mile on the buses.

Since the towns themselves now own the street railway there is no fear of jitneys. Hence the alternative bus route has been abandoned in favor of a 30-minute headway on the trolley only. It is interesting that in the competition with the personal car in this territory, the newer motor buses had suffered more than the older trolley cars. It is stated that the number of riders is now only one-third of the traffic in the year 1917. This reduction may be due as much to the increase in fares as to the increase in automobiles.

The remainder of the Connecticut Valley Street Railway was disposed of as shown on the map, viz., the route between the Greenfield boundary and North Hatfield was abandoned, while the section North Hatfield-Hadley-Amherst was sold to the Northampton Street Railway.

An interesting sidelight on local transportation problems is afforded by the difference in public attitude toward bus or trolley in the three different Massachusetts areas once served by the same management.

In the territory of the Concord, Maynard & Hudson Street Railway the public permitted for 1 year a subsidy equal to taxes. When this was withdrawn, the railway was abandoned. Buses followed at once and have remained.

On the other hand, Athol and Orange were so opposed to buses that their trial was not permitted. It has already been noted that Greenfield and Montague deliberately threw out the alternative short-cut buses between Greenfield and Turner's Falls, although operated as part of the railway property. Finally, the local man who had purchased 9 miles of track extending from the Greenfield boundary through Deerfield and South Deerfield found that the public would stick to the bus. These differences in opinion are not ascribed so much to differences in service or the actual opinions of the majority, but rather to the mass in each town following the lead of a few who for one reason or another were either inclined to street cars or to buses.

PROVISIONS OF THE ENABLING LEGISLATION

The state of Massachusetts has a long and progressive record in public utility regulation. In the early days it was a pioneer in such matters as control of stock issues and earnings, which did much to keep the utilities of the state on a clean-cut financial footing in pre-war days. In more recent years it has fostered the public trusteeships of the Boston Elevated and Eastern Massachusetts properties. The transportation area statutes of 1920, under which the Athol-Orange and Greenfield-Montague properties were taken over, provided for public operation of electric railways in districts where they could not be operated profitably any longer under private ownership. It was not, however, until March, 1924, that advantage was taken of this statute, as previously described.

Section 143 of the transportation area statutes of 1920 states that one or more cities or towns may establish transportation areas for freight and passenger operation of street railways existing in their territory. With the approval of the voters, such a transportation area becomes a corporation vested with the rights and obligations under the general street railway laws that would apply to a privately owned railway, including regulation by the Department of Public Utilities. The

law provides that the term "Transportation Area" shall be included in the title.

Another section states that a city, by vote of its Council, subject to charter provisions, or a town by vote of its Selectmen, may make preliminary agreements with one or more railway companies for lease or purchase and operation of the properties. Such preliminary agreements are made binding upon the company following due hearing by the Department of Public Utilities, but subject to final acceptance by the voters. The department is responsible for the appraised value of the property, which shall be "upon the basis of the actual value at the time of appraisal, and not on the cost of replacement." Within 60 days after due advertisement of such a preliminary agreement and appraisal the voters are asked to decide if the agreement for public operation shall be accepted. If approved by a majority of the voters the mayors, city councils and selectmen may proceed to the final agreement, subject to a few reservations made by the Department of Public Utilities.

CONTROL VESTED IN TRUSTEES

According to the statutes (Section 146) the management and control shall be vested in a board of trustees, two of whom shall be chosen by the Mayor of each city concerned, with the approval of the City Council, and two by the Selectmen of each town concerned. These trustees are selected for 2-year terms, with an initial 1-year term for one trustee in each case. For a transportation area established by a single city or town a board of five members is to be appointed, one member being chosen annually. These trustees, who may be removed for cause, are not deemed public officers, and cannot incur personal liability as such. No stated salaries are provided, but they may be paid \$10 for each meeting attended, provided the total does not exceed \$300 a year. Stockholders of street railways affected are not eligible as trustees.

These trustees have full power to operate, lease or sub-lease a property, subject to approval by the Department of Public Utilities. They can appoint, compensate and remove officers, managers, and assistants. Upon the request of such a board the department shall take, by eminent domain, on behalf of the transportation area, all or part of a property which the company has ceased to operate for more than 90 days. This, of course, is subject to approval by the voters.

An important clause of the act (Section 150) provides that "the cities and towns comprising a transportation area shall contribute to the discharge of its liabilities and obligations on the basis of one-third part, according to the single-track street railway mileage within the town limits, one-third part according to their population, and one-third part according to their assessed valuation. The department shall establish the said basis at least once in three years."

Deficits must be made up by the different communities in proportion to their respective interests, and must be provided for in the tax levy for the year following the financial (calendar) year of the transportation area. Should there be a surplus, 85 per cent shall be distributed among the communities in proportion to their respective interests, the remaining 15 per cent being held as a reserve to meet possible deficits. In making the calculation, not less than 3 per cent nor more than 5 per cent of the book value of the property shall be charged off as depreciation.

For the purpose of acquiring street railways, the transportation area, with the approval of the Department of Public Utilities, may borrow money in excess of the statutory limit, but not exceeding 2 per cent of the assessed valuation. The trustees may also issue notes for current expense for terms not exceeding one year, subject to approval by the department.

The department has authority to exclude any community from a transportation area, but such exclusion shall not prevent the operation of street railways in or through its territory. The department may also permit a transportation area to operate into an adjoining state.

It is provided (Section 155) that the rental of a leased property shall not exceed 7 per cent of the price fixed in any option to buy. No lease shall be made for more than 5 nor less than 2 years, but a lease may be renewed if approved by the department as a matter of public necessity and convenience. Rentals shall be paid at least once in 6 months, and 4 months advance notice must be given to the owners of the property in case of a renewal of the lease. A lease may be terminated by consent of a majority of the stockholders, or by a majority of the voters to an election which is called upon petition of 10 per cent of the registered voters.

The fares established by the trustees, subject to the department's approval, shall be such as "will reasonably assure sufficient income to meet the cost of the service, including operating expenses, taxes, rental, interest, and the allowance for depreciation required," as previously mentioned. The trustees are required to maintain the leased property in good operating condition, so that if restored to the owner it must be in as good operating shape as when taken over, ordinary wear and tear excepted. A provision must be included in all leases, whereby any question of damages will be submitted to the department within 90 days from the date of expiration, and decision by the department shall be final.

As to taxation, it is provided that nothing in the act "shall affect the right of the Commonwealth, or any subdivision thereof, to tax the property owned or leased by a transportation area in the same manner and to

the same extent as if it were under private management, but cities and towns may abate in whole or in part the taxes thereon." This provision continues the railway subject to such state imposts as the excise tax of 1898, but allows it to be relieved of purely local burdens. It may be stated here that during the last 5 or 6 years the Connecticut Valley Street Railway and associated companies were tacitly relieved of paying assessments, because the communities realized the impossibility of getting blood out of a turnip.

963 Buses Ordered in 1924

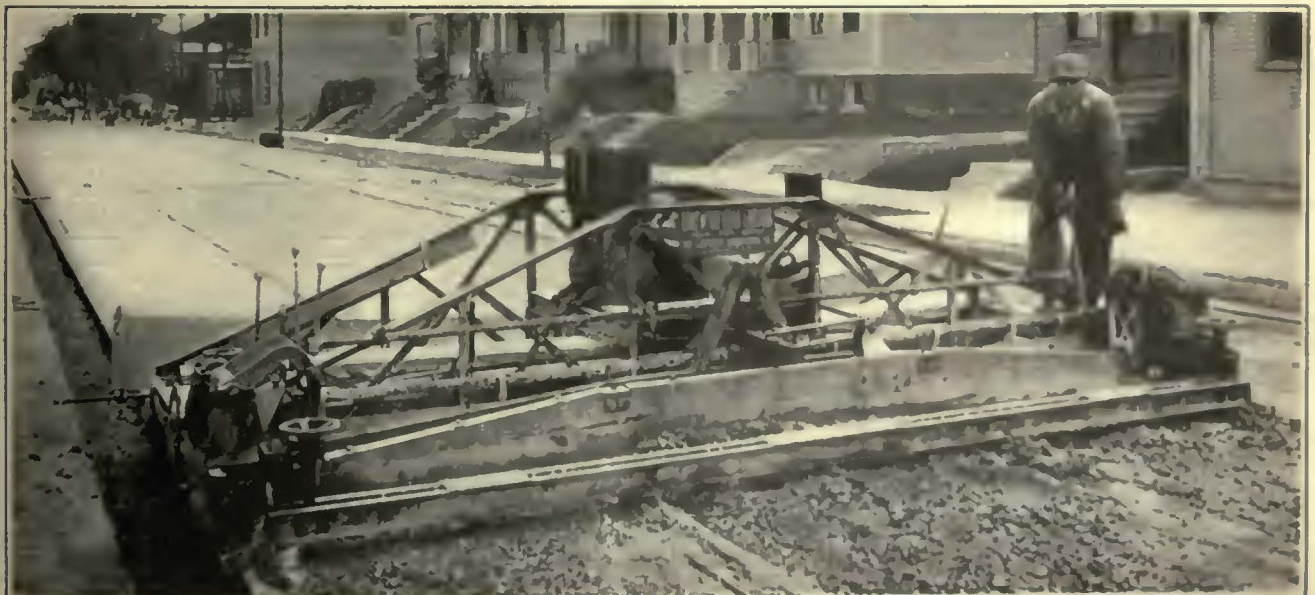
THE survey conducted by this paper covering the number of buses owned by electric railways and the number purchased during the past year shows a total of 963 ordered. This figure appeared incorrectly in the table published on page 8, issue of Jan. 3.

	Motor Buses Ordered	Trolley Buses Ordered	Other Automotive Equipment Ordered	Total
1922.....	240	6	112	358
1923.....	621	15	148	784
1924.....	963	7	105	1075
Increase 1924 over 1923....	342	8*	43*	291

*Denotes decrease.

Machine Speeds Up Concrete Finishing

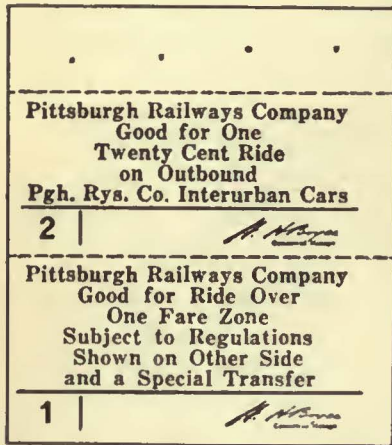
THE latest addition to the equipment of the way and structures department of the Milwaukee Electric Railway & Light Company is a road finisher specially fitted to level and finish concrete pavement. The supporting wheels of this machine are so spaced as to ride on the outside rails of a double track. Four trowels are arranged to cut the flangeways on the insides of the rails. In other respects the machine is similar to those used for spreading, tamping and surfacing concrete highways. It is a self-propelled machine, being driven by a gasoline engine, with dual control levers, which allow it to be operated from either side. The operator rides the carriage as shown in the accompanying illustration. The apparatus was built by the Lakewood Engineering Company, Cleveland, Ohio.



Hand Labor Finishing the Surface of Concrete Track Paving in Milwaukee Has Been Eliminated by This Machine

Coupon Books Arranged to Extend Transfer Privileges

TWO types of special tickets, one colored robin's egg blue and the other pink, have been adopted by the Pittsburgh Railways, with a view to extending the transfer privileges of passengers on the Harmony and Mars interurban lines. One type of ticket is made up in pads of six leaves, each leaf consisting of three coupons. The first coupon is good from the suburban terminus of the Pittsburgh Railways into the city, and entitles the holder to a regular transfer such as is issued to city passengers. The second coupon is good on the return trip from any point reached by the transfer to a connection with the interurban route. A third coupon is accepted on outbound Harmony and Mars cars as far as the end of the Pittsburgh Railways line. The pads are sold to the public at \$1 each.



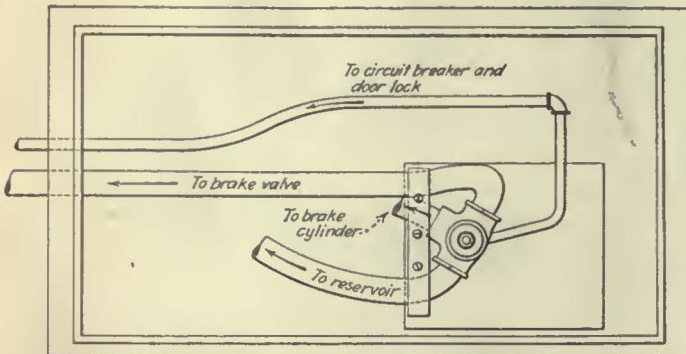
This Style of Coupon Has Been Devised by the Pittsburgh Railways to Afford Special Transfer Privileges for Interurban Passengers

On Sundays there are special transfer privileges on a 10-cent cash fare instead of the 8½-cent token fare. A second booklet, containing five leaves of three coupons each, and selling for \$1, is designed to give the interurban passengers these special Sunday privileges. Assuming that the interurban passenger desires a transfer, this saves 16½ cents for a round trip on week days, and 13½ cents for a round trip on Sundays.

These books are intended only for the use of the regular patrons of the Harmony and Butler short-line route, and are sold only by the conductors on these cars, in order to prevent the excessive overcrowding which might result from the issuance of transfers on a regular token fare paid on these cars.

Emergency Valve for One-Man Cars

THE laws of Massachusetts require that all street railway cars operated by one man shall be equipped with apparatus to perform three distinct functions. There must be suitable arrangements so that any passenger, by pulling an emergency cord, can apply the



brakes, shut off the power, and release the doors. The device adopted by the Middlesex & Boston Street Railway to accomplish this consists of a three-way valve which normally provides connection from the air reservoir to the brake valve. When this is thrown to the emergency position by a passenger pulling a handle suspended from the roof of the car, air reservoir pressure is connected directly to the brake cylinder and to the circuit breaker and door unlocking mechanism.

The apparatus is located in a box suspended from the ceiling of the car. A pull cord hangs down where passengers easily can reach it. The outside of the box is labeled "For emergency only—to stop car pull cord." Pulling the cord rotates a handle attached to the valve and held in position by a spring. The rotation throws the spring over center and the valve is then held open by the same spring which ordinarily holds it closed.

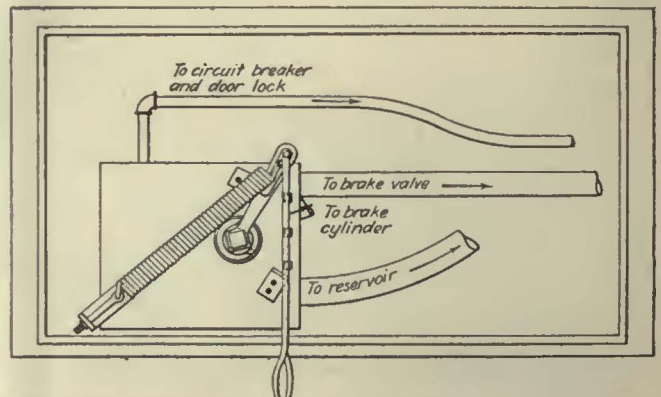
Railway Collects Souvenirs

THE articles in the accompanying illustration are not parts of a well-known make of automobile nor the contents of the gizzard of an ostrich who got his breakfast in a machine shop. They are the odds and ends, trinkets and gewgaws, dropped by passengers into the fare boxes of the pay-as-you-enter street cars of the Illinois Power & Light Corporation at Champaign, Ill. Among them are washers, combs, marbles,



Some Trinkets Found in Champaign Fare Boxes

safety pins, hairpins, keys, screws, nails, bits of glass, theater checks, nuts, bolts, lockets, pebbles, matches, tacks and a 38-caliber cartridge. Similar trinkets are found on all the city systems operated by the company.



Front and Back Views of Emergency Stop Device Designed by the Middlesex & Boston Street Railway for One-Man Converted Cars

Purchased Power for Illinois Central

Contract Between Railroad and Commonwealth Edison Company Provides for Supply of All Energy Required in Electrified Chicago Terminal Zone—Seven Substations, Totaling 40,500-Kw. Capacity, to Be Owned and Maintained by Edison Company

AN IMPORTANT step in the completion of its plans for electrification of the Chicago Terminal District was recently taken by the Illinois Central Railroad, which has entered into a contract with the Commonwealth Edison Company of Chicago, to supply all of the power requirements for this project. While the purchase of energy instead of its generation has become the generally favored practice among railways, this is one of the largest contracts of the sort executed up to the present time. Some of the general basic principles included in the new Illinois Central-Commonwealth Edison contract are of general interest as indicating recent practice in large power contracts of this type.

This contract is made for a term of 10 years, commencing Jan. 1, 1927, or any earlier or later date (not later than Jan. 1, 1928) with provision for four extension periods of 5 years each. The estimated load calls for an initial capacity of 40,500 kw. This will be converted in seven substations to be owned and operated by the power company. The substations are to be constructed upon property either owned or leased by the power company, or upon right-of-way of the railroad company. When located on the railroad right-of-way, a small nominal rental will be charged the power company, providing that at least 80 per cent of the substation capacity is used for the railroad requirements. The power company is given the right to distribute energy from the substations to other customers, but if in any year the amount of energy so distributed exceeds 20 per cent of the entire output of the station, provision is made for charging a higher rental for the property on which the station is located.

Energy will be supplied in three forms, i. e., (a) direct current at 1,500 volts nominal; (b) 60-cycle, three-phase, four-wire power at 4,000 volts nominal between phases; (c) 60-cycle power at such other voltages and phases as may be mutually agreed upon. The underground transmission and distribution lines for supplying the railroad energy requirements may be constructed on the railroad's right-of-way, and provision is made in the contract that the number, capacity and distribution of such lines will be such as to permit any one to be cut out without interrupting the delivery of the required amount of energy. Provision is also made to avoid fluctuations in potential of the direct current, which is to be delivered at a nominal voltage of 1,500. It is specified that this shall not exceed 1,550 volts nor be lower than 1,400 volts. Under normal conditions the frequency and voltage are not permitted to vary more than 5 per cent above or below the normal figures.

PROVISION FOR ADDITIONAL POWER

Under the terms of the contract the power company agrees to provide sufficient generating, transmitting and converting equipment at all times, but the railroad is required to give at least 12 months' written notice of any expected substantial increase in traffic or business

which may necessitate the installation of additional generating, transmitting or converting equipment.

The seven substations originally specified in the contract will be spaced at intervals of 5 to 7 miles along the railroad right-of-way. Provision has also been made for additional 1,500-volt direct-current substations where it may be found later that energy cannot be economically transmitted from the existing ones. Such additional stations will be installed upon written request from the railroad company, specifying the approximate location, the estimated amount of additional energy required and the approximate date of first delivery. Notice of new substation requirements must be given at least 12 months before operation is contemplated. The additional power required must be not less than 3,000 kw., and the railroad company is obligated to provide a site for the new station unless the power company has a site of its own available.

In the event that the contract is not extended for more than one 5-year period after the original 10-year term, provision is made to protect the power company from loss on its investment in substation apparatus. The railroad is then required to purchase all such apparatus which has been installed in any substation for supplying direct current for traction service. Even though the contract is extended for more than one 5-year period, the railroad company must purchase, at its termination, any apparatus which has been in service in substations for a period of 15 years or less, except that which the power company elects to use for other purposes. Under this clause of the contract the railroad has an option to buy any or all of the substation equipment, at the termination of the contract, which the power company has erected on the right-of-way of the railroad. The purchase price is to be determined by agreement between both parties, giving due consideration to replacement costs, obsolescence, normal depreciation and conditions with respect to repair and serviceability of buildings or equipment. If no agreement can be determined, the purchase price is to be referred to an arbitration board.

Extensions of the contract for terms of 5 years may be made by the railroad company four times, upon written notice one year in advance of expiration of the previous term. Even if such extensions run later than May 31, 1947, the contract is to terminate on that date, unless prior to that time the Edison Company is permitted by legislation to operate in at least as ample or broad a manner as at present.

DETERMINATION OF DEMAND

After the end of each calendar month, the railroad company's maximum demand will be determined by selection of the 3 hours from the specific month (one to be taken from each of three different days) in which the aggregate output of power is greater than that supplied in any other 3 hours in the month. One-third of the aggregate number of kilowatt-hours taken during the 3 hours selected is to be considered as the number

of kilowatts constituting the railroad company's maximum demand for that month, provided that in ascertaining the figure a period of abnormal demand has not been selected. If in any month every hour selected should be one of abnormal demand, the maximum demand for that month is to be the number of kilowatt-hours constituting the maximum demand for the last preceding month in which the maximum demand was ascertained as described. An abnormal period is considered to be one during which there is extra heavy railroad traffic, abnormally low temperature or other unusually severe weather conditions. In the event of abnormally heavy railroad traffic which continues beyond ten consecutive days in any month, the maximum demand will be determined as previously outlined, but will not be used in determining the load factor for that month. Should the total usable surplus generating, transmitting and converting capacity of the power company at any time be insufficient or unavailable to enable it to supply the railroad company a portion of the excess energy in an abnormal period, the railroad will be required upon notice by telephone or otherwise to refrain from drawing such portion of excess energy until notified.

BASIS OF ENERGY CHARGES

Rates for energy to be charged under the contract are made up on a sliding primary charge, based on maximum demand, and a sliding energy charge based on the number of kilowatt-hours drawn. The primary charge is the same for all demands up to and including 5,000 kw.; about 8 per cent less between 5,000 kw. and 10,000 kw. inclusive; about 13½ per cent less for 10,000 to 15,000 kw. inclusive, and 19 per cent less for demands in excess of 15,000 kw.

The energy charge, expressed in mills per kilowatt-hour, is the same for consumptions up to and including 5,000,000 kw.-hr. per month. It is about 0.8 per cent less for consumptions between 5,000,000 kw.-hr. and 7,500,000 kw.-hr. inclusive, and 1.5 per cent less for consumptions in excess of 7,500,000 kw.-hr. The secondary or energy charge is based on 10,500-B.t.u. coal at \$4 per ton and is subject to increase or decrease depending upon the average cost and heating value of coal. Whenever the average cost of the coal or its calorific value departs from this basis for any month, the energy charge will be calculated according to the following formula:

$$\frac{\text{Cost} \times 10,500}{\text{heat units}} + 2.5 = \text{Mills per kilowatt-hour for consumptions up to and including 5,000,000 kw.-hr. per month.}$$

$$\frac{\text{Cost} \times 10,500}{\text{heat units}} + 2.45 = \text{Mills per kilowatt-hour for the excess over 5,000,000 kw.-hr. and up to and including 7,500,000 kw.-hr. per month.}$$

$$\frac{\text{Cost} \times 10,500}{\text{heat units}} + 2.4 = \text{Mills per kilowatt-hour for the excess over 7,500,000 kw.-hr. per month.}$$

In this formula, the cost is the weighted average cost per ton to the power company of all coal delivered to it during the preceding 12 months, including freight, switching and car service charges and the cost of storing and handling the coal. No increase in the secondary energy charge becomes effective unless such increase is consistent with a contemporaneous general change in the cost of mining coal in the states of Illinois, Indiana and Kentucky, and in the cost of transportation of coal to Chicago. No adjustments due to change in calorific

value are to be made unless the B.t.u. per pound exceeds 11,000 or falls below 10,000.

The railroad guarantees that during each month of the contract the total consumption of energy in kilowatt-hours will not fall below 30 per cent of the equivalent of its maximum demand, and that its total aggregate payment will not be less than such a load factor would require.

PROVISION FOR METERING ENERGY

Meters for determining the maximum demand and energy consumption are to be installed by the power company at its own expense. The energy is considered to be delivered to the railroad at the point where the feeders leading from the substations intersect the railroad company's right-of-way. All watt-hour meters will be tested and calibrated monthly in the presence of representatives of both parties when desirable, and any meter found to be not more than 1 per cent away from normal is to be considered correct. If any meter exceeds this limit of accuracy, readings will be corrected by the per cent of inaccuracy found, but no correction will extend back beyond 30 days previous to the finding of the inaccuracy. If any meter is tested at the request of the railroad company and the registration is found within 2 per cent of accurate, the railroad company will be required to bear the expense of the test. All other tests are to be made at the expense of the power company.

INTERRUPTIONS OF SERVICE

In case of interruption or failure of power supply, the primary demand charge for that month is to be proportionately reduced, and if the inability to supply energy causes the railroad's load factor to fall below the guaranteed amount, the railroad is relieved of the guarantee for the corresponding month and the average secondary charge is not to be made at a higher rate than the average secondary charge during the preceding normal month. Furthermore, if the railroad is prevented from operating regular train service due to causes beyond its control, the minimum load factor of 30 per cent is not to apply for this period. The minimum load factor will apply only during those days in which the railroad has not been prevented from operating its regular service.

The contract also stipulates a recognition on the part of the power company that the railroad must receive regular uninterrupted service, and provision has been made whereby the railroad can cancel the contract if trouble with the character of service is not remedied within 90 days from the date of complaint. However, the railroad is required to give the power company 30 days notice in writing of its intention to cancel the contract, stating the date of its proposed termination. If this is done, the contract is to terminate upon the date when the railroad company is able to obtain elsewhere energy necessary for the operation of its lines. Until such date, the power company is required to supply energy in accordance with the terms of the contract.

If at any time the power company supplies energy to any other railroad, at a lower rate which is not justified by different conditions of service, making the cost of production and distribution to the other consumers relatively less than to the Illinois Central Railroad, the latter is to be entitled to a reduction in its rates equal to that portion of the difference as shall not be justified by the difference in conditions.

In case of any railroad accident or abnormally heavy railroad traffic, the railroad company is required to give the power company immediate notice by telephone or otherwise. At the termination of such abnormal periods the parties to the contract are to agree, if possible, on the duration of the abnormal period and if they are not able to agree within 10 days the subject is to be submitted to arbitration.

ARBITRATION BOARD

Any differences of opinion arising between the two parties with respect to their rights and obligations, which cannot be settled otherwise, are to be referred to a board of arbitrators, consisting of three disinterested persons. One is to be chosen by each of the parties. These two are to select a third arbitrator. If they cannot select a third member within 20 days after their appointment, the third arbitrator is to be chosen by the senior judge of the United States District Court of the eastern district of the northern division of Illinois. In case the railroad company disputes and desires to submit to arbitration any bills rendered by the power company, the railroad will be required to pay those bills within 30 days without prejudice toward its rights to recover any sum which the decision of the arbitrators may find to be overpayment, with interest at 6 per cent. Compensation of the arbitrators is to be paid in equal parts by the two parties to the contract.

Buses Link Industrial with Residential Section

Two Buses Replace Shuttle Car Service in Rensselaer, N. Y., and Provide Extensions to Sections Not Previously Served

AN ORDINANCE permitting the operation of buses by the Capital District Transportation Company, Inc., a subsidiary of the United Traction Company, Albany, N. Y., was adopted by the Common Council for the city of Rensselaer in June, 1924. Operation began on Sept. 24. This bus operation replaces a shuttle service which was furnished by an electric car line in Rensselaer. At the same time the line was extended to the south a little over 1/4 mile to reach an industrial district which was previously without transportation

service, and to the north it was extended for nearly a mile to include a residential section. Industrial and residential sections are thus joined so that the service is improved over that originally furnished by the car line. The buses have been routed during certain hours of the day along East Street, to reach a school and a church in that section and also to serve residents who were without transportation. This latter routing is experimental. It is being done to make certain whether

DIMENSIONS AND EQUIPMENT DETAILS OF RENSSELAER BUSES

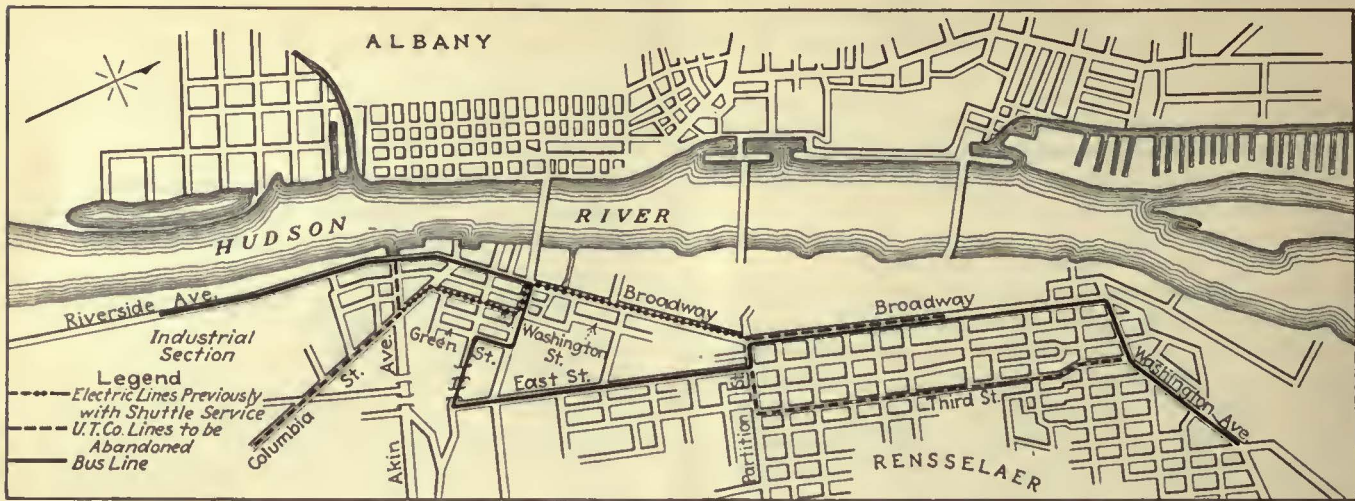
Operating company	Capital District Transportation Company
Number of buses in this service	2
Chassis	Pierce-Arrow Model Z
Wheelbase	196 in.
Front tread	68 in.
Rear tread	89 in.
Turning radius inside wheels	37 ft. 6 in.
Wheels	Budd-Michelin
Tires	General Pneumatic cords 36x6, dual rears
Engine	4-in. bore, 5 1/2-stroke
Ignition system	Delco, double
Engine starter	Delco
Lubrication system	Alemite
Axle bearings	Timken
Brakes	Service on drive shaft, emergency on rear wheels
Body manufacturer	Bender Body Company
Type body	Pay-enter
Length over all	16 ft. 4 in.
Height inside	6 ft. 4 in.
Width inside	6 ft. 10 in.
Seating capacity	25
Seats	Hale-Kilburn 208 de luxe
Seating material	Spanish leather
Interior trim	Mahogany
Headlining	Exposed carlines, white enameled
Roof material	Canvas
Window guards	Outside, stationary
Ventilators	Nichols-Lintern
Signal system	Faraday
Destination signs	Hunter, roller
Doors	Folding, hand operated
Heater	Exhaust
Lamps, interior	Six 21 candlepower
Fare registers	Ohmer
Rolls and straps	Porcelain with sanitary grips
Emergency door	At rear right hand side, mechanically controlled from driver's seat
Painting	Red body, cream trimmings, buff roof

or not the traffic warrants service through this section. If it does, the car routes can be rearranged readily.

An accompanying map shows the route of the bus line as it is now operated and also the shuttle service which was previously furnished by the electric cars. The portion of the line along Broadway between the Hudson River bridge and Partition Street is also served by cars which cross the bridge from Albany. As the tracks on Third Avenue, Washington Street and Columbia Street are still traversed by cars of the Albany Southern Railroad operating between Albany



New Buses Used to Give Improved Service in Rensselaer, N. Y.



Map of Rensselaer Showing Bus Line and Electric Line Previously Operated as Shuttle

and Hudson, N. Y., the only part of the electric line to be abandoned is a section along Broadway north of Partition Street and a short section along Akin Avenue.

At present two buses are used for the service. These have bodies made by the Bender Body Company, mounted on Pierce-Arrow Motor Car Company's model Z chassis. The buses, which are of the pay-enter type, seat 25. The accompanying table gives the principal dimensions and details of construction.

Where possible, the various items of equipment used on these buses are the same as those used on the trackless trolley vehicles operated by this company in Cohoes, and which were described in the Dec. 13 issue of *ELECTRIC RAILWAY JOURNAL*. Particular attention has been given to providing an attractive and comfortable bus throughout. The Hale & Kilburn type 208 de luxe seats give comfortable riding, and a clear height inside of 6 ft. 4 in. gives headroom for standing passengers. Special attention has also been given to providing an efficient lighting system. The illumination at night is furnished by six 21-cp. lights. An emergency door on the rear right-hand side is mechanically controlled from the driver's seat. The exterior painting is standard United Traction Company's color design with red body, cream window posts and buff roof.

Fifty Reasons for Traveling Traction

AN ADVERTISING campaign is being conducted by the Indianapolis & Cincinnati Traction Company in five daily newspapers along the line. One good reason for "traveling traction" is given in each advertisement. The same heading is used all the time in all the papers. The first appearance was on Sept. 1, and one advertisement was published every second day, after that time. In all, 50 were published, ending Dec. 26. Among the reasons presented are the following:

It is a problem to find parking space in Indianapolis. A man saves lots of time leaving his auto at home when he goes to the city.

The I. & C. makes a real low rate on Sunday. A fine thing for the fellow who works all week and wants an outing on Sunday. Only a dollar between any two stations on either division.

The cars carry fresh ice water. This is a little thing but it means a lot in hot weather, and the I. & C. coolers are according to government regulations, with the ice separate from the water.

The I. & C. has careful, well-trained men. They are making a wonderful record for safe operation.

The I. & C. is a Hoosier institution, home managed—home owned, a vital part of the community.

Everybody prefers to ride steel cars. All of the new I. & C. cars are steel.

The interurban lets the city man live in the country and the country man work in the city. It is so easy to go back and forth every day.


The train schedule is dependable all the year around. The cars run rain or shine, snow or sleet, and maintain splendid service.

The I. & C. has low commutation rates for the daily traveler. The rate from here to Indianapolis is only — cents.

The traffic rules in Indianapolis change so fast it is hard to keep out of jail. So much easier to leave the auto at home and take the traction.

The traction line checks 150 lb. of baggage free and a man can take almost any amount of excess right along with him, usually on the same car.

The I. & C. trainmen are always courteous and thoughtful in helping elderly people and children. They never run off and leave you, either.



"TRAVELING?"

"Yes,—Traction!"

"Why?"

The regular Interurban fare is 20% less than the railroad fare. This means a lot to a frequent traveller.

Reason No. 6

44 other reasons!

Indianapolis & Cincinnati Traction Co.

This Heading Is Used in All the Papers All the Time in the Advertising Campaign of the I. & C.

The I. & C. cars have such broad, roomy, comfortable seats. There is plenty of leg room, too—comfort for both tall and short.

A man can put in a busy day, catch the traction and get all cleaned up before he gets home. The toilet facilities on the cars almost equal a Pullman. Plenty of room.

The I. & C. cars are kept clean. Ever notice that there is no noisy fare register; no cash fare receipts littered on the floor? Even the bell cord is strung along the side of the car. The cars must be cleaned daily.

Too many driving hazards—fool driver—speed fiends at cross roads—road hogs. The interurban is safe. No worries about getting your auto stolen either.

Clearing Trouble on Underground Feeder Sections*

A COMPLETE set of general instructions for the clearing of trouble on underground feeder sections has been completed during the year by the United Railways & Electric Company of Baltimore, Md. This has been prepared by Adrian Hughes, Jr., superintendent of power, in co-operation with his foremen. The instructions give in detail directions for the manner of procedure on every section of the company's lines in case of trouble. The instructions for each section embody a number of tests to determine the location of the break or seat of trouble. The first test in each instance is for the cause which experience shows would be most likely to be responsible for trouble in that section. The second test is for the next most likely cause, and so on.

These instructions in handling grounded sections are intended to be of aid in locating and correcting trouble quickly. Such instructions cannot be written for every specific case, and it is, therefore, necessary to cover in a general way all cases of trouble that can be foreseen. The linemen, of course, are supposed to use their judgment in applying the instructions and to be guided by the results obtained from the different steps.

The general rule for grounded sections is first to inspect the overhead portion of the section, i.e., the trolley wire and the overhead feeder; and then to separate the underground portion of the section, i.e., the underground feeder, beginning as near the middle point as possible. In this way the various portions of the section will be eliminated until the trouble is found.

A test lamp is considered useful in this work. The testing outfit consists of either a single lamp in series with a suitable resistance, or a five-light cluster, so

that it can be safely connected between a source of 600-volt energy such as the trolley wire, or a live feeder or switch and the ground. By connecting to such a source of energy and touching the test point to a cable which has been separated from the rest of the circuit, it is possible to determine whether or not this cable is grounded. If the lamps light the cable is grounded, and if they do not light it can usually be assumed to be in good condition. The testing outfit should always be tried out before and after making a test to be sure a lamp is not burned out or other trouble developed in it. For instance, after connecting the lamp to a source of energy such as a live trolley wire or a live switch it should be connected to a known ground such as the rail or a negative wire. If the lamp lights and burns at normal brilliancy it shows the testing outfit is in good condition. It then is safe to make the test on the underground cable or other portion of the circuit. Upon completion of the test the test point should again be touched to the ground to be sure the testing outfit is in good condition and did not give a false indication.

The distributing lines in Baltimore are divided into some 70 sections, designated by the name of the street or portion of the street where the feeders are located. Specific instructions have been worked out for each section, the conditions having been studied carefully so that there is little opportunity for guesswork on the part of the tester as to the proper procedure to make to locate trouble. The instruction sheets for several of the sections which follow indicate the general form.

*This article is based on material included in the brief submitted to the Charles A. Collin Prize Committee, of the American Electric Railway Association by the company named.

Baltimore Street Section Central Substation No. 3

First go over trolley wire.

If No Overhead Trouble Is Found:

CABLE No. 8—Open switch on cable No. 8 on pole south side Baltimore Street opposite east B/L Charles Street. Have substation test No. 8 cable.

If No. 8 is GROUND—Have substation cut out No. 8 cable and close breaker.

If No. 8 is CLEAR—Close switch on cable No. 8 and proceed to Baltimore and Eutaw Streets.

CABLE No. 52—Open switch on cable No. 52 on pole south side Baltimore Street 50 ft. east of east B/L Eutaw Street. Have substation test cable No. 52.

If No. 52 is GROUND—Have substation cut out No. 52 cable and close breaker.

If No. 52 is CLEAR—Close switch on cable No. 52 and proceed as follows:

CABLE No. 116—Open all switches on cable No. 116 located on south side Baltimore Street as follows: east of Paca Street—50 ft. east of Eutaw Street—southeast corner Sharp Street—opposite east B/L Charles Street—southeast corner Light Street.

Test No. 116 with test lamp at either Charles Street or Eutaw Street.

East Baltimore Street Section Pratt St. D. C. Board No. 4

If Two Crews Are Available, One at Caroline Street and One at Lombard Street:

CAROLINE STREET CREW—Starting at Baltimore and Caroline Streets proceed east to Broadway and south to Gough Street. If no overhead trouble is found, return over section to meet other crew.

LOMBARD STREET CREW—Starting at Baltimore and Calvert Streets proceed east to Caroline Street. If no overhead trouble is found, continue over section to meet Caroline street crew.

If No Overhead Trouble Is Found by Either Crew:

CABLES No. 15 AND No. 24—Lombard Street crew shall open switches at Baltimore Street and Market Place on cables Nos. 24, 63 and 64 and switch at Baltimore

and Holliday Streets, on cable No. 15. Call Pratt Street D. C. Board to test cables Nos. 15 and 24. If either, or both of these cables test clear, close switches at Holliday Street and at Market Place but do not close switches on Nos. 63 and 64 until all switches have been opened and cables tested with test lamp.

CABLES No. 63 AND No. 64—Caroline Street crew after meeting Lombard Street crew will open switches on cables Nos. 63 and 64 at the following locations: Broadway and Gough Street, Broadway and Pratt Street, Broadway and Baltimore Street, Baltimore and Caroline Streets, Baltimore Street and Central Avenue, Baltimore and High Streets.

Return to Baltimore and Caroline Streets, close cross-connecting switch with Caroline Street section. Then test cables Nos. 63 and 64 with test lamp at this location. If either, or both of these cables show clear, close in switches on clear cable at the location given above and then meet Lombard Street crew at Baltimore Street and Market Place.

If cable No. 24 is O.K. and has been closed in, close switches on either No. 63 or No. 64, or both, if they are O.K. at Baltimore Street and Market Place.

If Only One Crew Is Available:
First go over trolley wire.

If No Overhead Trouble Is Found:

Return to Baltimore Street and Market Place and proceed as above for cables Nos. 15 and No. 24. Then follow procedure for cables No. 63 and No. 64.

Belair Road Section

Northern Substation No. 7

First go over trolley wire.

If No Overhead Trouble Is Found:

CABLES Nos. 84, 85 AND 163—Open switches on Belair Road as follows: No. 84 and 85 at northwest corner of Brehm's Lane, No. 163 at southwest corner of Brehm's Lane, No. 84 and 85 at Clifton Park gate, Nos. 84 and 85 at No. 2346, Nos. 84 and 85 at Lyndale and 84 and 163 at Ravenswood Avenue.

Have operator at Northern substation test cables and close switches on clear cables.

Boulevard Section

Northern Substation No. 7-1

First go over trolley wire, observing the following route. St. Paul Street to 31st Street, to Greenmount Avenue, back to University Parkway, then open switch that controls the Gullford extension. If power comes on it indicates trouble on Gullford extension. Continue over University Parkway to Roland Avenue, then south to Overhill Road to Charles Street Avenue, to Gullford terminus, then south to University Parkway.

If No Overhead Trouble Is Found:

CABLE No. 154-A—Open switches on cable No. 154-A, located on St. Paul Street at 31st Street, at 29th Street, and at 26th Street.

If Section Does Not Clear Up:

CABLES Nos. 154 AND 155—Open switches on cables Nos. 154 and 155 at northwest corner of Greenmount Avenue and 31st Street.

Then call operator at Northern substation. If operator reports section as still grounded, send driver to St. Paul Street and University Parkway to close switch that controls Gullford extension, and also to Roland Avenue to close tie line switch with Roland Park section. This will make Boulevard section alive. The driver will then meet the lineman at Greenmount Avenue and H. & O. right-of-way, where cables Nos. 154 and 155 are to be opened and tested with test lamp.

If Nos. 154 and 155 Test Clear:

CABLES Nos. 106 AND 107—Go to Exeter Hall Avenue and open switches on cables Nos. 106 and 107 and have operator at Northern substation test these cables, after which close in on clear cable, notifying operator to do the same. Then close tie line switch between Boulevard, Roland Park and St. Paul Street section at Exeter Hall Avenue. Then go to York Road and H. & O. right-of-way and Greenmount Avenue and 31st Street and close switches on cables Nos. 154 and 155. Then test cable No. 154-A and if clear, close switches on it.

Then go to Roland Avenue and open tie line switch with Roland Park section.

American Association News

Claims and T. & T. Committees for 1925

THE committee appointments of the Claims Association and of the Transportation and Traffic Association for the current year have now all been made. Invitations have been sent out to the members given in the following list, and acceptances have been received from all but a few of those named. An additional committee on engineering symbols which has been appointed in the Engineering Association is also included below.

It is expected that committee appointments in the Accountants' Association, as well as additional American Association committees, will be announced in the near future.

Claims Association

ACCIDENT PREVENTION

(Joint Committee with T. & T. Association)

C. B. Hardin, general claim agent United Railways of St. Louis, St. Louis, Mo., co-chairman.

J. H. Handlon, San Francisco, Cal.
S. G. Shaw, Denver, Col.
H. H. Barnard, Birmingham, Ala.
J. S. Harrison, Jacksonville, Fla.
L. F. Wynne, Atlanta, Ga.
G. R. Whitmore, Peoria, Ill.
T. C. Neilson, East St. Louis, Ill.
Wallace Muir, Lexington, Ky.
J. G. Bruce, Indianapolis, Ind.
E. J. Paige, Baltimore, Md.
W. H. Hyland, Gloversville, N. Y.
C. W. Giltner, Detroit, Mich.
H. E. Cady, Utica, N. Y.
R. A. Sears, Boston, Mass.
Samuel Riddle, Louisville, Ky.

EMPLOYMENT

W. G. Marshall, superintendent claim department, Pittsburgh Railway, Pittsburgh, Pa., chairman.

Neil Funk, Louisville, Ky.
C. M. Roberts, Los Angeles, Cal.
H. L. Osgood, Springfield, Mass.
A. E. Shaw, Montreal, Canada.

MEDICAL AND SURGICAL WORK

F. L. Mosser, surgeon Third Avenue Railway, New York, N. Y., chairman.
George Lorenz, Chicago, Ill.
E. W. Miller, Milwaukee, Wis.
Daniel Strook, Newark, N. J.
J. A. Watts, San Antonio, Tex.

RESOLUTIONS

William Tichenor, claim agent Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., chairman.

D. M. Finch, Des Moines, Ia.
A. G. Jack, Wilmington, Del.
A. F. Solms, Savannah, Ga.

SUBJECTS

J. J. Reynolds, claims attorney Boston Elevated Railway, Boston, Mass., chairman.

S. A. Bishop, Los Angeles, Cal.

W. H. Hyland, Gloversville, N. Y.
F. S. Macy, Brooklyn, N. Y.
Wallace Muir, Lexington, Ky.
E. J. Paige, Baltimore, Md.
C. E. Redfern, Providence, R. I.

Transportation and Traffic Association

ACCIDENT PREVENTION

(Joint Committee with Claims Association)

C. W. Chase, president Gary Street Railway, Gary, Ind., co-chairman.
M. W. Bridges, Chicago, Ill.
J. F. Egolf, Aurora, Ill.
Arthur Gaboury, Montreal, Canada.
J. A. Jarvis, Chicago, Ill.
A. W. Koehler, Rochester, N. Y.
R. L. Lindsey, Durham, N. C.
G. H. McFee, Framingham, Mass.
A. B. Miles, St. George, S. I., N. Y.
R. M. Reade, Quebec, Canada.
C. F. Schmidt, Indianapolis, Ind.
R. J. Smith, Davenport, Iowa.
Samuel Riddle, Louisville, Ky.
George Theis, Jr., Wichita, Kan.

BUS OPERATION

A. H. Ferrandou, executive assistant Washington Railway & Electric Company, Washington, D. C., chairman.
B. W. Arnold, Milwaukee, Wis.
D. C. Barnes, Boston, Mass.
C. H. Chapman, Waterbury, Conn.
F. A. Cummings, Boston, Mass.
E. D. Dreyfus, Pittsburgh, Pa.
M. L. Harry, Decatur, Ill.
D. J. Locke, Newark, N. J.
J. W. McCloy, Syracuse, N. Y.
H. A. Mullett, Milwaukee, Wis.
D. A. Scanlon, Akron, Ohio.
O. A. Smith, Los Angeles, Cal.
R. H. Smith, New York, N. Y.
J. B. Stewart, Jr., Youngstown, Ohio.
J. V. Sullivan, Chicago, Ill.

SELLING TRANSPORTATION

W. E. Wood, local manager Houston Electric Company, Houston, Tex., chairman.

W. M. Bird, Paducah, Ky.
J. R. Blackhall, Joliet, Ill.
J. A. Dewhurst, Philadelphia, Pa.
H. Etheridge, Harmony, Pa.
C. A. Graves, Olean, N. Y.
J. P. Griffin, Dallas, Tex.
C. F. Handsby, Springfield, Ill.
W. W. Holden, San Antonio, Tex.
H. G. Monger, Milwaukee, Wis.
C. D. Smith, New Brighton, Pa.
Bert Weedon, Indianapolis, Ind.
E. S. Wilde, New Bedford, Mass.
W. H. Boyce, Pittsburgh, Pa.

TRAFFIC CONGESTION

G. B. Anderson, manager of transportation Los Angeles Railway, Los Angeles, Cal., chairman.

W. E. Thompson, superintendent of transportation Third Avenue Railway,

New York, N. Y., vice-chairman.
W. S. Bell, Wilkes-Barre, Pa.
R. C. Brooks, Savannah, Ga.
S. C. Dows, Cedar Rapids, Ia.
D. L. Fennell, Kansas City, Mo.
J. A. Greig, Chicago, Ill.
J. E. Heberle, Washington, D. C.
F. R. Latta, Syracuse, N. Y.
W. H. Maltbie, Baltimore, Md.
A. R. Myers, Erie, Pa.
J. P. Pope, Lexington, Ky.
E. S. Rider, Detroit, Mich.
J. P. Tretton, Indianapolis, Ind.
P. E. Wilson, Cleveland, Ohio.

Engineering Association

ENGINEERING SYMBOLS

H. R. Stamm, architect the Connecticut Company, New Haven, Conn., chairman.

H. W. Coddling, Newark, N. J.
R. C. Cram, Brooklyn, N. Y.
E. L. Lockman, Boston, Mass.
J. F. Neild, Toronto, Canada.
C. W. Squier, New York, N. Y.

Executive Committee

THE executive committee of the American Electric Railway Association met in regular meeting in New York on Jan. 7. Members present were President J. N. Shannahan, Secretary J. W. Welsh, R. P. Stevens, C. E. Morgan, W. H. Sawyer, J. H. Hanna, T. C. Cherry, J. P. Barnes, C. H. Clark, C. S. Hawley, E. P. Waller, A. A. Hale, E. F. Wickwire and M. B. Lambert.

Reports were heard from the various standing committees. Approval was given the work done by a special committee in engaging new headquarters for the association beginning May 1.

Speaking for the committee on publicity, Mr. Barnes urged that the members of the association and the association itself give thorough co-operation in following up the work of the National Conference on Street and Highway Safety, which was called by Mr. Hoover. Mr. Barnes also gave a brief report of the activities of this conference and expressed the view that it had resulted in the most instructive and conclusive statement for guidance in the street and highway traffic situation that has ever been compiled. He thought that this conference had started a humanitarian and altruistic movement of great importance. The statement referred to was presented in ELECTRIC RAILWAY JOURNAL, issue of Dec. 20, 1924, page 1042, together with editorial comment pointing out certain aspects of the work done by the conference, page 1021.

A set of principles drawn tentatively by the committee on co-operation with the motor vehicle industry to express the policies of the American Electric Railway Association with respect to the bus was read to the executive commit-

tee but no action taken at this meeting. The committee also discussed at some length the need for legislation to bring interstate operation of motor bus lines under the jurisdiction of the Interstate Commerce Commission. No definite step was taken, the object being merely to get an expression of view in respect to this problem. There was unanimity of opinion that the Interstate Commerce Commission should be given jurisdiction over such common carrier operation.

President Shannahan read a report of the Coffin prize committee in which suggestions had been made to the Coffin Foundation for extending somewhat the basis of award. A communication from the Foundation stated several reasons why it was deemed undesirable to make any changes in the plan this year.

The next meeting of the committee will be held in Washington on Monday, Feb. 16, at 10 a.m., in the United States Chamber of Commerce building.

Way Committee

A GENERAL outline of the work to be undertaken by the various sub-committees was considered at a meeting of the way committee, in New York, on Dec. 18-19. Among the subjects of interest discussed was the question of substitute ties. The committee suggested that the sub-committee analyze the results of last year's questionnaire, and follow up the various member companies and manufacturers who are in a position to furnish data. It was the consensus of opinion that the sub-committee should endeavor to design a suitable substitute tie for track in paved streets. Later a design of tie for open track construction can be studied. Considerable discussion took place concerning ways to reduce the noise of car operation. It was thought that the greater part of the noise could be attributed to the condition of the cars. Comparative noise of operation over monolithic steel tie track structure and other forms of ballasted track will be investigated.

During the discussion of welded rail joints, C. H. Clark, president of the American Electric Railway Engineering Association, who was present at the meeting, outlined the results of a visit to Washington, and said that the repeated impact testing machine was now running about 17 hours a day, and striking about 3,600 blows per hour. It drops a 400-lb. weight 6 in. on the joint. R. H. Dalglish added that arrangements had been made to install a so-called "telemeter" on the lines of the Washington Railway & Electric Company to obtain data on the actual impact of car wheels. The committee asked the chairman to request the chairman of the committee on welded rail joints to resume the distribution of the monthly bulletin to members of the way committee.

C. H. Clark outlined his views on the organization of the special committee which he will appoint in the near future to make an exhaustive personal study of the subject of rail corrugation. The members of this committee will visit several of the larger railways in this country and report their conclusions.

One of the most important problems requiring solution in connection with the question of surface hardening of rails is the matter of accurately determining the amount of wear. Several members made suggestions and expressed their views on the subject, and a number also offered to furnish instruments which they had used for this purpose. The next step of the sub-committee will be to determine the relative wear on treated and untreated rails.

Review of existing standards, standardization of frogs and switches, crossing designs, welding methods, welding wire, and the allowable limit of wear were other subjects considered. Those present were: H. H. George, chairman; C. A. Alden, V. Angerer, H. H. Dartt, W. R. Dunham, Jr., E. B. Entwisle, T. A. Ferneding, R. B. Fisher, Chester F. Gailor, Fred Glenton, Jr., D. J. Graham, H. C. Heaton, Norman M. Hench, M. M. Johnston, Thomas J. Lavan, E. L. Lockman, H. F. Merker, L. A. Mitchell, O. C. Rehffuss, E. M. T. Ryder, A. T. Spencer, J. B. Tinnon, W. W. Wysor, R. H. Dalglish, sponsor.

Special Reports Available

THE following special reports have been prepared by the Bureau of Information and Service of the American Electric Railway Association and are available to member companies in good standing upon request. Beginning with the new year the bulletins, reports, compilations, etc., will be numbered in the order in which they are issued. This, it is believed, will make ordering easier.

Bulletin No. 1—Electric Railways Operating Motor Bus Lines: Revision of the compilation of Aug. 1, 1924, bringing up to date data on the number of routes and buses operated, type of bus and seating capacity, fare charged and transfer privileges, etc. There are approximately 180 companies included in the present list.

Bulletin No. 2—Trend of Electric Railway Operations: A month-by-month record of the traffic, revenues, expenses, taxes, car-miles, operating ratio, etc., of a group of 80 companies since Jan. 1, 1920. This is a new edition of the compilation of Aug. 1, 1924, bringing the record of operations of this group of 80 companies down through October, 1924.

Bulletin No. 3—Motor Bus Operations in the United States, Part II: This is a second installment of a list of motor bus lines, the first part of which was issued Dec. 1, 1924. It shows the name and address of all motor bus operators and where the information is available, statistical data on the character of their operations. The present installment covers the states of Iowa, Washington and West Virginia.

Bulletin No. 4—Trend of Material Prices: New edition of the association's compilation bringing down to date the trend of prices of materials used by electric railways furnished by manufacturers.

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

Arrangements for Mid-Year Dinner

THE American Electric Railway Association is sending out descriptive material and a tentative program for the Mid-Year Meeting and Dinner which will be held in Washington, Feb. 15 and 16. Blanks are inclosed for reservations for the dinner and allotments will be made in the order in which requests are received.

Monday will be devoted to committee meetings, between 15 and 20 committees having made arrangements to meet that day.

The morning and afternoon sessions on Tuesday will be held in the Chamber of Commerce Building, H Street and Connecticut Avenue. They will be in the form of a town meeting or open forum with free discussion by all interests represented. The morning topic will be "What Are the Facts About Electric Railway Service." The discussion will be led from the standpoint of the outsider by Peter Witt of Cleveland, Ohio, and from the standpoint of the manufacturer by J. G. Barry of Schenectady, N. Y. The subject for the afternoon session will be "Motor-buses—When, Where and How They Should be Used by Electric Railways." S. B. Way of Milwaukee will lead the discussion from the electric railway standpoint, while a representative of the National Automobile Chamber of Commerce will present the viewpoint of the motor bus operator.

The dinner will be held at the New Willard Hotel. Addresses will be given by national speakers in the government service at Washington as well as by leading men of the electric railway industry.

Washington offers many attractions peculiar to itself. With this in mind the committee of arrangements is planning a special program that will be of interest to the ladies who are in attendance.

News of Other Associations

A.E.S.C. Elects Officers

AT THE annual meeting of the American Engineering Standards Committee on Dec. 11 Charles E. Skinner, assistant director of engineering Westinghouse Electric & Manufacturing Company, a representative of the American Institute of Electrical Engineers, was elected chairman for the year 1925, and Charles Rufus Harte, construction engineer the Connecticut Company, representative of the American Electric Railway Association, was elected vice-chairman.

Southern Equipment Men Will Meet

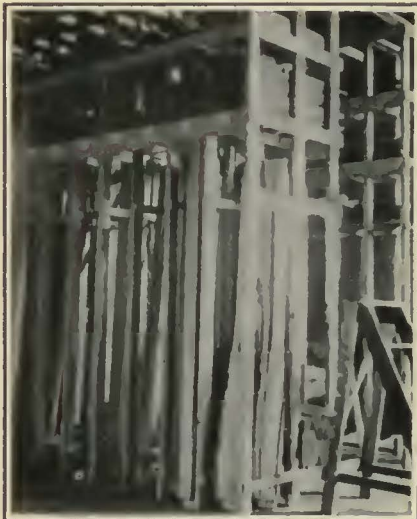
The Electric Railway Association of Equipment Men, Southern Properties, will hold its annual meeting in Dallas, Tex., Jan. 21, 22 and 23.

Maintenance of Equipment

Millwork Stored in Racks

SIDE posts, belt rails, arm rests and other car replacement parts made in the shop mill room are stored in racks located in a room adjacent to the mill room by the Columbus Railway, Power & Light Company. These racks are made up of waste, or otherwise worthless lumber.

The uprights are 3½ in. x 1¼ in. and are approximately 8 ft. long. The cross-members are odd-sized



In Columbus, Ohio, Millwork Is Stored in Racks Where It Is Readily Available for Car Repairs

pieces approximately ½ in. x 1½ in., while the diagonal braces at the center of the framework are lighter strips. The racks are 30 in. deep and about 10 ft. long. The lower openings of the rack are of sufficient height to accommodate car side posts vertically. Above these spaces are two tiers of small openings approximately 1 ft. square which hold short lengths of interior trim. Long pieces of molding and beading are stored the long way of the racks.

On the front of the rack just above the openings are labels which identify the contents. As this material is not under the jurisdiction of the stores department, a carpenter may take any part needed from the rack without giving a requisition for it.

Similar racks are used for storing sash, doors, and other small

made-up millwork. With these storage facilities, it is possible to utilize the wood-working machines to the best advantage, as a large quantity of any one particular piece may be made up at a time. With an ample supply of millwork replacement parts a car may be put through the shops in less time than when making individual parts.

Cheap Dasher Card Racks

STEEL strips bolted fast to the dashers have been installed by the Altoona & Logan Valley Electric Railway, Altoona, Pa., to hold display cards. These strips are slightly raised from the face of the dasher and the card is slipped in at the bottom. After it has been pushed all the way up it is allowed to drop back a fraction of an inch into the lower support. Previous to the installation of these racks advertising and other cards were carried on wooden boards suspended from hangers on the dashers. The earlier practice was rather unsightly and the swinging of the boards when the car was in motion had a tendency to deface the paint. The new rack costs only \$2.25 to install. This is not appreciably more than the cost of the old boards.



This Neat Card Rack Costs But Little More to Install Than the Unsightly Wooden Dasher Sign Which It Has Replaced

Using a Portable Drill as a Drill Press

A SET-UP using a Chicago Pneumatic Tool Company's drill for work ordinarily done on a drill press has proved a great time saver at the 39th Street shops of the New York Rapid Transit Corporation, Brooklyn, N. Y. It has been used principally in



With This Supporting Arrangement a Pneumatic Drill Is Used for Drilling Small Parts on the Work Bench

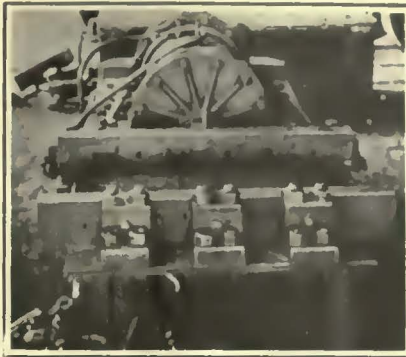
connection with some work which required finishing operations at the bench. In the ordinary procedure the workman would be required to walk a considerable distance to the nearest drill press for the drilling operation. By setting up this pneumatic tool on the bench the workman could do the entire job without unnecessary walking and waste of time.

The vertical support for the pneumatic drill consists of a 10-in. channel, as shown in the illustration. A bracket is bolted to this with a crossarm which has two supporting springs. Hooked rods passing through these springs with washers and caps at the top keep the drill firmly in contact with the supporting bracket. The flexible hose connection allows vertical movement of the drill so that it can be fed into the work by the hand screw in the ordinary manner.

Provision for the vertical motion is made by two slotted guides bolted to the channel on either side, and which hold in position the handles of the drill, to one of which the air supply passes.

Pinion Failure Traced to Worn Axle and Housings

THE ACCOMPANYING illustration shows a pinion which was one of several being tested in service by the Worcester Consolidated Street Railway. Inspection was made and measurements were taken of each pinion approximately every 20,000 miles. The pinion shown in the illustration was inspected at the end of 24,154, 41,288 and 56,682 miles and had very little wear up to the last inspection, when it was found to be ruined. Referring back to the time of the previous inspection showed that the interval was exactly 15,394 miles. An investigation was begun to determine the cause for this pinion breaking down in service, when it previously had shown up so well. The axle and axle bearing housing of the motor on which this pinion was installed were



A Simple Pneumatic Bulldozer Built in the Shops of the Kansas City Railways Has Proved to Be a Very Efficient Shop Tool

chine was built in the forge shop some years ago and has saved its cost many times over by reducing the time required for various small forming jobs.

The bulldozer is used for forming all small angle plates, wear plates, and similar truck parts, and also for truing up light castings. The illustration shows the stationary back bar which is bolted to the frame of the machine, and also the movable bar which is fastened to the piston, and to which are bolted the various dies and forming tools that have been developed for use with the machine.

The air cylinder has a bore of 16½ in. and a stroke of 24 in. It develops a pressure of 21,000 lb., when air at a pressure of 100 lb. per square inch is admitted. The piping is arranged with a double-action valve so as to develop pressure on the piston for movement in either direction.

Handy Tank for Heating and Cleaning Pinions

A SIMPLE type of hot water heater is found handy in the shops of the Twin City Rapid Transit Company, Minneapolis, Minn. This is used for preheating pinions before they are placed on the armature shafts. A circular steel tank, steam jacketed, has a capacity of 60 gal. of water. By the admission of low pressure steam to the jacket this is kept at a temperature close to the boiling point.

This tank is useful for another purpose. In many cases pinions are removed from armatures for various reasons before they are worn out. They are usually very greasy and disagreeable and hard to handle. To put them in condition for handling in the shop until they are put back in service soda ash is added to the

hot water in the tank and the greasy pinions are readily cleaned by immersion in the solution.

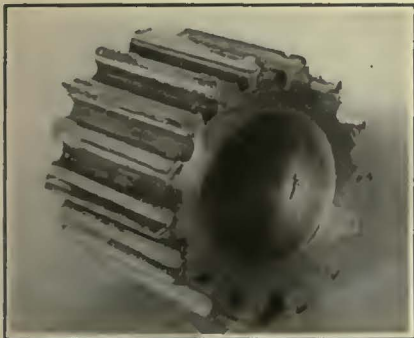
A sheet metal hood conducts steam and other vapors to a ventilating flue, thus preventing them from spreading into the shop.

Causes of Pull-Ins

REPORTS compiled by the Electric Railway Association of Equipment Men, Southern Properties, for the first 11 months of the year just ended show that more pull-ins were caused by defective armatures than by any other one thing. On the nine railways furnishing figures for the entire period pull-ins from this cause numbered 597. Air brakes were responsible for 515, controllers 338, brake rigging 318 and defective field coils 300. While the total number of pull-ins for other reasons was large, no one cause was as important as those listed above.

Adjustable Headlight Mounting

HEADLIGHTS on the suburban and interurban cars of the Gary Street Railway, Gary, Ind., are mounted on the dash in such a manner that they may be tilted. This



The Ends of the Pinion Teeth Were Destroyed as a Result of Worn Axle Bearing Housing

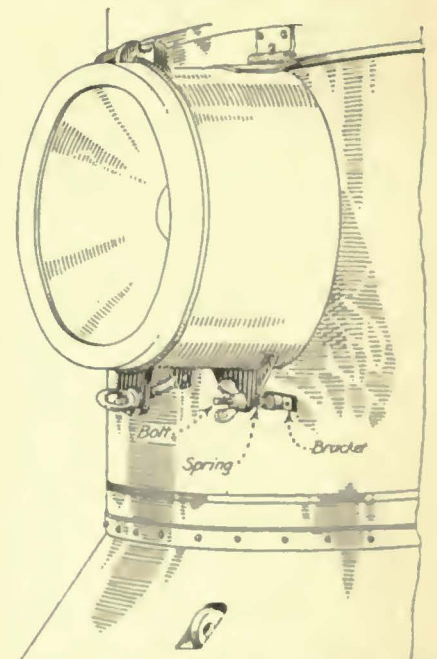
found worn considerably but the bearings themselves showed very little wear. This housing and axle wear had allowed the gear and pinion centers to separate so that sufficient pressure was exerted at the ends of the teeth to cause the pinion to wear excessively at this point and ultimately break.

Air Operated Bulldozer

By J. L. ROGERS

Forge Shop Foreman Kansas City Railways

A HANDY, home-made outfit that has proved very useful on many kinds of work in the forge shop of the Kansas City Railways is the pneumatic bulldozer shown in the accompanying illustration. This ma-



Adjustable Mounting of Headlights on Suburban Cars of Gary Street Railway Allows Beam of Light to Be Directed Toward the Proper Point Ahead of Car

permits the motorman to direct the ray of light to the proper point ahead of the car. The headlight is fastened at the top to a hinge and is

held at the bottom by a bolt with winged nut. This lower fastening is adjustable. It is used to tilt the headlight up or down about the hinged support at the top.

An ordinary flat iron hinge, approximately 4 in. wide, is bolted to the vestibule belt rail and to the top of the RM-12 Golden Glow headlight. The flange for mounting the headlight in a recess in the dash is removed. A short piece of angle section is riveted to the bottom of the headlight casing. A hole in the projecting lip of this flange piece receives a $\frac{1}{2}$ -in. bolt which is held in a small bracket attached to the dash.

An automobile valve spring placed on the bolt between the headlight flange and a washer at the bracket keeps the headlight flange against a winged nut on the end of the bolt. The spring serves to hold the headlight in position after adjustment is made by the nut.

Before taking the car out, the motorman adjusts the position of the headlight so that the beam of light strikes the ground at the proper point ahead of the car. This adjustment is made so that the light is not thrown up into the air, temporarily blinding motorists or pedestrians alongside the right-of-way.

tachment does not materially alter the appearance, size or method of operation of the circuit breaker.

Collapsible Arm for Door Engines

AN IMPROVED type of collapsible arm for the engines which operate sliding type car doors has been brought out by the Consolidated Car Heating Company, Albany, N. Y. The arm is made in two parts. The one fastened to the operating shaft of the door engine is made of pressed steel and forms a housing for the other part of the arm to slide in. This housing contains two springs about 10 in. long, which keep the arm in its extended position. Should

New Equipment Available

Drive Screws for Permanent Fastening

FOR attaching nameplates or making permanent assembly, where screws once inserted are not removed frequently, the Parker-Kalon Corporation, New York, N. Y., has brought out a hardened metallic drive screw which cuts its own thread in the material as it is hammered in. Such a type of screw is cheaper to install because the cost of tapping is saved and less time is required to make the fastening. An accompanying illustration shows the construction.



Hardened Metallic Drive Screw

is controlled electrically by means of push buttons. The control of the welding head and travel of the motor are so interlocked that when the starting button is pushed, the arc is automatically established simultaneously with the starting of the travel motor. Should the arc fail for any reason, the travel motor will stop without overtravel. When the arc is re-established, the travel motor will restart without attention from the operator. The equipment is approximately 3 ft. 6 in. long, 2 ft. 7 in. wide, and 2 ft. 6 in. high, and has a weight of 800 lb.

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Shockproof Circuit Breaker

DDOUBLE-POLE, interlocked-trip and shockproof circuit breakers are new types being placed on the market by the Roller-Smith Company, New York, N. Y. The interlocked-trip breaker is so arranged that the two poles are closed independently and successively. In case of an overload the pole first closed will open as soon as the second pole is closed. Should an overload occur after both poles are closed they will open simultaneously. This type of breaker is intended for use largely on motors and feeder circuits in place of switches and fuses.

Shockproof circuit breakers are intended for operation under conditions of excessive vibration or so subject to mechanical shock as to cause undesirable openings. Any listed standard type circuit breaker can be supplied with shockproof attachment to meet any requirements. It is said that the addition of this at-



Door Engine Fitted with Collapsible Arm
Above, arm in extended position. Below, arm forced back to provide door opening.

a passenger be caught by the door, it can be pushed back readily so as to provide for his release up to the time when the door is entirely closed. Another improvement in the construction of this arm is the use of a hardened steel roller with ball bearings, which runs in the pressed steel track on the door with no possibility of binding. This construction is the same as that used on the sheaves for door hangers furnished by the company and provides interchangeability.

Travel Carriage for Arc Welding

IN ORDER to simplify the work of building up worn flat surfaces by the arc-welding method, a travel carriage has been developed for automatic welding of straight seams by the General Electric Company, Schenectady, N. Y. This carriage is a self-contained unit and includes an automatic welding head, the necessary control, a travel motor and a wire reel. The welding head and control are mounted on the apron of the carriage, so as to feed the electrode wire from the reel to the arc.

In operation the travel carriage

The News of the Industry

\$50,000,000 Project

Reported Electrification Plan of Pennsylvania Railroad Comprises More than 220 Miles

The Pennsylvania Railroad will electrify its lines between New York and Washington in the near future, according to a report published in New York and Philadelphia newspapers. This involves one of the heaviest four-track trunk line systems in the world, about 220 miles in length. Estimates of the cost of the work are said to be upward of \$50,000,000. Short portions of the route from the Pennsylvania Station in New York City to Manhattan Transfer, New Jersey, and in the vicinity of Philadelphia already are operating electrically, the former on the third rail system at 600 volts direct current and the latter on an overhead trolley at 11,000 volts, single-phase. The plan of electrification will be to use the 11,000-volt system throughout. In connection with the New York, New Haven & Hartford Railroad, which operates with electric power on the 11,000-volt alternating current system between New York and New Haven, this would be a continuous electrified line of some 300 miles.

No power plants are included in the construction program, it is said. Power is to be purchased from several of the utility companies along the line, such as the Public Service Electric & Gas Company, the Philadelphia Electric Company and its subsidiary, the Susquehanna Power Company, and the Consolidated Gas, Electric Light & Power Company of Baltimore.

No confirmation could be obtained of the reports up to the time this paper went to press. Undoubtedly, a program so extensive as this would have to be carried out in a piecemeal fashion, inasmuch as it would take several years to complete the entire project. It is possible that the first section to be converted would be that from Philadelphia to Wilmington, which has been mentioned several times as the next electrification to be undertaken by the Pennsylvania Railroad.

Flat 6-Cent Fare in Duluth

Under an order issued by Federal Judge Wilbur F. Booth, sitting at St. Paul, Minn., the Duluth Street Railway, Duluth, Minn., is entitled to charge a straight 6-cent fare. Judge Booth's order affirms the findings of Judge T. D. O'Brien, special master, to the effect that any fare under 6 cents would not provide a fair rate of return on the valuation of the company's property. On July 13, 1922, the State Railroad & Warehouse Commission filed an order granting the Duluth Street Railway the right to charge a flat rate of

6 cents for single fares and to sell coupons at the rate of five rides for a quarter. From this order the company appealed to the federal court, and as a result of a hearing before a special master the flat 6-cent rate was ordered.

Pending appeal the company issued coupons bearing five tickets which sold for 30 cents. The stub of the tickets constituted a coupon redeemable by the

company for 5 cents if the Railroad & Warehouse Commission rate of five rides for a quarter were sustained. The coupon, however, will be void unless upon appeal to the United States Supreme Court the city secures a reversal of the order for a flat 6-cent rate.

The City Council is now considering the matter of an appeal, but no action has yet been taken.

Interstate Commission Controls Rates of Interstate Interurbans

Supreme Court Distinguishes Between Urban and Interurban Railways and Places the Rates of the Latter Under Federal Regulations

—Justice McReynolds Dissents

A DECISION of the federal court for the Northern District of Ohio has been reversed by the United States Supreme Court. In an opinion rendered on Jan. 5 the Supreme Court declared that the Interstate Commerce Commission has authority to regulate passenger rates on an interstate electric interurban railway regardless of whether it is part of a general steam railway system. Laying down this principle, the court did not feel it necessary to pass upon the point of whether the electric carriers involved were engaged in a general freight business, which was another question raised in the original suits. The court quoted various passages of the Interstate Commission acts of 1887 and 1910 to show that all common carriers by railroad were included in their provisions, pointed out that the federal employers' liability act and the safety appliance act had been applied to interurban electric railways and that in the transportation act of 1920 certain classes of electric railways were excluded only by express mention. The court also referred to the Omaha & Council Bluffs Street Railway case (230 U. S., 324, 327) and said that the distinction in that case, in which the commission did not have rate jurisdiction over an interstate line because it was purely an urban system, had been carefully observed in the present case. Justice Brandeis rendered the decision of the court. Justice McReynolds dissented.

The two cases under consideration were parallel in principle and were decided in the single opinion rendered. Both cases were appeals by the United States for the Interstate Commerce Commission and the electric railways involved from adverse decisions in the local district court. One case involved the village of Hubbard, Ohio, and the Pennsylvania-Ohio Power & Light Company and the other involved the city of Wellsville, Ohio, and the Steubenville, East Liverpool & Beaver Valley Traction Company.

In both cases the Interstate Commerce Commission had assumed jurisdiction and ordered the electric railways to increase intrastate passenger fares within Ohio so as to remove discriminations against interstate passenger fares between Ohio and Pennsylvania points. The fares within the Ohio municipalities were not disturbed, but the increased intrastate rates came in conflict with ordinances of Hubbard and Wellsville and suits were brought by these communities to test the authority of the I.C.C.

The District Court held with the Ohio communities that as the electric railways involved were neither parts of general steam railways nor generally engaged in carrying freight, they were excluded from the jurisdiction of the Interstate Commerce Commission. From these decisions, the government, with the railways, appealed.

In his dissenting opinion, Justice McReynolds asserts that nowhere has he found an expression by Congress to disregard the limitations of the commission's authority over electric lines laid down by the court in 1913 and that "the states can and should control until and unless Congress, by clear language, shall indicate the intent to regulate."

Wisconsin Commission Rules It Cannot Authorize Abandonment

Ruling that it could not authorize the abandonment of a railway franchise unless the consent of the City Council had first been given, the Wisconsin Railroad Commission dismissed the petition of the Janesville Traction Company to discontinue service on its Washington Street line. In its findings the commission said that it was apparent that the applicant could not indefinitely furnish service at a financial loss, that the city must grant substantial concessions in this form of relief from paying obligations or that there must be a considerable increase in patronage.

Further Interurban and Bus Co-ordination in Missouri

Decisive action in co-ordinating interurban bus and electric railway transportation has been taken by the Kansas City, Clay County & St. Joseph Railway. The Missouri Public Service Commission recently granted the company the right to reduce its train schedules, and on Dec. 31 the company installed two more Blue Bus service routes. Train schedules on the electric railway will be altered.

On the Excelsior Springs division rush hour trains will run as before. Mid-day trains will run one and one half hours apart, instead of one hour. Running time between Kansas City and the Springs will be reduced 6 minutes on all trains. A new train will leave Kansas City at 10:30 at night to meet the demand of picture show crowds, which develop earlier than those from the theaters.

On the St. Joseph division the only trains that will be taken off are locals that ran on the same time as the limiteds. The limiteds will stop on flag at the three towns en route, Ferrelview, Camden Point and Dearborn. All local trains on the St. Joseph division will be speeded up.

Operating its "Blue Car" de luxe safety coaches, already on hourly schedule between Kansas City and Excelsior Springs, the Kansas City, Clay County & St. Joseph Auto Transit Company at this time protects itself as far north as Trimble, Mo., where the fare is \$1. Nearing Kansas City fares from the other towns served are: Smithville, 75 cents; Nashua, 55 cents; Gashland, 40 cents; Linden, 30 cents; Templeton, 25 cents; North Kansas City, 20 cents. Three round trips are made as far as Smithville, and two from there to Trimble. It is the intent of the railway to extend the bus line to St. Joseph as soon as the paved road is completed.

Robert P. Woods, president of the companies controlling both bus and electric line, says: "We believe in the interurban business."

"Blue Line" de luxe safety coaches are to be used on all routes.

What the Railway Does

Advertising matter pointing out the place in the community enjoyed by the electric railway industry is being issued by the Chicago Surface Lines. The advertising is addressed to heads of industries and mentions the Chicago lines only incidentally, aside from the signature of Henry A. Blair, president of the Surface Lines. Under the heading "Street Car and Factory," Mr. Blair says:

As an individual you have a civic interest in good street car service.

As a manufacturer you have a financial interest in the proper solution of the problems of street car operation.

Efficient local transportation is essential to orderly industry and street cars provide the only satisfactory and dependable mass transportation.

Street railways contribute directly toward industrial prosperity, for a surprisingly wide variety of materials are used in their construction, equipment and operation. These materials are always bought near home.

And the payroll of the street car system is no insignificant item in the community budget. The Chicago Surface Lines, for instance, pays out in wages a total of

\$30,000,000 a year, all of it disbursed in the district served by the system.

It is to the interest of every citizen to see that street railways are given a fair chance to render efficient service.

More than this they do not ask.

Detroit Commission Balks

Refuses to Approve Contract to Standard Company for Buses—Change in Authority Contemplated

After voting at its last 1924 meeting to award a contract for furnishing the Detroit Department of Street Railways with 50 double-deck buses, the City Council has been blocked in its action by the Street Railway Commission. On its part, the department has refused to sign the contract for the purchase of the buses from the Standard Motor Truck Company, Detroit. In consequence it appears likely that a charter amendment will be submitted to the voters in the spring providing for a return to the original status under which the City Council will have no control over contracts awarded by the Street Railway Commission.

Notwithstanding the recommendation of the department that the contract for 50 buses be awarded to the Yellow Coach Manufacturing Company, Chicago, which has both built and operated buses, the City Council voted to award the contract to the local company which has never built any buses. Information from Ross Schram, manager of the railway, that the commission would not sign the contract led the Council to consider giving the voters a chance to decide the issue, in the way of a charter amendment. Such a charter amendment if passed will put the Department of Street Railways entirely under the control of the Mayor and the Street Railway Commission or in the same status that it was originally when the municipal system was started by former Mayor James Couzens. The commission believes it was a mistake to add a clause giving the Council the right to approve contracts for the street railway.

About four months ago the first bids were asked for furnishing buses to supply transportation in the unserved outskirts of the city. About three years previously the D. S. R. had been authorized to buy trackless trolleys or buses. An amendment to the charter approved about the same time removed the duty of buying equipment for the D. S. R. from the Department of Purchases and Supplies, but the contracts according to the amendment, are subject to the approval of the City Council.

After certain trials, it was decided by the commission that the trackless trolleys were not fully satisfactory for use in the intended service. Later Mr. Couzens, then Mayor, authorized the purchase of one single-deck bus. After further study William B. Mayo, chief engineer of the Ford Motor Company and at that time general manager of the D. S. R., recommended double-deck buses and specifications were drawn up by the commission's engineers, which left the way open for various companies to bid.

When the first bids were opened on Sept. 9, 1924, proposals were submitted by two motor truck companies in Detroit and by two bus manufacturers

with factories located in other cities. It was decided to reject all bids. When new bids were opened on Sept. 29, they were lower than the original ones. In opposition to the recommendation of the Street Railway Commission, the Council on Nov. 15, meeting in committee, voted to award the contract for 50 buses to the Standard Motor Truck Company, Detroit, the lowest bidder. The matter was reopened when Ross Schram, general manager, questioned the decision that the Standard Company was low bidder on the grounds that it bid on a type of bus differing in several respects from the specifications.

While awaiting final decision as to the purchase of the double-deck buses, the renting of 25 single-deck buses was authorized and these buses are being put into operation as rapidly as they are delivered by Dodge Brothers Motor Car Company. The city pays a rental of 29 cents per bus mile of operation and reserves the right to purchase the buses, the rental paid to apply on the purchase price. An account of this new service is given in another column.

When Mayor John W. Smith on Dec. 1 suggested the purchase of five buses from the two local bus companies and from the Yellow Coach Manufacturing Company, the Council directed the Street Railway Commission to take the matter up with the three companies. An order for five buses was refused by the Standard Company. The vote in the Council awarding the entire 50 buses to the Standard Company followed. Later this move was blocked by the commission's refusal to sign the contract.

The Council has approved the request of the general manager of the D. S. R. to rent 25 additional Dodge single-deck buses and early deliveries were urged because of the great demand for bus transportation. One line has already been put into operation, the first trip being made over the Mack line on New Year's day, with eight buses in operation. The number is to be increased as the vehicles are delivered to the commission.

Providence Still Negotiating New Labor Agreement

Negotiations for a new working agreement or for arbitration are still in progress in Providence, R. I., between the officials of the United Electric Railways and the union employees. Although the men have recently taken a vote in favor of suspending work, their act did not necessarily mean that they would strike. This phase of the matter was stressed by Delegate Coleman, who stated that negotiations with the company were still under way, but that union officials did not propose to allow the conference to drag on.

The contract with the men expired Oct. 31. Prior to that date the men submitted demands calling for an increase of 14 cents. The present scale is 56, 59 and 61 cents. In addition to the disagreement over the wage scale the labor and company representatives were unable to come to a settlement over the question of arbitration. The attitude of the men and the company has been referred to previously in the ELECTRIC RAILWAY JOURNAL.

Purchase Before Council

Chicago Body Hopes to Present Traction Measure to Voters on Feb. 24

The Chicago municipal traction ordinance providing for a referendum on the co-ordination deal there in connection with local railway operation has been placed in the hands of the City Council by Mayor Dever with a request to rush passage so the proposition can go on the ballot on Feb. 24. The ordinance provides what is known as a half billion dollar plan for immediate subway construction, purchase and extension of the Chicago Surface Lines and an offer to the Chicago Rapid Transit Company for the elevated properties.

ORDINANCE ADVANCED PROMPTLY

The ordinance was submitted on the morning of Jan. 5 and in the afternoon had gone to the local transportation committee of the Council, which had Major R. F. Kelker, Jr., and finance and legal experts before it for questioning. Aldermen who oppose the extensive building of subways brought up the unprofitable operation of subways in New York to Major Kelker as an argument against certain parts of the proposed Chicago system and Major Kelker answered them with figures from the Dec. 20 issue of the *ELECTRIC RAILWAY JOURNAL*. He quoted the figures on part of a mile to show that the approximate cost per mile in New York was \$25,000,000 as against \$10,000,000 a mile in downtown Chicago and \$3,000,000 in outlying districts. His argument carried the point of relative profit.

The ordinance is based on satisfactory consummation of arrangements for buying the Surface Lines at \$162,700,000 or less, based on an appraisal being made by Major Kelker, William J. Hagenah and Gen. William Barclay Parsons, the latter having sent H. M. Brinckerhoff from his New York office to represent him.

The elevated lines situation is dealt with frankly in the ordinance, the administration recognizing that Samuel Insull has solid backing for his statement that the mortgages on the lines interfere with a sale. However, the maps of the proposed unification and primary stage of extensions as explained by Major Kelker show the existing elevated lines completely bottled up by proposed city lines, which, while not in direct competition, will limit elevated zones of influence to small fringes paralleling the lines.

All the city-built tube and elevated structures are laid out so that connections can be made with the elevated lines should a later purchase be made, or the city lines can cover much of the same territory by surface line feeders using universal transfers.

Every effort was made to utilize all the existing facilities. In one case an arrangement was made to purchase 3 miles of Rock Island Railroad suburban line to give rapid transit to a district 16 miles from the business section in the loop.

An official summary of the ordinance drawn by Corporation Counsel Bush

and Alderman Swartz, authors of the measure, has been issued to explain the terms of the purchase. This statement ran to the extent of several newspaper columns.

Settlement of Issues at Toledo Expected Shortly

Many electric railway developments are expected in Toledo in 1925. The Community Traction Company favors a cross-town bus line and co-ordination of bus and railway operation so as to afford extensions to some new sections of the city.

Then the application of the Toledo People's Motor Bus Company to put in a competing bus system is before the Public Utilities Commission at Columbus. It is not believed any action will be taken on this application before the settlement of a similar issue in regard to Cleveland. The chances are that any decision of the commission will be appealed to the Supreme Court and that it will be many months before a definite decision on the competitive bus operation is had. The Ottawa Coach Line, which is the largest independent and competing line in Toledo, has already announced a fare increase effective on Jan. 9, at which time the cash fare will be 10 cents and a token rate of six for 40 cents will be started. Heretofore, the fare has been 7 cents cash.

Settlement of the power cases started many months ago are also expected in the next few weeks. The question of jurisdiction of the Public Utilities Commission on power rates between the Toledo Edison Company and the Community Traction Company has been argued, but as yet no decision has been rendered. The courts have already refused jurisdiction under the Milner ordinance. In the meantime the Toledo Edison Company has voluntarily reduced the power rate for the traction lines.

Los Angeles Banishes the Horse

DOBBIN is peremptorily banished from a district several square miles in Los Angeles, Cal., under the McClintock traffic ordinance, effective Jan. 22, but six months' grace is allowed for gradual enforcement of the new rules. During the six months horse-drawn vehicles are excluded from this area in rush hours.

The new ordinance provides for traffic lanes and rules for pedestrians, the same as motorists. There will be "No walking" and "No standing" signs. Fine and imprisonment will be the punishment for disregarding them. The signs for pedestrians will be painted on the sidewalks.

Jaywalking is forbidden, and those who cross the streets afoot are to be compelled to signal their intention with upraised arm, just as autoists signal for turns. Some long street blocks will have pedestrian-crossing zones painted in the middle.

Detroit Extends Bus Service

Motor Coaches Used as Feeders for Existing Trolley Lines with a Charge for Transfer

Bus service with single-deck coaches was started on Jan. 1 by the Department of Street Railways, Detroit, as a short extension to its Mack Avenue line, and on Jan. 4 a similar service was begun as an extension of the service on the East Warren Avenue line. The buses used were secured from the Dodge Brothers Motor Company on a rental basis with the understanding that the department may purchase them if it so desires at the expiration of 3 years.

In addition to these routes, the department also has two routes operating from the northern end on its Woodward Avenue line and a short route on the west side of the city, connecting with its trolley line on Grand River Avenue.

The fare charged on these buses is 10 cents cash or a street railway ticket and 4 cents additional. Street railway tickets are sold nine for 50 cents, the railway cash fare being 6 cents. This bus fare entitles a passenger to a free transfer to the street railway cars. If a second transfer is desired, it can be secured for 1 cent additional.

A passenger on a street railway who wishes to transfer to a bus can secure a transfer by the payment of 4 cents additional fare. The transfers used are of the usual kind, arranged to be punched for time, but read in large letters: "To Motor Coach" or "To Street Car," as the case may be.

The buses used have a capacity for 21 seated passengers. The seats are upholstered in real leather. Pneumatic tires are used. The bus floor is of double thickness to keep out cold and dust, and the center aisle is slightly depressed, so that the mat which occupies this space comes flush with the floor line. This type of mat prevents the passenger from slipping when he enters or leaves the coach.

Urban Bus Lines in Virginia Improperly Protected

There is insufficient credit base in Virginia to warrant a feeder bus system being organized as an auxiliary to electric railway service in cities. So the Virginia Railway & Power Company, operating railways in Richmond and Norfolk, holds in a recent issue of "Public Service News," published by it. In explaining why it cannot at this time agree to supplement its urban lines with buses the company said:

Our company stands ready to supplement its service with buses and even blimps, if necessary, and it has done everything possible to get a proper credit base for such investment in the state of Virginia so that it might be in a position to invite and attract the capital needed from time to time to furnish an adequate transportation service, but this has not yet been accomplished.

In Virginia the bus has been declared a common carrier only on state highways, not in the cities; in the cities it is still a free lance and subject to most any kind of competition the different localities might devise. The basis for investment in bus transportation offered investors in other states does not prevail in Virginia cities and any investment which has been made so far is purely speculative.

Binghamton Company Seeks Seven-Cent Fare

The Binghamton Railway, Binghamton, N. Y., at a recent meeting of Common Council presented a petition asking permission to increase its fare within the city limits to 7 cents. The company is unable to continue operating under the existing 6-cent rate, it is declared. Unless the 7-cent rate is permitted, the petition sets forth, the company will be compelled to curtail operations greatly or appoint a receiver to conduct its affairs. The great increase in the use of automobiles is declared one of the moving causes for the failure to meet expenses under the present fare schedule. The communication was referred to the finance committee of the Council.

The petition alludes to the receivership of William G. Phelps, which was terminated Jan. 1, 1924, and appended a statement which showed the company had operated at a loss during the last year.

A comparison of the net corporate income during 1924 and 1923 showed a deficit of \$20,214 for the year 1924, and this, added to the previous deficit of \$41,997 for 1923, made a total deficit of \$62,211.

The petition set forth that no dividends had been paid on the capital stock of the company since 1913. The company had been forced to curtail its service greatly already, especially on its outlying lines, the report said.

Municipal Ownership Talk Revived in Winnipeg

A special committee may be appointed by the new City Council of Winnipeg, Man., at the first meeting of that body this month for the purpose of considering the advisability of taking over the railway from the Winnipeg Electric Company. The matter is now under discussion in municipal circles, and it is felt that early action to deal with the question is desirable. The city will have to give its decision on the franchise question in June of 1926, which will probably mean that the electors will be consulted in a referendum at the next civic elections.

The preliminary procedure suggested is that the committee thus appointed should devote itself to ascertaining all the facts relating to the railway and the probable obligations which would have to be assumed provided it were acquired under the terms of the agreement. It is also proposed that a survey of railway situations be made in other cities, particularly Toronto and Detroit.

Railway Restrained from Operating Buses

Rumored plans of the Stark Electric Railroad, Alliance, Ohio, to purchase three buses for use between Canton and Alliance were blocked on Jan. 3, when the Stark County Common Pleas Court issued an injunction against the railway restraining it from operating buses either in Canton or Alliance or on the highways between the two cities.

The case was started by Mrs. Sadie

Salisbury, Canton, proprietor of a bus line which has been operating for six years. This company at present operates buses over the Canton-Alliance highway.

Charges that the Stark Electric was conspiring with Samuel Derenberger to compete with her have been made by Mrs. Salisbury.

The restraining order expires on Jan. 12, when a hearing will be held on a permanent injunction. Mrs. Salisbury says the railway has no authority from the Ohio Public Utilities Commission to operate buses.

A short time ago the Stark Electric started half-hour service over the entire line from Salem to Canton, a distance of about 40 miles. This is effective from about 5 o'clock in the morning until 7 o'clock at night.

Uniform Bus Regulation Urged in Oregon

Operators of buses in Oregon—and electric railways are included among them—are agitating for regulation of authority over their industry. It is cited that buses operating in and out of Portland are under the jurisdiction of the police department as represented by the motorcycle squad, the traffic officers and the patrolmen. In addition, there is a superintendent of motor buses, with uniformed officers and special deputies, who makes rules and interprets them. Moreover, there is no real basis of taxation. A bus company in Portland must pay a gasoline tax, a special license tax and \$4 to the state. The city imposes a bus tax, as does the federal government, and the manufacturers also pay a federal tax of 5 per cent of the price of the bus. Operators must also furnish a public liability and property damage bond and an insurance policy to the Public Service Commission of Oregon. The bus owners are willing to comply with any centralized authority, but insist that something be done to eliminate this scattering of supervision.

Suburban Riders Will Pay Same Fare as Cleveland Riders

The City Council of Lakewood, a suburb of Cleveland, has agreed to have its car riders pay the prevailing rate of fare charged Cleveland car riders, and as a result, John J. Stanley, president, has withdrawn from service one-man cars he had been using on one of the main lines operating through Lakewood. Lakewood has a franchise calling for a 5-cent fare, but the rate in Cleveland now is 6 cents, with a 1-cent charge for transfer. The Lakewood City Council agreed to permit the Cleveland rate of fare on its lines if Mr. Stanley would withdraw the one-man cars.

The Cleveland rate of fare is to go into effect 40 days from Jan. 5, although it is unlikely that a referendum will be called on the Council's action, as many Lakewood citizens had expressed their willingness to pay the Cleveland rate of fare, despite the company's franchise, if Mr. Stanley took the one-man cars off the Clifton line.

Committee Will Decide Service for Reading

The Selectmen of Reading, Mass., have voted to cancel a contract under which the Eastern Massachusetts Street Railway has operated a bus service between North Reading Center and North Reading Junction at a cost of \$2,200 a year to the town to cover the deficit. The contract expired on Oct. 31. The town agreed to pay \$2,200 for another year, but the Eastern Massachusetts had been operating at a loss very much larger than the \$2,200 and proposed a schedule of fewer trips per day. As the railway declined to maintain the old schedule and the Selectmen declined to accept the new one, though they had agreed upon the \$2,200 deficit, the Selectmen recently decided to cancel the contract. The company has agreed, however, to maintain the service for a reasonable length of time. A committee has been appointed to provide service over the route which the Eastern Massachusetts will abandon. A schedule of the service will probably be offered for public bids within two or three weeks.

Bus Ordinance in Lansing Upheld

Judge Leland W. Carr, in Ingham County Circuit Court, has denied a temporary restraining order against enforcement of the Lansing ordinance regulating routes of buses operating out of the city. An injunction was sought by the Michigan Highway Transportation Association on the ground that the ordinance conflicted with a legislative act of 1923 placing control of buses with the Michigan Public Utilities Commission. The association is expected to appeal.

Higher Fares Authorized in Madison

The Madison Railways, Madison, Wis., on Jan. 5 put into effect the following new rates: Cash fare for adults, 8 cents; cash fare for children under 12 years, 4 cents; tickets or tokens for adults, 17 for \$1; tickets or tokens for high school students, 10 for 50 cents, and two children under 12 on one adult ticket or token.

The new schedules, put into effect by an order issued by the Wisconsin Railroad Commission, are authorized in order to permit the company to make the extensions and replacements as outlined in the program agreed upon by the representatives of the company, the city and the commission. Details of the program were referred to in the Oct. 25, 1924, issue of the *ELECTRIC RAILWAY JOURNAL*. The order also makes it possible for the company to increase the wages of its men to the extent of \$10,000 for this year. Based on the number of riders during the past year, the company expects to raise \$80,000 additional revenue under the new schedule, which will enable it to carry out the improvement program. It is estimated that the entire program will cost \$700,000 and be spread out over a period of 7 years.

The commission will have supervision over the excess revenues to be derived

from the additional fares and also over the moneys to be obtained through the sale of new securities. This means that the excess over and above the operating expenses must be used for replacements and extensions.

With an adequate increase in revenue, the company will this year carry out the following improvements as part of its program of improvements: Rebuilding, double tracking and paving of Atwood Avenue from Division Street to Fair Oaks Avenue; double tracking and paving Breeze Terrace from University Avenue to Regent Street and purchasing 17 cars, replacing nine.

Renewed Agreement in Cincinnati Expires June, 1926

The agreement between the Cincinnati Street Railway and the Cincinnati Traction Company, Cincinnati, Ohio, that grew out of the negotiations for a new franchise has been renewed. The agreement expired by limitation on Jan. 1, but a new one became effective immediately thereafter. The new date of expiration is June 30, 1926. By that time the new city manager form of government will have been functioning in Cincinnati six months. This was contemplated in connection with the new agreement. Those who are interested in a new franchise considered that if Mayor Carrel succeeds in defeating the negotiation of a new franchise in the year that remains of his term, the new régime will have an opportunity to bring about a new contract. The renewal of contractual relations between the two companies that would be perfected if a new contract were approved would eliminate the Cincinnati Traction Company as the operating company. Its interests would be bought out by the Cincinnati Street Railway. It is understood that the modifications in the contract between the two companies were very slight.

Competition in Tacoma Reduces Railway Service

The Tacoma Railway & Power Company, Tacoma, Wash., is curtailing its service in an attempt to offset the loss of business to jitneys, fostered by Mayor A. V. Fawcett. The curtailment is being extended to lines paralleled by buses. In general, the cuts have been confined to service in outlying residential districts, in an effort to keep up service in the sections of heavier travel.

The unrestricted licensing of jitneys by the City Council, at the request of Mayor Fawcett, is a part of the Mayor's pre-campaign promises to give the city of Tacoma a 5-cent railway fare or drive the railway from its streets. The railway states that 5,000 persons are being carried daily by the jitneys. This means a loss of between \$250 and \$300 a day for the company.

After a two weeks investigation by its public affairs committee, the Kiwanis Club of Tacoma urged in a public resolution that efforts be made to co-operate with the traction company in furnishing better service to all parts of the city.

The City Commissioners of Tacoma have declared themselves entirely out of sympathy with the Mayor's plan. They have expressed the opinion that the jitney holds no promise of an adequate, reliable form of transportation for the city. At present 20 jitneys, ranging in capacity from 7 to 35 passengers, are skimming the cream from the railway by serving only the shorter and easier routes.

Portland Extensions Discussed

At a recent traffic hearing before the City Council, Franklin T. Griffith, president of the Portland Electric Power Company, Portland, Ore., stated that car lines would be built to any and all sections of the city if the people were willing to pay for the service. Mayor Baker declared that the railway must provide adequate service to all parts of the city, and that if the company would not do this he would favor granting a franchise to some company that would. Mr. Griffith announced that his company would meet the city on any reasonable plan for extensions of lines. Matters relating to providing adequate service to the outlying districts were referred to John M. Mann, Commissioner of Public Utilities, who was directed to hold hearings, make a thorough study and report to the Council.

Milton R. Klepper, attorney for the Portland Motor Coach Company, is asking for a franchise over five routes in the downtown district. He said that his concern was prepared to lay \$500,000 on the table before the Council whenever that body wanted to see it. Mayor Baker replied that this sum would be but a "drop in the bucket" in the cost of furnishing adequate transportation service for the city; that many millions of dollars have been invested by the Portland Electric Power Company, and that he would not be a party to any plan of competition, if that company would give the service needed.

Mr. Griffith stated that his company had in mind a crosstown bus line, a line over the new Ross bridge and the St. Johns bus line. He pointed out that the residential development of the city had been mostly at the ends of car lines, and the problem before the company was whether the extensions could be made to pay.

He pointed out that the Pacific Coast cities are large in area but are thinly populated. This presents a difficult problem for the traction companies to settle. He stated that 25 of the 32 railway lines in the city were not paying. He declared that if the bus lines served the city as the car lines do, they could not do it profitably at any such fare as proposed in the franchise of the Portland Motor Coach Company.

Mr. Griffith said that a zone system of fares would make it possible for each line to meet its own expenses, but he added that American people were opposed to such methods. Mayor Baker feels that a satisfactory plan for providing better service can be worked out with the company. He is proceeding in his consideration of the matter on that basis.

News Notes

Increased Rate Until June.—The Public Service Commission has issued an order granting to Leverett S. Miller, receiver of the Westchester Street Railroad, permission to charge until June 1, 1925, the increased rate of fare granted last June for transportation of passengers upon the Tarrytown, Silver Lake Park, Scarsdale and Mamaroneck Avenue lines.

Seeks Higher Rates.—A flat passenger rate of 3 cents a mile for the Joplin & Pittsburg Railway was asked in a petition filed in the federal court in Kansas City by Murdock H. MacLean of Chicago, receiver for the company. The present rates are 3 cents a mile in Missouri, 3.6 cents in Kansas and an interstate ticket is 3.6 cents. The petition also asked that fare be changed in incorporated towns along the line of the railway, a 5-cent fare for children and 10 cents for adults. In the petition Mr. MacLean asked a ninety-day trial of the new rates and then a permanent order if they proved desirable.

Higher Rates Approved.—Fares on the Rochester & Syracuse Railroad and connecting with Port Byron and Auburn will be increased 0.6 of a cent per mile over the former 3 cents a mile straight rate, effective on Jan. 18. The increase has received the approval of the New York Public Service Commission.

Fare Controversy Over.—The California Railroad Commission, upon request of the complainant, has dismissed the complaint of the city of Alameda against the Southern Pacific Company and the Key System Transit Company, involving one-way and commutation fares between Alameda and San Francisco.

Will Reconsider Fare Clause in Franchise.—Rather than have the International Railway abandon its Sugar Street line, Niagara Falls, with the possible application for abandonment of other local lines where the company is reported to be losing money through the 5-cent fare, the Niagara Falls City Council is reported to be willing to change the company's franchise so as to allow it to appeal to the Public Service Commission for a reasonable rate of fare. The commission recently decided that it was without authority to increase fares from 5 to 7 cents owing to certain provisions in the franchise. The commission, however, agreed to allow the company to abandon its Sugar Street line. The International will continue to operate the Sugar Street line until an agreement can be reached with the City Council.

Railway Man Receives Honor.—J. P. W. Brown, general superintendent of the Nashville Railway & Light Company, Nashville, Tenn., has been declared the most valuable citizen of Nashville in 1924. This is the opinion of Kiwanis, which calls together a representative from each civic club to name the person whose service to Nashville has been of the highest character.

Pamphlet for Utility Investors.—A treat for the new year in the form of a pamphlet is "The Security Survey," which will appear quarterly, so that those who own securities of the Illinois Power & Light Corporation may know about the developments and facts of interest regarding their investment and the company back of it. The January number requested helpful suggestions and constructive criticisms.

Arrested Operators Discharged.—Seven operators of one-man cars in the city of Buffalo charged with violating the new anti-one-man car ordinance enacted by the City Council over the objection of the city law department were discharged when arraigned for trial in City Court. Despite the ruling of the court, Mayor Frank X. Schwab has ordered the police department to arrest other operators of one-man cars on local lines of the International Railway who were found to be driving cars faster than the ordinance allows. Traffic police have arrested additional motormen and their trials have been adjourned until Jan. 23. Counsel for the railway contended in court that the ordinance is illegal and that the authority for regulating one-man cars rests entirely with the Public Service Commission, which already has held a hearing in Buffalo on the application of the city to force the abandonment of the one-man cars.

Ordinance Restricts "Jitney Buses."—The Board of Aldermen of the city of Louisville recently passed an ordinance which will have to go before the City Council regulating fares, routes, carrying capacity and overcrowding of "jitney buses" and forcing drivers of such cars to put up a \$500 real estate bond for each one operated. It is also understood in Louisville that there is a movement under way for a bill before the next Legislature to force all owners of automobiles to carry insurance and to arrange for liability coverage in the event of accident.

Asks Co-operation of Automobile Owners.—The Oklahoma Railway, which has failed to obtain relief from adverse traffic conditions in Oklahoma City, Okla., has undertaken to work out its own salvation by inducing automobile owners to refrain from using the downtown streets for car storage during business hours. Placards have appeared in all local cars reading: "Automobiles for pleasure; street cars for business." The recent cold weather and bad condition of the streets have caused hundreds of automobile owners to avail themselves of electric transportation, and the company has sought to secure their continued patronage and co-operation by urging the advantages of the street car for everyday business travel.

Extra Fare Charged.—A new tariff charging an extra fare of 1 cent for all passengers riding in cars across the Juniata bridge at Lewistown, Pa., was filed with the Public Service Commission recently by the Lewistown & Reedsville Electric Railway. The tariff will become effective Feb. 1. The extra fare is being levied for the purpose of making up the sum of \$4,000 charged against the company for repairs on the bridge by the Mifflin

County courts. The company has appealed and pending action on the appeal will give rebate slips for the 1-cent fare. Tickets will be sold at 12 for 11 cents or 50 for 45 cents.

Students Ask Special Rate.—A resolution petitioning the Philadelphia Rapid Transit Company, Philadelphia, Pa., to grant a reduced fare to students en route to school was passed recently by a special committee of 100 high school students. The resolution pointed out that many cities and many railroads grant special rates to students.

Money Appropriated for Bus Chassis.—The City Council of Seattle, Wash., has passed an ordinance appropriating \$38,000 to purchase truck chassis for five buses, three of which are to be operated on Empire Way, and the others held for emergency use. The superstructure of the five buses will be built in the shops of the Seattle Municipal Railway, thereby reducing the cost. The plan of operation on the Empire Way bus line will be the same as on other bus lines operated by the municipal railway, the fare will be 10 cents cash, or 8½ cents token, with free transfers to and from the municipal railway. Request of the Seattle-Rainier Valley Railway to the Council for a bus franchise was opposed by residents of the Empire Way district.

Fares Increased.—With the virtual consent of patrons, fearful of suspension of service under present conditions, the Board of Public Utility Commissioners of New Jersey has approved requests of the Five-Mile Beach Electric Railway in Cape May County, N. J. and of the Atlantic & Suburban Railway, in Atlantic County, to increase rates from 6 to 10 cents. Weekly passes will be issued at \$1 each for use between Sept. 15 and June 15 of the ensuing year. The new rate of the Atlantic & Suburban Company, operating between Atlantic City and Pleasantville, will be 16 cents instead of 14 cents. On the three remaining zones the fare will be increased from 7 to 8 cents. Strips now selling at ten for 65 cents will be increased to 70 cents. Similar increases are granted with request to various forms of commutation tickets.

\$5 Gift for Employees.—Every employee of the East St. Louis & Suburban Railway, East St. Louis, Ill., received a Christmas present of \$5 together with a personal letter from W. H. Sawyer, president, replete with the Yuletide sentiment. The letter also thanked the workers for the splendid co-operation accorded the management in the past and requesting a continuation of this spirit.

Wants to Extend Bus Service.—The St. Louis Bus Company, a subsidiary of the United Railways, has asked the Board of Public Service of St. Louis, Mo., for permits to operate two more bus lines as feeders to existing railway lines.

Bus Line Given Up.—The bus line operated between Beverly and Essex, Mass., since early in the summer was abandoned on Dec. 1, according to an announcement by officials of the Eastern Massachusetts Street Railway. The revenue did not pay the expense.

Commission Against Higher Fare.—For the second time within the last 6 months the Public Service Commission has handed down a decision adverse to the International Railway, Buffalo, in its attempt to secure a higher rate of fare on local lines in the cities of Tonawanda and North Tonawanda. The company asked a fare of 14 cents between certain points in the two cities. The commission held that the franchises limit the rate of fare and the commission is without authority to increase the charges without the consent of the municipal authorities.

Interurban Puta on Buses.—The Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, has instituted bus service connecting Waterloo, Independence and Jesup. Buses stop on signal at any point along the route to receive or discharge passengers.

Limited Service Authorized.—Rapid service over the East St. Louis-Belle-ville, Ill., division of the East St. Louis & Suburban Railway was made possible on Dec. 15 by the City Council of East St. Louis permitting the railway to run limited trains on the division. The cars formerly stopped in East St. Louis only at certain street. The fast cars would utilize the Day line or old Belleville Electric tracks to Mount Hope Cemetery, where they would connect with the main line of the Belleville-East St. Louis division.

Would Operate Buses Between Buffalo and Niagara Falls.—Application has been made by the International Bus Corporation, Buffalo, a subsidiary of the International Railway, to the municipal authorities of Tonawanda and North Tonawanda and to the town board of Tonawanda for permission to operate a de luxe bus line between Buffalo and Niagara Falls, via Kenmore and the Tonawandas, and also over streets and highways in the towns and cities between Buffalo and Lockport.

Policies for Christmas Gifts.—Christmas presents in the shape of \$500 life insurance policies were presented to 5,901 public utility employees of the North American Light & Power Company and subsidiary companies. The blanket amount of the company's gift policies is nearly \$3,000,000. Subsidiary companies of the North American Light & Power Company are the Illinois Power & Light Corporation, Illinois Traction System, Missouri Power & Light Company, Kansas Power & Light Company and Iowa Power & Light Company. The employees' policies were taken out in the Travelers' Insurance Company, Hartford, Conn.

Skip-Stop Arrangement Planned.—The Jacksonville Traction Company, Jacksonville, Fla., will put the skip-stop service into effect during rush hours in South Jacksonville. This will be undertaken to relieve the congestion.

"Azuride" Wins Prize.—An eleven-year-old school boy won the prize of \$5 in car tickets offered by the Tri-City Railway, Davenport, Iowa, for suggesting the name since adopted for the publication which will be distributed soon in the cars. The winning name was "Azuride." The little paper will be printed twice a month and placed in the cars. It will contain information of interest to passengers.

Financial and Corporate

Story of Receivership

Indiana Interurban Unable to Pay Bonds and Meet Interest—Road Hard Hit by Private Auto

The receivership for the Union Traction Company of Indiana was precipitated by the inability of the company to pay bonds, interest and other fixed charges amounting to more than \$300,000. This inability was occasioned by a large decrease in the earnings of the company during 1924, resulting in a reduction of more than \$500,000 in the gross revenue for the year. It was impossible to meet this decrease in receipts by corresponding reductions in operating expenses, and the company, therefore, found itself at the close of the year without the large sum of money necessary to pay its bond interest and without the credit required for a loan of that magnitude.

CREDITOR BROUGHT ACTION

As explained in the *ELECTRIC RAILWAY JOURNAL* for Jan. 3 the receiver was appointed on the application of the Westinghouse Electric & Manufacturing Company, which asserted that the defendant is indebted to the plaintiff for \$74,192, a sum long past due. It further was alleged that the railway has other debts it is unable to pay and is in imminent danger of insolvency. The complaint also alleged the company was unable to pay \$281,125 in semi-annual interest and \$29,150 in rentals that were due the first of the year.

Arthur W. Brady, receiver and president of the company, says that the buses and the privately owned automobiles, with their lack of state regulation in contrast to the regulation imposed on the electric and steam lines, have been the principal factors that have contributed to the present condition of the company. Largely on this account the company has filed a petition with the Indiana Public Service Commission for permission to abandon its interurban service between Anderson and Middletown and to substitute the operation of a bus line for the present traction service. The diminished earnings on this branch are attributed by the petition largely to the bus line between Anderson and Newcastle by way of Middletown, "which motor bus line is not subject to any regulations or restrictions in respect to the service it shall give or the rate it shall charge."

FUNDS NEEDED FOR IMPROVEMENTS

The petition states that funds are needed to improve the property and service on other lines and that it is unfair to discriminate against patrons of the other lines who contribute the earnings from which deficits must be paid on the line sought to be abandoned.

The Union Traction Company is the pioneer interurban system in Indiana. The first interurban in the state was built and operated between Anderson and Marion more than 30 years ago

with Charles L. Henry, Indianapolis, and Philip Matter, Marion, as the promoters. This road subsequently was acquired by the Union Traction Company with Mr. Henry president and general manager. When he sold his interest, George F. McCulloch, now dead, became the president and general manager. He was succeeded by Mr. Brady, formerly Mayor of Muncie, Ind., who has been president for many years. Harry A. Nichol is general manager.

The system of the Union Traction Company consists of 455 miles of road. In addition to the extensive interurban lines it includes city systems in Anderson, Muncie, Marion and Hartford.

Electric Railways in California Issue \$13,067,496 in Securities

During the 12 months ended Dec. 31, 1924, the California Railroad Commission authorized public utilities to issue \$237,875,848 of stock and bonds, and other evidences of indebtedness, the largest amount ever authorized by the commission in any one year since March 23, 1912, the effective date of the public utilities act. In addition to granting applications to issue \$237,875,848 of securities during 1924, the commission denied applications to issue \$100,000 of securities and dismissed without prejudice applications to issue \$1,178,358, making a total of \$239,154,206 acted upon during the year.

The amounts authorized during 1923 and 1924 are divided into various classes of securities as follows:

Class	1923	1924
Stock	\$74,809,880	\$128,391,109
Bonds	115,290,210	102,027,900
Notes	340,845	4,201,838
Equipment trust certificates ...	6,362,000	3,255,000
Total	\$196,802,935	\$237,875,847

Of these totals electric railways issued \$13,067,496 in securities in 1924 and \$29,059,093 in 1923.

Gross Earnings Up in Philadelphia

The Philadelphia Rapid Transit Company, Philadelphia, Pa., rounds out its fiscal year with about \$45,460,000 gross revenue, comparing with \$44,930,491 for 1923. The company has had the benefit of the new rates of fare for only a little more than three months, but the gain in passenger revenue during that time is said to be about in conformity with the company's estimated requirements.

For 1924 a small surplus over all charges will be shown, the rate relief having made it possible to earn substantially the 10 per cent wage dividend for employees, amounting to between \$1,850,000 and \$1,900,000, in addition to the 6 per cent dividend for stockholders, amounting to \$1,800,000. In 1923 the wage dividend was not earned by \$50,000.

Receivers Appointed for Oklahoma Railway

Judge F. E. Kennamer in the Oklahoma federal court, Western district, on Dec. 27 granted the plea of bondholders for the appointment of a receiver for the Oklahoma Railway, Oklahoma City, Okla. George A. Henshaw, a former member of the Oklahoma Corporation Commission and a well known Oklahoma City attorney, and John W. Shartel, president and general manager of the company, were appointed co-receivers. They are to give bonds of \$20,000 and are to file an inventory within sixty days of the company's finances, including its assets and liabilities. The court will not pass on the application of the bondholders to abandon some of its unprofitable lines in Oklahoma City until this report is made to the federal court. Mr. Henshaw among other duties will handle the public relations of the company.

The receivership was granted on a showing by the bondholders to the court that the Oklahoma Railway last year lost about \$100,000 on operation of its Oklahoma City lines, due largely to automobile and jitney competition.

Before it went into receivership the company had filed an application with the State Corporation Commission asking for permission to increase its rates to 10 cents single fare, three fares for 25 cents. This plea is set for hearing Jan. 10.

Mr. Henshaw has announced that a complete survey of the company's property, both local and interurban, will be made by G. H. Clifford, Fort Worth, general manager of the Northern Texas Traction Company, which in 1924 won the \$1,000 prize and certificate awarded by the Coffin Foundation each year to the electric railway in the United States making the most notable contribution to the advancement of the industry.

\$821,459 Spent in Chicago on Subway Surveys—None Built

For thirteen years Chicago has been studying the feasibility of subways, and in that period of time the sum of \$821,459 has been spent in "surveys" and "reports," with not a spadeful of earth turned as yet. City Controller Martin J. O'Brien recently disinterred these facts.

With close to \$1,000,000 in reports filed, the City Council about six months ago authorized another inquiry to disclose "how, when and where, if subways are found practicable, they may be built."

The money for the various reports has come from the city's share of the traction receipts, paid under the terms of the 1907 traction ordinance, whereby the city gets 55 per cent of the net receipts of the Chicago Surface Lines.

This traction fund now totals \$40,376,776, having grown from the first deposit of \$1,556,809, to which has been added interest of \$8,480,353.

Bion J. Arnold made the first survey of the city's traction needs in 1911. He recommended subway construction. His report cost the fund \$24,642. In 1912 Mayor Carter Harrison created a sub-

way and terminal commission which undertook a new study of the Chicago traction problem. After three years of study, a "comprehensive" subway plan was recommended, at a cost of \$120,071. Then in 1916 another \$203,882 was spent for the so-called Ridgeway-Arnold-Parsons report. Ridgeway and Parsons collaborated with Walter Fisher in a supplemental report in 1917, for which the trio were paid \$76,820, and in 1918 Mr. Fisher received \$13,621 for other data on the same subject.

A junket of the local transportation committee of the City Council to California to study traction in the Western cities cost \$22,331. Lawyers received \$1,143 from the fund for their advice to the committee in 1919. In 1920 and 1921 Mayor William Hale Thompson dipped into the fund to finance his scheme for a 5-cent fare. A 35-page booklet was issued at a cost of \$195,093.

During the Thompson administration, three attorneys, William H. Sexton, Stephen H. Foster and Jerome Frank, retained by the transportation committee, were paid \$57,790 for their legal advice in 1922. These same lawyers, who advised Mayor Dever during his recent unsuccessful negotiations with the Surface Lines, together with Major Kelker, received \$76,063 from the fund in 1923, and until Aug. 1, 1923, the same men have thus far been paid \$30,896 from the fund. There has apparently been no effort since then to bring the figures down to date.

Electric Line on Long Island Suspend

The Nassau County Railway, Sea Cliff, Long Island, has stopped running its cars. The company quit because it found it could not make any profits. It had operated a trolley line for 22 years between Sea Cliff, L. I., and Glen Cove. The road is more than 10 miles long.

Insull Interests Acquire Chicago & Joliet Electric Railway

Van Horn Ely, president of the American Electric Power Company, Philadelphia, Pa., has announced the company has sold several properties to the Central Illinois Public Service Corporation, acting for the Middle West Utilities Company of Chicago, Martin J. Insull, president. They include the Chicago & Joliet Electric Railway, operating in Joliet, Ill., with suburban lines leading into Chicago; the Quincy Gas & Electric Company, Quincy, Ill.; Warsaw Gas Company of Warsaw, Ind.; Goshen Gas Company, Goshen, Ind.; Niles Gas Light Company, Niles, Mich. The last three companies are in the vicinity of South Bend, Ind.

Funds for this purchase have been obtained by the sale of \$4,800,000 of serial gold notes, a public offering of which will be made shortly by Halsey, Stuart & Company. The notes will be in \$1,000 denomination, dated Jan. 2, 1925, and serial maturities of the issue in the amount of \$400,000 will be taken up each quarter beginning April 1, 1925, and ending Jan. 1, 1928. The first four maturities will bear 4½ per cent interest while the remaining eight will bear 5 per cent. The Central Illinois Public Service Company will sell

preferred stock among its customers over the three-year period for the purpose of permanently funding the purchase and meeting the note maturities.

Taxation Amount Cut.—At a final hearing of the Board of Equalization on Dec. 31 the assessment for taxation of the Louisville Railway, Louisville, Ky., for 1925 was cut \$434,633. The amount previously set was \$12,934,633.

Does Not Seek Abandonment Permission.—Upon request of the applicant, the California Railroad Commission has dismissed the application of the Los Angeles Railway for authority to discontinue the operation of portions of certain of its electric railway lines.

Line Abandoned.—The Danville & Sunbury Transit Company ceased operations on Dec. 31. The line operated between Danville, Pa., and Riverside, on the south side of the Susquehanna River, and ran to the Danville State Hospital. No disposition has been made of the equipment.

Purchases of P. R. T. Stock for Employees Increase.—New purchases of Philadelphia Rapid Transit Company stock for account of the wage dividend fund amounted to 40,000 shares during 1924. This makes the employees' total holdings of the stock 160,000, including 10,000 shares in the Welfare Association, or more than 26.6 per cent ownership of the entire 600,000 share capitalization.

Profit in Seattle.—The Seattle Municipal Railway lines, Seattle, Wash., showed a net profit of \$27,760 over all charges for October, according to the report submitted to the City Council by Superintendent of Railways D. W. Henderson. Gross revenues for the month were \$515,377, with operating expenses \$334,436. In addition, \$62,930 was set aside as the month's share of the annual interest charges and \$70,250 for bond redemptions. The usual allowance of \$20,000 was also made.

Extra Dividends Declared.—The Tri-City Railway & Light Company, Davenport, Iowa, has declared four quarterly dividends of 2½ per cent each, payable April 1, July 1 and Oct. 1, it was announced, to stockholders of record on the twentieth day of each preceding month. This is an increase of one-fourth of 1 per cent on the common.

Merger Bill Reappears in Washington.—A bill has been introduced in the Senate by Senator Ball of Delaware, chairman of the Commission on the District of Columbia, which proposes a merger of all the street railways, bus companies and the Potomac Electric Light Company. If these companies do not merge voluntarily, Senator Ball's bill proposes that the Public Utilities Commission take charge and operate them as a unified system after July 1, 1925. A measure similar to this has made its appearance at every session for the last 10 years at least.

Denver Decree Signed.—Federal Judge Symes has signed a formal decree giving the Denver Tramway, Denver, Col., permission to raise fares to any figures that will bring a net return annually of \$2,207,500, or 7½ per cent on the valuation of \$23,516,769 plus a reserve for depreciation of

\$450,000. The decree affirms the company's right to a perpetual franchise, obviating the necessity of an election in 1926.

Urges Purchasing of Substations.—J. D. Ross, superintendent of the light department at Seattle, Wash., has urged the City Council to take immediate steps to purchase the substations used by the Puget Sound Power & Light Company in supplying power to the Seattle Municipal Railway. He declares that each day of delay costs the city \$2,000, paid to the Puget Sound Company for power, and points out that a year's advance notice is required for taking over a substation.

Authorized to Issue Stock.—The Key System Transit Company, Oakland, Cal., has been authorized by the California Railroad Commission to issue prior preferred and preferred stock to refund \$56,000 of bonds of the San Francisco, Oakland & San José Railway, provided that the owners of the bonds in each instance pay to or otherwise account for, to the Key System Transit Company, the amount to which they, as owners of such bonds, are entitled to receive from the proceeds of the foreclosure sale of the properties securing the payment of the bonds, and provided further that the holders of such shares of stock shall have no right to any dividends payable prior to Jan. 1, 1925.

Abandonment Under Consideration.—A. N. Broadhead, president of the Chautauqua Traction Company, Jamestown, N. Y., announces that the company is seriously considering abandoning the entire system between Jamestown and Westfield, a distance of 32 miles, because the line is a losing proposition. An application is now pending before the Public Service Commission by the company to abandon that part of its line between Mayville and Westfield.

Equipment Sold.—The property of the Titusville Traction Company, Titusville, Pa., was sold on Jan. 3 to S. W. Platt & Company, a wrecking concern of Pittsburgh, and Lessor Levy, who will junk the property. The price was \$22,250. The sale was made to satisfy the first mortgage of \$106,000, on which \$24,000 in interest had accrued. The mortgage foreclosure proceedings were preceded by discontinuance of railway service on Dec. 31. Titusville is a town of 8,432 inhabitants. The railway operated 16 miles of line there.

Interborough Shows Deficit.—The total revenue of the Interborough Rapid Transit Company, New York, N. Y., for the 5 months ended November, 1924, was \$23,311,852, an increase of \$392,545 over a similar period for the year previous. The operating expenses, taxes and rentals paid the city for the old subway were \$15,562,302. This represented a decrease of \$534,802 over a similar period in 1923. The income available for all purposes was \$7,223,987. This is an increase of \$1,677,055 over a similar period in 1923. After the consideration of charges and rentals, the balance after actual maintenance showed a deficit for the 5 months' period ended Nov. 30, 1924, of \$459,711. This figure was an increase of \$1,297,514 over the balance shown in the five months ended Nov. 30, 1923.

Personal Items

Recognition for Long Career

J. K. Buchanan Becomes Executive Head of West Virginia Properties
—Paul H. Sommer Advanced

J. K. Buchanan, general manager of the local utilities in Morgantown, W. V., has been made a director, vice-president and general manager of both the West Virginia Utilities Company and the Wheeling Public Service Company. Mr. Buchanan succeeds M. R. Stern, Wheeling, who has resigned to take up private engineering work. Mr. Stern will, however, be retained as consultant to assist Mr. Buchanan, for a while at least, in handling the Wheeling properties.

With the elevation of Mr. Buchanan to the executive position in the two companies comes the announcement that Paul H. Sommer, for the past two years superintendent of the electric department in Morgantown, will become general superintendent of the properties there. He will take over the routine administration formerly handled by Mr. Buchanan.

Mr. Buchanan has been identified with the local utilities since 1904, when he entered the employ of the Union Utility Company, then a Morgantown corporation directed by Harry Warfield as executive officer. Mr. Buchanan rose steadily in the confidence of the owners until he reached the position of general superintendent, which he has held for the last 15 years. The Union Utilities Company then became the Union Utilities Company and later the West Virginia Traction & Electric Company, at which time its ownership passed into the hands of Eastern interests. During the war-time period there was a receivership, but this was lifted on April 1, 1920, and the property, along with that at Wheeling, was purchased in 1921 by Anderson & Company, Providence, R. I.

The Morgantown properties of the West Virginia Utilities Company include electric, water and street railway departments and are conservatively valued at \$4,000,000. The Wheeling properties, estimated at \$3,000,000, include a 25-mile street car line running from Wheeling to West Alexander, through the well-known "Pike" section of Wheeling and the suburban towns; a bus line within the city of Wheeling and an electric service to domestic customers along the territory served by the traction line.

F. H. Raub has succeeded E. S. Stoffet as supervisor of the Atlantic City & Shore Railroad, Atlantic City, N. J.

W. E. Johnson has succeeded C. N. Garrison as assistant secretary and assistant treasurer of the Springfield Traction Company, Springfield, Mo.

C. G. Staples is secretary and treasurer of the Springfield Electric Railway

Company of New Hampshire, with office at Brattleboro, Vt.

Walter P. Ordway is president of the Somerset Traction Company, Skowhegan, Me. He succeeds F. W. Briggs.

President Herr of Westinghouse Company in New York

E. M. Herr, president of the Westinghouse Electric & Manufacturing Company, has removed his headquarters from East Pittsburgh to New York. Mr. Herr is leaving Pittsburgh after having been there since 1899. He has achieved a notable place in industry. Graduating from the Sheffield Scientific School of Yale in 1884, he became a special apprentice of the Chicago, Milwaukee & St. Paul Railway in the motive power department and later was engaged as mechanical draftsman and test engineer and superintendent of telegraphs and later as a division superintendent of the Burlington Railroad. In 1890 he was appointed master mechanic on the Chicago, Milwaukee & St. Paul and in 1892 was appointed to the superintendency of the Grant Locomotive Works in Chicago. In 1895 he was in Russia establishing locomotive works there. Then he was made general superintendent of the Gibbs Electric Company, Milwaukee, and later superintendent of motive power of the Chicago & Northwestern Railroad. Thence he went to a similar position on the Northern Pacific. In 1899 he entered the service of the Westinghouse company and after various promotions was elected to the presidency in 1911.

Thomas I. Carter is one of the vice-presidents of the Cumberland & West-ernport Electric Railway, Frostburg, Md.

Winchell G. Yates, who for the last four years has been superintendent of track and railway of the Wheeling Traction system, Wheeling, W. Va., tendered his resignation to G. S. Wills, general superintendent, to take place immediately. He is leaving the traction company to go into the contracting business for himself. Mr. Yates has been connected with the Wheeling Traction Company for more than 13 years.

V. D. Jennings is treasurer of the Central Maine Power Company, Rockland, Me. The position was formerly held by Walter S. Wyman, since made president.

A. William Sperry, New Haven, Conn., has been engaged as managing engineer of the Danbury & Bethel Street Railway, Danbury, Conn., now in receiver's hands.

C. H. Forsgard is general superintendent of the Durham Public Service Company, Durham, N. C.

A. I. Hunter, formerly treasurer of the Grand Forks Street Railway, Grand Forks, N. D., is now head of the claims department. E. J. Lauder has assumed the position of treasurer.

New Vice-President

Official of Canadian Westinghouse Company Made Vice-President and General Manager at Pittsburgh

F. A. Merrick, vice-president and general manager of the Canadian Westinghouse Company, Hamilton, Ont., has been elected vice-president and general manager of the Westinghouse Electric & Manufacturing Company in general executive charge of the activities of the company.

Mr. Merrick is a native of New Jersey. He received his technical education at Lehigh University. Shortly after graduation he was employed by the Steel Motors Company, a subsidiary of the Lorain Steel Company, where he was responsible for many important electrical inventions and rose to the position of chief engineer. Later he joined the Westinghouse company at East Pittsburgh, Pa., in charge of the production of street railway motors. After the formation of the Canadian Westinghouse Company, Ltd., in 1903, he was sent there as superintendent, and later became manager of works and finally vice-president and general manager.

During the war Mr. Merrick had charge of the factory of the New England Westinghouse Company, at Chicopee Falls, Mass., from which the government's requirements in Browning machine guns were supplied. Mr. Merrick had to reorganize and largely re-equip this factory in order to handle this work, but he was able to complete 60,000 guns within 11 months after operations were begun. This manufacturing achievement is regarded as probably without parallel.

After the war Mr. Merrick was located in London for 2 years as special representative of the Westinghouse Electric International Company. He then returned to Canada.

S. R. Perkins has succeeded B. Crow as master mechanic of the Tulsa Street Railway, Tulsa, Okla.

A. W. Walton has succeeded W. K. Danvers as electrical engineer of the Oklahoma Railway, Oklahoma City, Okla. O. P. Johnson is now road-master, replacing T. McMains.

Dwight B. Dean, formerly vice-president and general manager of the Kuhlman Car Company, Cleveland, Ohio, has become associated with the Yellow Coach Manufacturing Company, Chicago. Mr. Dean will represent the Yellow Coach Company, with headquarters in the Hanna Building, Cleveland.

George L. Markland is second vice-president of the Stone Harbor Railroad, Stone Harbor, N. J. Joseph P. Lodge, formerly secretary, has been succeeded by James B. Lichtenberger, who is performing the duties of secretary and treasurer.

E. E. Thornton, for many years in charge of train service of the Key System Transit Company, operating in Oakland and San Francisco, Cal., has been succeeded by Harry T. Brobeck, former superintendent of the central division. Mr. Thornton has been with the Key System Transit Company for

about 25 years and is now on sick leave. Charles E. Bourn has been transferred from superintendent of the western to the central division, while W. B. Hamilton takes charge of the western division, left vacant by Mr. Bourn. W. A. Niedrich has been promoted to acting night superintendent to replace W. B. Hamilton.

Obituary

Capt. H. M. Stine

Capt. Henry M. Stine, secretary and treasurer of the Pennsylvania Street Railway Association since 1909, with offices in Harrisburg, Pa., died at his home in that city recently. Captain Stine's public activities had a large scope. He was president of the County Commissioners' Association of Pennsylvania in 1923 and at the time of his death was chairman of the legislative committee of that body. He was serving his third term as County Commissioner. He served one term as Recorder of Deeds and three years ago he was a candidate for the Republican nomination for Congress from the Harrisburg district.

His military career covered two wars. In the Spanish-American War he was second lieutenant in Company I, Fourth Pennsylvania Volunteer Infantry. He saw service in Porto Rico. After the war he was active in the National Guard, and at the entrance of the United States in the World War he was placed in command of Company C in the Eighth Regiment, which became the 112th Infantry in the reorganization of the army on a war basis. He mustered his company in Chambersburg in 1917. The 28th Division, of which the 112th Infantry was a part, trained at Camp Hancock, Augusta, Ga. There Captain Stine was taken ill and he was sent back home while his company went overseas without him. During the Mexican border campaign in 1915 and 1916 Captain Stine recruited in Harrisburg and throughout the Cumberland Valley for the Pennsylvania National Guard.

Captain Stine was a graduate of Dickinson College, Carlisle, and of the Dentistry School of the University of Pennsylvania. He was 63 years old.

Charles Smith, the Pittsburgh representative of William Wharton, Jr. & Company, Inc., Easton, Pa., died in Pittsburgh on Dec. 16.

Fred Pefferkorn, superintendent of the Municipal Street Railway, Alexandria, La., died recently.

Frank Edward Haylock, for many years active in the coach painting departments of electric and steam railroads and for the past 16 years foreman of the paint department at the shops of the Schenectady Railway, Schenectady, N. Y., died on Jan. 2, at the age of 60, after an illness of six weeks. Mr. Haylock prior to his connection with the Schenectady Railway held responsible positions in the paint departments of the New York Central & Hudson River Railroad and the Rutland Railroad.

S. D. Hutchins

Well-Known Figure in Central Electric Railway Territory Had Long Been Ill

S. D. Hutchins, representative of the Westinghouse Air Brake Company at Columbus, Ohio, with which he had been connected since May, 1896, died in that city on Jan. 5. "Judge" Hutchins, as he was familiarly known, was one of the most beloved of traction men in the Central West. He was genuinely accepted in the counsels of the electric railway men, as much so, as though he were himself an operating man. It had become the custom to intrust to him for years past the work of making all business arrangements for the meeting places and accommodations of the Central Electric Railway Association. He will be remembered by many for his



S. D. Hutchins

handling of the boat trips on the Great Lakes, if for no other of his labors. Nothing was left undone by him on these occasions.

Judge Hutchins was an unusual figure in many respects. Not only was he loved and esteemed by his immediate associates and the officials of all the electric railways with whom he came in contact, but he commanded the respect and the admiration of the rank and file of the electric railway employees. In fact, it was his work in behalf of the trainmen that led to his appellation of "Judge." No matter how busy he was, Judge Hutchins always found time to act in arbitration cases and was drafted for service in many of them. In these his rôle was always that of umpire. Men and companies alike had absolute confidence that he would decide on the facts and the facts only. Bias had no part in his make-up. He knew the trials and tribulations of the men—for he had been one of them—and he knew the trials and tribulations of the managements, for he was close to them. Moreover, he had the faculty of expressing himself tersely and still not giving offense. In all of this work his services were rendered gratis.

Judge Hutchins was born in Cleveland, Ohio, on May 25, 1855. He was an old-time locomotive engineer. He ran on the Big Four Railroad between Co-

lumbus and Cincinnati from 1876 to 1895 and left that company as the senior engineer with first choice of runs and engines. For seven years he ran the best fast passenger train between Columbus and Cincinnati. Because of the skill he displayed in braking this train smoothly, he won the attention of H. H. Westinghouse, who sent for him to come to Wilmerding at the former's expense for an interview. Inasmuch as the Judge had secured patents on an angle cock and a new air gage, he thought that the purpose of the interview was to make some deal in this connection. As it turned out, however, Mr. Westinghouse offered him a job as chief instructor of the Westinghouse Air Brake Company, with the duties of showing locomotive engineers all over the country how to operate the brakes. It seems that the brake apparatus was being accused of all the shortcomings, whereas it was largely a matter of lack of skill on the part of the men. After two or three months of consideration of leaving the railway with which he had been so long connected, Judge Hutchins finally went over to his new work on an extended leave of absence. The railroad really never did let him quit.

In his new work he traveled all over the country for about two years, and then put in three years with headquarters in Buffalo. Judge Hutchins refused to move his family from Columbus, Ohio, and the company told him that if he would not move his family to Buffalo the company would move his office to Columbus. And it did so. It sent him there to act as special engineer in connection with air-brake equipment installations and troubles. Finally he picked for himself the job of straightening out air-brake equipment in use on the electric railways, most of which consisted of a simple tank of air piped to the brake cylinder with a plain valve for control. If anything happened to the air piping on either side of the valves, the air exhausted to the atmosphere and the car was without brakes.

The first work was to eliminate the weaknesses of this system. There followed the introduction of "automatic air." The first equipment of this type was put on an interurban car at Ypsilanti, Mich., the Judge personally spending two weeks "on his back" to make the installation. But the triple valve used was not flexible enough and he was recalled in a week and had to change back to straight air. But from this start experiments were made and the control gradually perfected. By his single-handed work and persistence, and almost complete control of design for the electric lines, there was developed a uniform system of braking, about the only thing that is a complete standard on the electric railways.

For a long time Judge Hutchins had not been well. Unsparing of himself, he did too much. So a year ago the Westinghouse company sent Mr. and Mrs. Hutchins abroad for a 10 weeks' trip. His health improved for a time after his return, but the improvement was only temporary. He had made inroads on his energy too deep to be repaired. The dear old Judge has passed on to his great reward.

Manufactures and the Markets

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

Copper Production Breaks Records

Production of copper in 1924 broke all previous records except those for the years during the World War. The output from domestic sources during the last year, as determined by the Geological Survey from reports of the smelters showing actual production for 11 months and the estimated production in December, was 1,628,000,000 lb., compared with 1,435,000,000 lb. in 1923, an increase of more than 13 per cent over that year, which itself was the highest of record with the exception of the war years. The smelter production of copper in December, as estimated by the producing companies, was 137,000,000 lb., a little higher than the average monthly production for the year, or at the rate of about 1,644,000,000 lb. a year.

The production of new refined copper from domestic sources, determined similarly, was about 1,764,000,000 lb., compared with 1,464,000,000 lb. in 1923. In 1924 the production of new refined copper from domestic and foreign sources amounted to about 2,293,000,000 lb., compared with 1,980,000,000 lb. in 1923. In addition to the output of new refined copper about 136,000,000 lb. of secondary copper was produced at the refineries, compared with 131,000,000 lb. in 1923, so that the total output of refined copper was about 2,429,000,000 lb. in 1924 and 2,111,000,000 lb. in 1923.

The imports of unmanufactured copper during the first eleven months of 1924, according to the Bureau of Foreign and Domestic Commerce, amounted to 706,127,251 lb., compared with 676,473,388 lb. during the entire year 1923 and 541,013,220 lb. in 1922. The imports of copper in the first eleven months of 1924 were thus higher than during any previous calendar year. The exports of copper also increased substantially during the first eleven months of 1924 and were higher than those recorded for any other calendar year except 1917. The exports in December will probably not be quite large enough to make the figures for 1924 surpass those for 1917. The exports for the first eleven months of 1924 were 1,018,426,271 lb., compared with 829,314,002 lb. during the entire year 1923.

Double-Truck Articulated Locomotives for Montreal

The Harbor Commissioners of Montreal recently received the four electric locomotives ordered in January, 1924. A brief description of these locomotives was given in ELECTRIC RAILWAY JOURNAL for Dec. 13. Further details are now available. Each locomotive weighs 100 short tons, all the weight being carried on the driving wheels. They are of the box cab, double-truck, articulated type, equipped with four 430-hp. motors. Power is transmitted to the axle through twin spur gears. The trucks and superstructure were built

by Messrs Beyer Peacock & Company, Manchester, England. Motors and electric control equipment were manufactured by the English Electric Company at its Preston works, where the locomotives were finally assembled and equipped. Following the usual Canadian practice they are fitted with M.C.B. automatic couplers, airbrake equipment, brake blocks, etc., made according to American standard design.

Some of the principal features are given in the following table:

Total weight.....	100 (short) tons
Weight per driving axle.....	25 (short) tons
Diameter of driving wheels.....	50 in.
Total wheel base.....	28 ft. 0 in.
Fixed wheel base.....	9 ft. 3 in.
Length over buffers.....	40 ft. 0 in.
Length over cab.....	33 ft. 9 in.
Brakes.....	Westinghouse, 14 E.L.
Pantographs.....	Two, air-operated
Number of motors.....	Four
Type of motor.....	DK. 96, 430-hp.
Line voltage.....	2,400 d.c.
Motor voltage.....	1,200-volt d.c.
Motor ventilation.....	Forced
Tractive effort on tread of wheels and speeds (forced ventilation):	
Continuous rating.....	32,000 lb. at 16 m.p.h.
One-hour rating.....	43,000 lb. at 15 m.p.h.
Normal acceleration.....	50,000 lb. up to 14 m.p.h.
Maximum acceleration.....	60,000 lb.

Street Car Production Expected to Increase

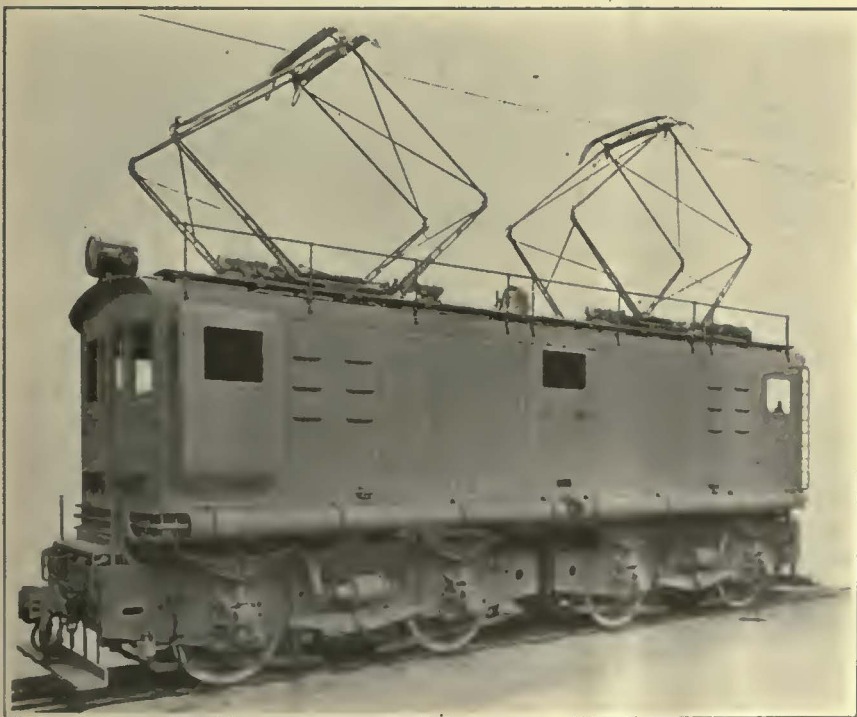
Carry-over orders and inquiries now in the market indicate that the average percentage of operations of the J. G. Brill Company this year will exceed that of 1924. This expected increased operation applies not only to the building of street cars, but also to other modes of transportation, such as gasoline-propelled cars for steam railroads and buses.

Standard Invoice Will Be Discussed at Conference

A national conference called by R. M. Hudson, chief of the Division of Simplified Practice of the Department of Commerce, will be held under the auspices of the National Association of Purchasing Agents on Jan. 14 at the Commerce Building, Washington, D. C. For some time now 41 national trade associations have been giving considerable attention to the national standard invoice, purchase order and inquiry forms. Mr. Hudson in a letter of invitation to the conference says that the general adoption and use of the proposed standards will work toward the elimination of those wastes resulting from the present tremendous diversity

Metal, Coal and Material Prices

Metals—New York	Jan. 6, 1925
Copper, electrolytic, cents per lb.....	15 00
Copper wire base, cents per lb.....	17 25
Lead, cents per lb.....	10 07 1/2
Zinc, cents per lb.....	8 18
Tin, Straits, cents per lb.....	60 00
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons.....	\$4 12 1/2
Somerset mine run, Boston, net tons.....	2.05
Pittsburgh mine run, Pittsburgh, net tons.....	1.87 1/2
Franklin, Ill., screenings, Chicago, net tons.....	1.95
Central, Ill., screenings, Chicago, net tons.....	1.95
Kansas screenings, Kansas City, net tons.....	2 30
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.....	\$7.25
Weatherproof wire base, N. Y., cents per lb.....	20.00
Cement, Chicago net prices, without bags.....	2 20
Linseed oil (5-lb. lots), N. Y., per gal.....	\$1.18
White lead in oil (100-lb. keg), N. Y., cents per lb., carload lots.....	0.1620
Turpentine (bbl. lots), N. Y., per gal.....	0 91



English Built Locomotive for Montreal Harbor Commission

in the forms used for the purposes indicated. Many national organizations have been actively promoting the use of the standard invoice among their members. Secretary Chandler of the National Association of Purchasing Agents states that if the customers can save \$15,000,000 by the use of standard invoices, the sellers can save at least an additional 10 per cent of that amount.

Rolling Stock

Madison Railways, Madison, Wis., plans to purchase 17 new cars, replacing some of its older cars. This policy was adopted following authorization by the Wisconsin Railroad Commission for a fare increase, referred to elsewhere in this issue.

Coast Cities Railway, Ashury Park, N. J., will purchase seven light-weight, double-truck safety cars. The Board of Public Utility Commissioners has approved a car trust agreement between the company, operating in Monmouth County, N. J., and the J. G. Brill Company, Philadelphia, for the purchase. Under the agreement the company will issue 60 serial notes totaling \$77,635, of which \$65,909 is the principal and \$11,726 interest.

Manhattan Bridge Three-Cent Line, New York City, N. Y., suffered the loss of one car by fire in the carhouse at the Flatbush Avenue extension. The damage was estimated at between \$5,000 and \$6,000.

Sand Springs Railway, Tulsa, Okla., suffered the loss of its carhouse and machine shop by fire on Dec. 18. Sixteen passenger cars, one express car and an electric locomotive were destroyed with the building. The company was seriously handicapped in operation as it had only seven interurban cars left. Sleet and cold greatly handicapped firemen in combating the flames. The fire, caused by an overheated stove in an express car, caused a loss estimated at \$200,000.

Track and Line

San Diego Electric Railway, San Diego, Cal., has constructed an overhead viaduct crossing at Torquois Street, La Jolla, at a cost of \$40,000.

Dallas Railway, Dallas, Tex., will consider the extension of the State Street line on Capital Avenue between Haskell and Henderson Avenues in East Dallas. The proposed extension would be nine blocks and cost between \$30,000 and \$35,000. It would serve a district now without adequate railway connections.

Stockton, Cal.—The State Railroad Commission has authorized the construction of a subway under the Southern Pacific and Western Pacific rail crossings at Miner Avenue. The project involves an expenditure of \$308,000. By the terms of the decision the city, which was the applicant, was to pay 50 per cent of the construction cost, the Southern Pacific 30 per cent and the Western Pacific 20 per cent, all exclusive of paving expenses, which are to be borne by the city of Stockton.

Womelsdorf, Pa.—It is said that an electric railway will be constructed next spring from Womelsdorf, Berks County, to Kleinfeltersville, Lebanon County, at a cost of approximately \$300,000. This will make direct trolley connections between Reading and Harrisburg. The line will be 6.06 miles long. It will start at Womelsdorf and go through Newmanstown, Millbach and Kleinfeltersville.

New York, N. Y.—The Board of Transportation issued an invitation to contractors to bid for the installation of tracks and other miscellaneous work in the construction of the Flushing extension of the Queensboro subway. The bids will be received and publicly opened by the Board of Transportation at 49 Lafayette Street, New York City, Jan. 9, 1925. Recently the board awarded a contract for the construction of foundations, retaining walls and embankment for the Corona storage yards, which will be connected by two spur tracks with the Flushing extension. The Flushing extension will be a three-track elevated railroad.

Power Houses, Shops and Buildings

Tennessee Electric Power Company, Chattanooga, Tenn., will erect shortly a one-story fireproof garage, 75 ft. x 100 ft., for its railway property. The estimated cost is \$15,000.

Boston, Mass.—It is decided that a station will be built at the corner of Charles and Cambridge Streets on the Boston Elevated line to Cambridge. The trustees of the Boston Elevated Railway have voted to accept the proposition. Plans for the station have the approval of the Public Utilities Department and of the Boston Transit Division. It is expected that the details will be worked out shortly and that the city of Boston will advertise for bids on the construction work.

Petaluma & Santa Rosa Railroad, Petaluma, Cal., has ordered from the Westinghouse Electric & Manufacturing Company a 300-kw. rotary converter for installation in a power substation which is to be erected at Forestville. The improvement will cost \$15,000. Delivery is expected May 1.

Trade Notes

Mitchell-Rand Manufacturing Company, New York, N. Y., held its annual dinner of officers, salesmen and factory managers, Dec. 27, at the Building Trades Employers' Club. Previous to the dinner the regular monthly meeting of the salesmen was held in the offices of the company. After the dinner the officers of the company, salesmen, factory managers and guests attended a performance of "New Brooms" at the Fulton Theater.

Electric Service Supplies Company, Philadelphia, Pa., announces that it has assumed the exclusive sale and distribution of the entire output of the Franklin Porcelain Company, Norristown, Pa., manufacturer of high-voltage porcelain insulators and fittings. The modern plant of that company is devoted entirely to the production of

the highest quality wet process electrical porcelain for every purpose and is being greatly enlarged in anticipation of a substantial increase in volume of business.

Jackson & Moreland, Boston, Mass., engineers, announce the formation of a department particularly devoted to investigations and reports of a special nature, such as appraisals and rate studies, organization and personnel matters. This department is under the management of Frank M. Carhart.

American Brass Company, Bridgeport, Conn., has booked through the new Kenosha wire mill an order for shipment to the Illinois Central Railroad for the proposed electrification of that company's line out of the suburban district near Chicago. The order calls for products of the Anaconda Copper Mining Company, of which the American Brass Company is a subsidiary, as follows: 130 miles hard drawn grooved copper-trolley wire, 105 miles feeder strand and messenger wire and 82 miles grooved hitenso trolley wire.

Anton S. Rosing, heretofore assistant manager advertising and publications bureau of the Portland Cement Association, Chicago, has been appointed publicity manager of the Armco Culvert & Flume Manufacturers' Association, Middletown, Ohio, in charge of advertising, publications and other publicity work. Previous to joining the staff of the Portland Cement Association he was engaged in active construction work, principally railroad construction, and for two years was assistant professor of civil engineering at Michigan Agricultural College, Lansing.

New Advertising Literature

International Motor Company, New York, N. Y., has issued the anniversary number of the "Mack Bulldog." One of the pictures shows the original Mack Trucks, Inc. plant and working force.

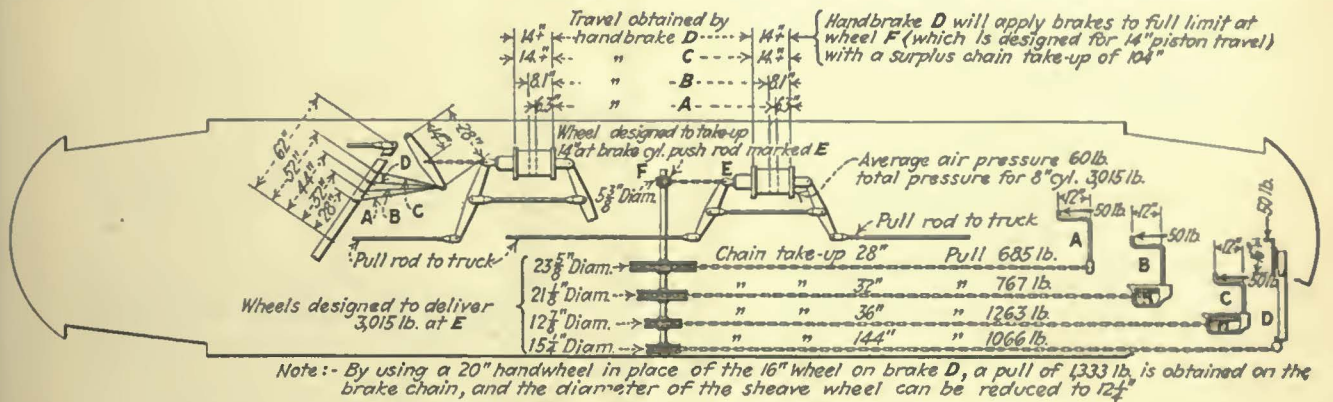
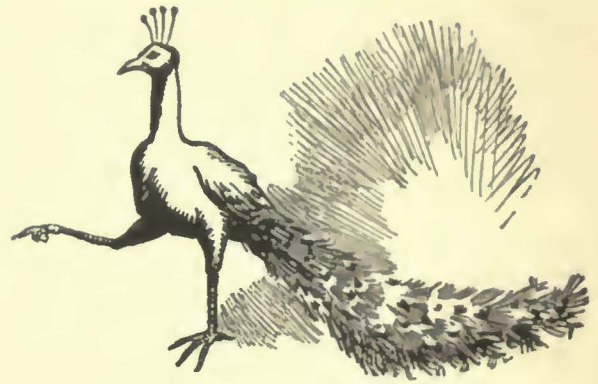
American Institute of Steel Construction, New York, N. Y., has issued "Steel Construction," a booklet which contains the institute's Standard Specification and Code of Standard Practice. The introduction of the book consists of a mathematical explanation of the development of the various formulas recommended in the Specification for the proper reduction of working stresses. A set of charts accompanies the explanation designed to eliminate a vast amount of mathematical calculation in connection with structural steel design. Data are given on action of structural steel members under varying conditions.

Electric Service Supplies Company, Philadelphia, Pa., has issued Bulletin No. 207, entitled "Cass Commutator Smoothing Stones." "Cass" is the new name for the old Aetna commutator smoothing stone.

Ohio Brass Company, Mansfield, Ohio, has issued a folder describing its new O-B trolley base, called Form 4, which has Timken roller bearings, special contact brushes, and a leather cup washer below the bottom bearing to act as a grease seal. The base is very compact and of light weight. It is intended particularly for use on small city cars.

The hand brake theory is here—

In a comprehensive study of the subject published in Electric Railway Journal, September 13, 1924, the author elaborates and illustrates clearly the fundamental theories underlying the installation and operation of hand brakes under various conditions. The diagram and tables below, are reproduced from the article.



Hand Brake Layouts for Cars with 8-In. Brake Cylinders

Type of Hand Brake	Designated by Letter	Pull Delivered by Hand Brake	Braking Power at E	Maximum Chain Pull Obtained by Hand Brake	Chain Pull Required by Hand Brake for 14 In. Push Rod Travel	Maximum Travel of Push Rod at Point E	Surplus Chain Take-Up	Deficiency of Chain Take-Up	Remarks
Ordinary staff	A	685 lb.	3,015 lb.	28 in.	62 in.	6.3 in.	.....	34 in.	55 per cent less than required
Peacock, size A-B	B	767 lb.	3,015 lb.	32 in.	55 in.	8.1 in.	.....	23 in.	42 per cent less than required
Peacock, size E	C	1,263 lb.	3,015 lb.	36 in.	34 in.	14.4 in.	2 in.	.....	5.8 per cent more than required
Peacock, staffless	D	1,066 lb.	3,015 lb.	144 in.	40 in.	14.4 in.	104 in.	.....	260 per cent more than required

PEACOCK STAFFLESS BRAKES



Adequate in practice and theory, too!

Analysis like the above indicates clearly that Peacock Staffless Brakes have more than ample chain winding capacity. Absolute limitation of piston travel, in the air-brake system may not infrequently require an emergency hand brake application, and hand brakes ought to be effective under all conditions.

It's easy to test it out. Take any car on the road and slack off the brake shoes until a piston travel of

nearly full stroke is attained. Then try your hand brake! Will it hold under these conditions? If not, ask yourself what use it is.

Peacock Staffless Brakes, because of their immense chain-winding capacity—will apply brakes and stop the car, no matter how much slack there may be. They are truly emergency brakes, because they operate successfully when other methods of controlling the car fail.

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Just off the press

This new book explains just how you can secure the right kind of publicity for your organization, in the right way and with the right results. It deals in a practical manner with common-sense methods of securing favorable attention and moulding it into public approval and good-will.

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A Handbook of Publicity

BY JOHN C. LONG

Manager of Educational Department, National Automobile Chamber of Commerce; previously on editorial staff of *Class Journal Company*.

218 pages, 5x8, illustrated, \$3.00 net, postpaid.

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This book does not encourage puffery. "Free" reading notices nor the attempts to put over sales talks which belong in advertising.

It tells you how to find out and present the news of your business.

Every organization, every public utility and many individuals engage in activities which have news value. PUBLIC RELATIONS tells how to present this information to the public with the best results.

It gives specific examples of successful campaigns. It describes the media of publicity. It discusses effective methods for corporations, associations, retail enterprises and individuals.

The book tells you

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- the needs of different newspaper departments;
- what the 100 leading newspapers are;
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- how to run conventions and banquets;
- how to organize a complete publicity campaign;
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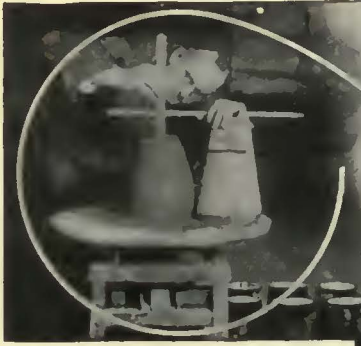
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On the job at Newark Bay. By means of this simple slump test, any competent inspector can easily control the quantity of mixing water and, therefore, the strength of the resulting Concrete.



The new, four-track Central Railroad of New Jersey Bridge over Newark Bay will be located 100 feet north of the present structure. The new track level will be 30 feet higher than the old.

New structure is to be 7500 feet long with Concrete Piers weighing 1500 tons each.



Quality Control in the Field

Central Railroad of New Jersey engineers believe in putting the laboratory to work right on the job.

In the Concrete construction, shown above, they are regularly applying approved methods of field control to keep the quality of the Concrete uniform and particularly to maintain desired strength.

Strengths are verified at regular intervals by testing field cylinders.

Proportions of fine and coarse aggregates are accurately determined by fineness modulus.

Slump tests are being made daily to control consistency.

This is only one of many jobs where the most modern field methods of control are directly helping to assure better Concrete with greatest economy.

* * *

The work on the Newark Bay Bridge is being done under the direction of A. E. Owen, Chief Engineer, J. J. Yates, Bridge Engineer, and H. E. Van Ness, Construction Engineer, Central Railroad of New Jersey.

Let us tell you more about the practical advantages of field methods of quality control. Write the nearest office listed below for your free copy of "Concrete Data for Engineers and Architects."

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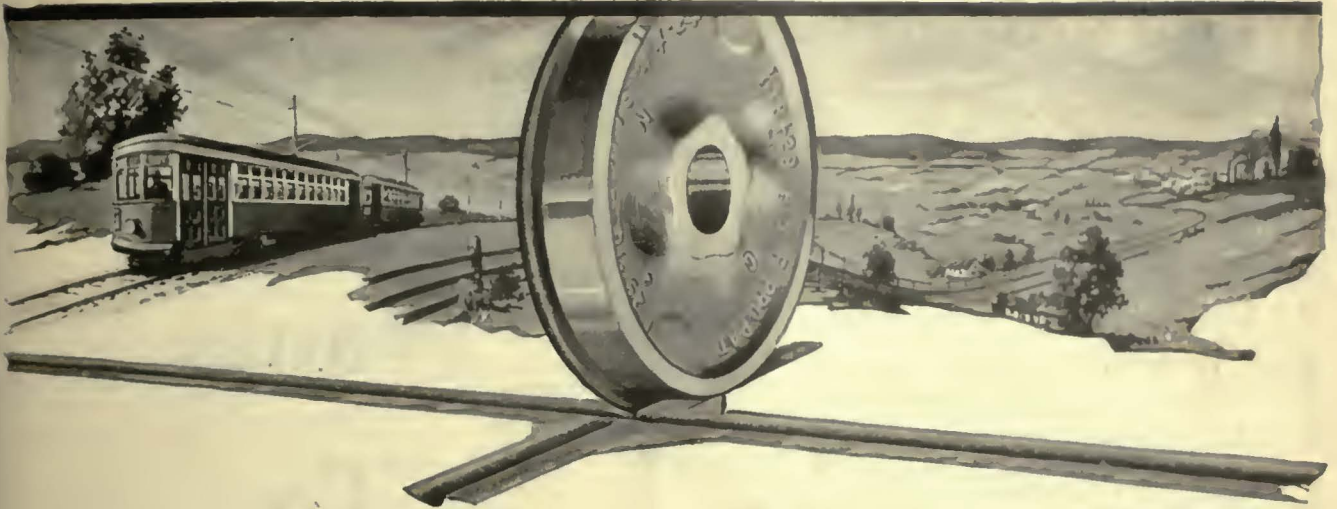
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—from this old block

MANY a weary mile has it traveled. Crossings and frogs have pounded it. Bad joints have tried its metal to the very core. Yet to the end of its span of life, the toughened tread and flange remain intact.

What does it profit to buy a cheaper wheel, and spend several times the saving in re-turning? The cost of one trip to the machine shop is more than enough to pay the difference for Davis "One-Wear" Steel Wheels. Their super-hardened high manganese, heat-treated treads and flanges are the best resistant to chipping yet developed.

American Steel Foundries
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 "ONE-WEAR"
STEEL WHEELS

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in general, study the question of *wood durability* for other purposes, as carefully as *Railway Signal* men have studied it for *Trunking* and *Capping*, there will be a lot more

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used for *Fencing, Ties, Car Material, Station Construction* and similar railroad requirements, *to the very great economy of the companies using it.*

The long service which “*All-Heart*” *Tidewater Cypress* gives,

**SAVES LABOR COSTS
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—big items in themselves.

“*All-Heart*” *Tidewater Cypress* comes nearer being decay proof than any other wood.

This mark  on every timber, board and bundle of Cypress is your *insurance of true replacement economy.*

The data in support of these facts will be promptly furnished upon request.

SOUTHERN CYPRESS MFRS.' ASSN

1265 Poydras Building, New Orleans La., or
1265 Graham Building, Jacksonville, Fla.



Some One Wants To Buy

the equipment or machinery that you are not using. This may be occupying valuable space, collecting dust, rust and hard knocks in your shops and yards.

Sell it

before depreciation
scraps it.

*The Searchlight Section is
helping others—*

Let it help you also

TRACK FOUNDATION

The Source of Good or Evil



Concrete properly protected in Track Foundation becomes a source of good. Unprotected, it leads to all kinds of Evil. The Dayton Tie supplies the necessary protection to concrete, to make it a source of good. Without the shock absorbing elements, concrete disintegrates and becomes a source of Evil.

Let us tell you in detail why concrete is the best foundation for track, and why The Dayton Resilient Shock Absorbing Tie is the only substitute that will preserve this, *the best* track foundation.

THE DAYTON MECHANICAL TIE CO.
707 Commercial Building, Dayton, Ohio

DAYTON *Resilient* TIE



SILENT!

Silent, smooth meshing gears minimize wear, tear, rattle, vibration and the resultant maintenance expenses.

NUTTALL HELICAL GEARS

Almost unbelievably quiet and smooth, Nuttall Helical gears are peculiarly suited to electric railway service.

Being scientifically correct in design, forged and heat-treated, Nuttall Gears are exceptionally enduring. They are guaranteed to last at least four times as long as ordinary gears and remain quiet and smooth in operation.

Nuttall gears will lengthen the life of equipment and cut gear costs in the bargain. Our free gear book tells you why.

R.D. NUTTALL COMPANY
PITTSBURGH  PENNSYLVANIA

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



Quality Cars for Detroit

The illustration shows one of the twenty-five new Peter Witt type cars now being delivered to the Detroit Municipal Railways, equipped with St. Louis equalized trucks.

St. Louis "Quality Built" cars are used by the principal electric railways throughout the U. S. Every car is built with the same high quality of workmanship.

Write for specifications

St. Louis Car Company

St. Louis, Mo.

"The Birthplace of the Safety Car"

Quality

Safety

Is Money Ever "Spent" for Advertising?

A young and energetic executive took hold of a fine old business in New York.

"What this business needs," he told himself, "is a place in the mind of the public."

And deliberately he set out to sacrifice the greater volume of his profits and invest the sacrifice into the building of good will.

He did. And to this old business, advertising was the breath of life.

For six months had not passed before the business had grown so that the

advertising cost was a smaller percentage than ever it had been, and, because of a larger volume, the shop effected economies and gave far superior service.

That was five years ago. Today a certain percentage is spent, or supposed to be spent, for advertising. But as fast as the appropriation is spent, the more the business increases; and the more that the business increases, the smaller the percentage becomes.

Is money ever "spent" for advertising?



AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE
TROLLEY WIRE
WEATHERPROOF WIRE AND CABLE
PAPER INSULATED UNDERGROUND CABLE
MAGNET WIRE

Reg. U. S. Pat. Office
 Incandescent Lamp Cord

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Boston, 176 Federal; Chicago, 113 W. Adams;
 Cincinnati, Traction Bldg.; New York, 100 E. 42nd St.

ELRECO TUBULAR POLES



COMBINE

Lowest Cost **Lightest Weight**
Least Maintenance **Greatest Adaptability**

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
 New York City, 30 Church Street

THE WORLD'S STANDARD

"IRVINGTON"

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation **Flexible Varnished Tubing**
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.
Irvington, N. J.

Sales Representatives in the Principal Cities

We are prepared

to handle any high grade proposition where
VARNISHED CAMBRIC
Wires and Cables
 are required.

When using *quality* Wires and Cables use *quality* Tapes.
 "MANSON" Tape, "OKONITE" Tape, "DUNDEE" Tapes.

THE OKONITE CO., Passaic, N. J.
 Incorporated 1884



*Sales Offices: New York—Atlanta—
 Pittsburgh—San Francisco.*
*Agents: Central Electric Co., Chicago,
 Ill. Pettibell-Andrews Co., Boston,
 Mass.; The F. D. Lawrence Electric
 Co., Cincinnati, Ohio; Novelty Elec-
 tric Co., Philadelphia, Pa.
 Canadian Representatives: Engineering
 Materials Limited, Montreal.*

TRADE MARK

ANDERSON

For dependable Line Material that will give you maximum service use

Send for Latest Quotations
 Main Office and Factory, Boston, Mass.



ELECTRICAL WIRES AND CABLES

John A. Roebbling's Sons Company
Trenton, New Jersey J-1707

Chapman
Automatic Signals

Charles N. Wood Co., Boston



ANACONDA
TROLLEY WIRE

ANACONDA COPPER MINING COMPANY THE AMERICAN BRASS COMPANY
 Conway Building, Chicago, Ill. General Offices, Washburn, Conn.

STANDARD
Underground Cable Company
Electric Wires and Cables of Quality

Branch Offices:

Boston Philadelphia Pittsburgh St. Louis New York
 Washington Chicago Detroit San Francisco

PEIRCE
Railway Feeder Pins

A strong Forged Steel Pin designed for heavy duty. Their low cost permits their use over the entire system.

HUBBARD & COMPANY
PITTSBURGH **CHICAGO**

AUTOMATIC SIGNALS
Highway Crossing Bells
Headway Recorders
Flasher Relays

NACHOD SIGNAL COMPANY, INC.
LOUISVILLE, KENTUCKY.



Shaw Lightning Arresters

Standard in the Electric Industries
for 35 years

Henry M. Shaw
150 Coit St., Irvington, Newark, N. J.

Arc Weld Rail Bonds

AND ALL OTHER TYPES
Descriptive Catalogue Furnished

American Steel & Wire Company

Chicago
New York
Boston
Cleveland
Pittsburgh
Denver
U. S. Steel Products Co.
San Francisco Los Angeles Portland Seattle



'CARNEGIE'
for
**WHEELS
AXLES
RAILS
CROSS TIES**
Carnegie Steel Company
PITTSBURGH, PENNA.

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.

Sales Offices:
Atlanta Chicago Cleveland New York
 Philadelphia Pittsburgh
Pacific Coast Representatives:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle
Export Representatives:
United States Steel Products Company, New York, N. Y.

BARBOUR-STOCKWELL CO.

205 Broadway, Cambridgeport, Mass.
Established 1858

Manufacturers of

Special Work for Street Railways

Frogs, Crossings, Switches and Mates

Turnouts and Cross Connections

Kerwin Portable Crossovers

Balkwill Articulated Cast Manganese Crossings

ESTIMATES PROMPTLY FURNISHED

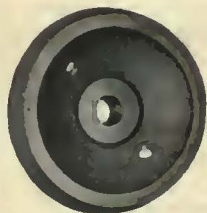
B. A. HEGEMAN, Jr., President C. C. CASTLE, First Vice-President
H. A. HEGEMAN, Vice-Pres. and Treas. F. T. SARGENT, Secretary
W. C. PETERS, Manager Sales and Engineering

National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York
Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago.

RAILWAY SUPPLIES

Tool Steel Gears and Pinions	Economy Electric Devices
Bell Locked Fare Box and Change Maker	Co.'s Power Saving and Inspection Meters
The Aluminum Field Coils	Anglo-American Varnish Co. Varnishes, Enamels, etc.
Walter Tractor Snow Plows	Gilmer Multiple Safety Step Treads
Cutler-Hammer Electric Heaters	National Hand Holds
Pittsburgh Forge & Iron Co.'s Products	Ft. Pitt Spring & Mfg. Co. Springs
Genesco Paint Oils	Turnstile Car Corporation's Turnstiles
E. Z. Car Control Corporation's Safety Devices	Anderson Slack Adjusters
Garland Ventilators	Feasible Drop Brake Staffs
Flaxlinum Insulation	Dunham Hopper Door Device
Yellow Coach Mfg. Co.'s Single and Double Deck Buses	



Cambria Rolled Steel Electric Car Wheels

Best for Longer Service

Other products for the electrical field includes axles, armature shafts, rails, spikes, track work, splice bars, bolts, tie plates, tie rods, pole line material, sheets, magnet steel and gear blanks.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

BETHLEHEM

Advertisements for the Searchlight Section

Can be received at the New York Office of Electric Railway Journal until 10 a. m.



Wednesday

For issue out Saturday

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of
Water Tube Boilers
of continuing reliability

BRANCH OFFICES

BOSTON, 49 Federal Street
PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 3001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 305 Gasco Building



WORKS

Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters
since 1898 and of Chain Grate
Stokers since 1893

BRANCH OFFICES

DETROIT, Ford Building
NEW ORLEANS, 521-8 Baronne Street
HOUSTON, TEXAS, Southern Pacific Building
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Agular 104
SAN JUAN, PORTO RICO, Royal Bank Building

OXYGEN, ACETYLENE, HYDROGEN for cutting, welding, etc.

Quick shipment and low prices also on cylinders, valves, torches, regulators and supplies.

INTERNATIONAL OXYGEN COMPANY

Main Offices: Newark, N. J.

Branch Offices: New York Pittsburgh Toledo

ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.

Electrical Machinery, Steam Turbines, Steam Engines,
Condensers, Gas and Oil Engines, Air Compressors,
Air Brakes

RAMAPO AJAX CORPORATION

Ramapo Automatic
Return Switch
Stands
for Passing
Sidings



RACOR Tee Rail
Special Work

Manganese
Construction

GENERAL OFFICES: HILBURN, NEW YORK

Chicago New York Superior, Wis. Niagara Falls, N. Y.
Canadian Ramapo Iron Works, Ltd., Niagara Falls, Ont.



ALUMINO-THERMIC JOINTS

New and independent process. No inserts needed.
Up-to-date and economical.

Alumino-Thermic Corp., Roselle Park, N. J.

RAILWAY UTILITY COMPANY

CAR COMFORT WITH **UTILITY** HEATERS
REGULATORS
VENTILATORS

141-151 West 29th St.
Chicago, Ill.

Write for
Catalogue

1328 Broadway
New York, N. Y.

A Single Segment or a Complete Commutator

Is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command our utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we build. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

"Boyerized" Products Reduce Maintenance

Bemis Trucks
Case Hardened Brake Pins
Case Hardened Bushings
Case Hardened Nuts and Bolts

Manganese Brake Heads
Manganese Transom Plates
Manganese Body Bushings
Bronze Axle Bearings

Bemis Pins are absolutely smooth and true in diameter. We carry 40 different sizes of case hardened pins in stock. Samples furnished. Write for full data.

Bemis Car Truck Co., Springfield, Mass.

GALVANIZING HOT DIP

We have the largest jobbing galvanizing plant and bottom in the United States. We guarantee our galvanizing to stand eight one minute dips in the Standard Copper Sulphate Solution Test. Galvanized Products furnished.

JOSEPH P. CATTIE & BROTHERS
Gaul and Letterly Sts., Philadelphia, Penna.

HORNE & EBLING CORPORATION

50 CHURCH ST., NEW YORK, N. Y.

Brass Hardware
For Cars and Buses



Sterling Trolley Bases
and Brakes

Motor and Controller
Parts

Mall. Iron and Brass
Castings

SAMSON SPOT WATERPROOFED TROLLEY CORD



Trade Mark Reg. U. S. Pat. Off.

Made of extra quality stock firmly braided and smoothly finished. Carefully inspected and guaranteed free from flaws. Samples and information gladly sent.

SAMSON CORDAGE WORKS, BOSTON, MASS.

NEW and RELAYING RAILS

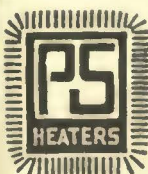
1 TON OR 1000

TRACK
EQUIP-
MENT

LB FOSTER CO.
PITTSBURGH - PENNSYLVANIA

RAIL
ACCESS-
ORIES

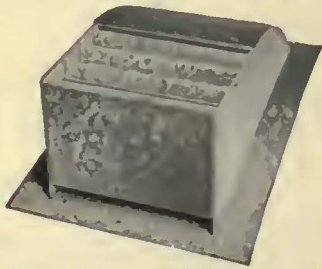
NEW YORK - JERSEY CITY - PHILADELPHIA - HAMILTON, O.



Car Heating and Ventilation

are two of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

The Peter Smith Heater Company
6209 Hamilton Ave., Detroit, Mich.



Type "A" for cars having small roof radius. One of a variety for street car and bus use.

Take the Stale Air Out of Your Cars!

Poorly ventilated cars are apt to become poorly patronized cars.

N-L Ventilators change all the air in the car many times an hour. Nothing but pure air can get in—no dust, rain or snow.

In use by leading street and suburban railways. Ask for copy of "Superior Ventilation."



THE NICHOLS-LINTERN CO.

7960 Lorain Ave. Cleveland, Ohio

Represented in Canada by
Railway & Power Engineering Corp., Toronto, Ontario

"Longwear" Pins and Bushings Hard—Accurate—Uniform



Renewal Materials
for Peckham and
other Trucks
Castings—Forgings
Springs

E.G. Long Company

50 Church Street, New York, N. Y.

Play for safety—

plus resiliency—

plus long life

By specifying

FORT PITT SPRINGS

FORT PITT SPRING &
MFG. CO.
Pittsburgh, Pa.



HALE-KILBURN CAR SEATS

For Every Class of Service

General Offices and Works: Philadelphia

Offices: New York, Chicago, St. Louis, Washington, San Francisco

PROVIDENCE FENDERS

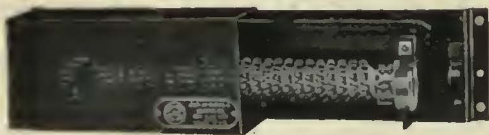
H-B

LIFE GUARDS

The Consolidated Car Fender Co., Providence, R. I.

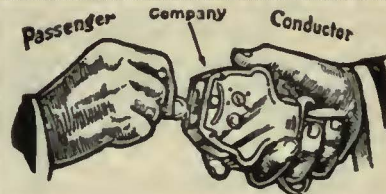
Wendell & MacDuffie Co., 110 E. 42nd St., New York
General Sales Agents

THE BEST TRUSS PLANK ELECTRIC HEATER EVER PRODUCED



No. 478E

GOLD CAR HEATING & LIGHTING CO., BROOKLYN, N. Y.



Direct
Automatic
Registration
By the
Passengers

Rooke Automatic
Register Co.
Providence, R. I.

Let Us Tell You of Our Especially Designed Fare Box for the

ONE MAN CAR

THE CLEVELAND FARE BOX COMPANY

Cleveland, Ohio

Canadian Cleveland Fare Box Co., Ltd., Preston, Ontario



Gets Every Fare
PEREY TURNSTILES
or PASSIMETERS

Use them in your Prepayment Areas and
Street Cars

Perey Manufacturing Co., Inc.
101 Park Avenue, New York City

100 New Users in the Last Nine Months
KASS SAFETY TREADS

HIGH

in efficiency and lasting qualities

LOW

in weight, initial and upkeep costs

Morton Manufacturing Co., Chicago



Electrical Insulation and Headlinings
THE PANELYTE COMPANY, Trenton, N. J.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD.

Positions Wanted, 3 cents a word, minimum 75 cents an insertion, payable in advance.
 Positions Vacant and all other classifications, 3 cents a word, minimum charge \$2.00.
 Proposals, 10 cents a line an insertion.

INFORMATION

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.
 Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH

1 to 3 inches \$4.50 an inch
 3 to 7 inches 4.00 an inch
 7 to 14 inches 3.50 an inch
 Rates for larger spaces, one year, rates on request.
 An advertising inch is measured vertically in a column, 3 columns 30% more for a page.

E. F. J.

POSITIONS WANTED

AUDITOR, broad and thorough experience in financing and accounting; all branches railway, electric and gas utilities, open for engagement. Possess initiative and capable of assuming full control of all accounting matters. PW-758, Electric Railway Journal, Old Colony Bldg., Chicago, Ill.

EXECUTIVE, Urban and Interurban. Wide successful experience in all departments of construction and operation. PW-740, Electric Railway Journal, Leader-News Bldg., Cleveland, Ohio.

EXECUTIVE, twelve years' experience in engineering and operation, city and interurban; first-class record and references. PW-757, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

GENERAL shop foreman, city or interurban, 18 years' successful experience in maintenance operation and general shop management. At present employed. Personal reasons for change. PW-767, Electric Railway Journal, Old Colony Bldg., Chicago, Ill.

GENERAL superintendent, chief engineer, or superintendent of equipment, technical graduate, eighteen years' experience on construction, operation, maintenance of power, shops, track, line buses. Highly successful in handling men and materials and producing results, fine references. Personal reasons for desiring change. PW-768, Electric Railway Journal, Old Colony Bldg., Chicago, Ill.

MASTER mechanic, with broad experience and successful record backed by prominent executives in railway field, desires change. PW-769, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

CAR WHEEL BORER

For Immediate Delivery

1—48-in. Niles Car Wheel Boring Machine without derrick, otherwise complete; good condition.

POWER SUPPLY COMPANY
 Terre Haute, Indiana



**In Small Lots
 As Well As Large**

THERE is a class of rail buyers, occasionally in need of only small tonnages, who are paying a premium on their purchases elsewhere because they believe that we do not seek their patronage.

We maintain a large organization to give efficient service on small orders. Our tremendous volume gives us unequalled buying power and saves our clients money regardless of the tonnage required.

Immense stocks at strategic distributing points provide complete assortments near you. This adds a saving in freight to our already unbeatable prices.

Next time you need rails, let us know your requirements.

We guarantee the same prompt, efficient service to all.

HYMAN-MICHAELS COMPANY

"The House of Dependable Service"

122 South Michigan Avenue, Chicago

Dealers in New and Relaying Rails,
 Locomotives and Railway Equipment

District Offices: New York, Woolworth Bldg.;
 St. Louis, Railway Exchange Bldg.; Pittsburgh, First Nat'l Bank Bldg.;
 San Francisco, 234 Steuart St.

Yards: St. Louis, East Chicago, Ind., McKees Rocks, Pa., San Francisco.

Cable Address: "Hymnmikl"

World's Largest Distributors of Rails

"SEARCHLIGHT"

IS
Opportunity
 Advertising

—to help you get what you want.

—to help you sell what you no longer need.

Take Advantage Of It

For Every Business Want

"Think SEARCHLIGHT First"

0187

FOR SALE

**Two Single Truck
 Snow Sweepers**

Complete
 Ready for operation
 Splendid condition

Transit Equipment Co.

Cars — Motors
 501 Fifth Avenue, New York

WE WANT TO BUY

30—West. 306-C.V.-4

MOTORS

Have you any to offer?

ELECTRIC EQUIPMENT CO.
 Commonwealth Bldg., Philadelphia, Pa.

RAILS

New Relaying

FROGS
 SWITCHES
 SPLICE BARS
 BOLTS
 NUTS
 TIE PLATES
 RAIL
 BRACES

All Rails and
 Track Materials shipped
 subject to inspection and
 approval at destination.

L. B. Foster Co.

PITTSBURGH-PA
 NEW YORK

UNUSUAL 70 LB.

RAILS

ARCE Section—Low Price

ZELNICKER IN ST. LOUIS

Steel Piling—Cars—Track Material, Etc.

WHAT AND WHERE TO BUY

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

- Advertising, Street Car**
Collier, Inc., Barron G.
- Anchors, Guy**
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Armature Shop Tools**
Elec. Service Supplies Co.
- Automatic Return Switch
Stands**
Ramapo Ajax Corp.
- Automatic Safety Switch
Stands**
Ramapo Ajax Corp.
- Axles**
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Johnson & Co., J. R.
St. Louis Car Co.
Westinghouse E. & M. Co.
- Axles, Car Wheels**
Bethlehem Steel Co.
- Badges and Buttons**
Elec. Service Supplies Co.
International Register Co.,
The
- Bearings and Bearing Metals**
Bemis Car Truck Co.
Brill Co., J. G., The
General Electric Co.
More-Jones Brass & Metal
Co.
St. Louis Car Co.
Westinghouse E. & M. Co.
- Bearings, Center and Roller
Side**
Stucki Co., A.
- Bells and Gongs**
Brill Co., The J. G.
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
St. Louis Car Co.
- Bearings, Roller**
Norma-Hoffman Bearings
Corp.
- Bollers**
Babcock & Wilcox Co.
- Bonding Apparatus**
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
- Bonds, Rail**
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Book Publishers**
McGraw-Hill Book Co.
- Brackets and Cross Arms
(See also Poles, Ties,
Posts, Etc.)**
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
- Brake Adjusters**
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.
- Brake Shoes**
Amer. Br. Shoe & Fdy. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
- Brakes, Brake Systems and
Brake Parts**
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
National Brake Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.
- Brushes, Carbon**
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Westinghouse E. & M. Co.
- Buses, Motor**
Brill Co., The J. G.
General Motors Corp'n
International Motor Co.
St. Louis Car Co.
- Bushings, Case Hardened and
Manganese**
Bemis Car Truck Co.
Brill Co., The J. G.
Long Co., E. G.
St. Louis Car Co.
- Cables. (See Wires and
Cables)**
- Cambric Tapes, Yellow and
Black Varnish**
Irvington Varnish & Ins.
Co.
- Carbon Brushes (See
Brushes, Carbon)**
- Cars, Dump**
Brill Co., J. G., The
Differential Steel Car Co.
St. Louis Car Co.
- Car Lighting Fixtures**
Elec. Service Supplies Co.
- Car M't'r's Ass'n**
Railway Car M't'r's Ass'n
- Car Panel Safety Switches**
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.
- Cars, Passenger, Freight,
Express, etc.**
Amer. Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.
- Cars, Gas, Rail**
Brill Co., J. G., The
St. Louis Car Co.
- Cars, Second Hand**
Electric Equipment Co.
Transit Equipment Co.
- Cars, Self-Propelled**
Brill Co., J. G., The
General Electric Co.
- Car Wheels, Rolled Steel**
Bethlehem Steel Co.
- Castings, Brass, Composition
or Copper**
Anderson Mfg. Co., A. &
J. M.
More-Jones Brass & Metal
Co.
- Castings, Gray Iron and
Steel**
Bemis Car Truck Co.
Fort Pitt Steel Castings Co.
St. Louis Car Co.
- Castings, Malleable and
Brass**
Amer. Br. Shoe & Fdy. Co.
Bemis Car Truck Co.
Fort Pitt Steel Castings Co.
Horne & Ebling Corp.
St. Louis Car Co.
- Catchers and Retrievers,
Trolley**
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.
- Catenary Construction**
Archbold-Brady Co.
- Ceilings, Plywood, Panels**
Haskelite Mfg. Co.
- Cement Products**
Portland Cement Assn.
- Change Carriers**
Cleveland Fare Box Co.
- Circuit-Breakers**
Anderson, A. & J. M. Mfg.
Co.
General Electric Co.
Westinghouse E. & M. Co.
- Clamps and Connectors for
Wires and Cables**
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
- Cleaners and Scrapers Track
(See also Snow-Plows,
Sweepers and Brooms)**
Brill Co., The J. G.
St. Louis Car Co.
- Clinsters and Sockets**
General Electric Co.
- Coal and Ash Handling (See
Conveying and Hoisting
Machinery)**
- Coil Banding and Winding
Machines**
Elec. Service Supplies Co.
- Coils Armature and Field**
General Electric Co.
Westinghouse E. & M. Co.
- Colls, Choke and Kicking**
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
- Coin Counting Machines**
Cleveland Fare Box Co.
Intern'l Register Co.
Johnson Fare Box Co.
- Coin Sorting Machines**
Cleveland Fare Box Co.
- Coin Weppers**
Cleveland Fare Box Co.
- Commutator Slotters**
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
- Commutator Truing Devices**
General Electric Co.
- Commutators or Paris**
Cameron Elec'l Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.
- Compressors, Air**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Tr. Br. Co.
- Condenser Papers**
Irvington Varnish & Ins. Co.
- Condensers**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.
- Connectors, Solderless**
Frankel Connector Co.
Westinghouse E. & M. Co.
- Connectors, Trailer Car**
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co.
- Controllers or Paris**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.
- Controller Regulators**
Elec. Service Supplies Co.
- Controlling Systems**
General Electric Co.
Westinghouse E. & M. Co.
- Converters, Rotary**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.
- Copper Wire**
Anaconda Copper Mining
Co.
- Cord, Bell, Trolley, Register**
Brill Co., The J. G.
Elec. Service Supplies Co.
Internat'l Register Co.,
The
Roebling's Sons Co., John
A.
St. Louis Car Co.
Samson Cordage Works
- Cord Connectors and
Couplers**
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.
- Couplers, Car**
Brill Co., The J. G.
Ohio Brass Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.
- Cross Arms (See Brackets)**
- Crossing Foundations**
International Steel Tie Co.
- Crossing, Frog & Switch**
Ramapo Ajax Corp.
- Crossing, Manganese**
Bethlehem Steel Co.
Ramapo Ajax Corp.
- Crossings**
Ramapo Ajax Corp.
- Crossings, Track (See Track,
Special Work)**
- Crossings, Trolley**
Ohio Brass Co.
- Curtains & Curtain Fixtures**
Brill Co., The J. G.
Elec. Service Supplies Co.
Morton Mfg. Co.
St. Louis Car Co.
- Dealer's Machinery**
Elec. Equipment Co.
Hyman-Michaels Co.
Transit Equipment Co.
- Derailing Devices (See also
Track Work)**
- Derailing Switches**
Ramapo Ajax Corp.
- Destination Signs**
Elec. Service Supplies Co.
- Detective Service**
Wish-Servico, P. Edward
- Door Operating Devices**
Brill Co., The J. G.
Consolidated Car Heat. Co.
General Electric Co.
Nat'l Pneumatic Co., Inc.
St. Louis Car Co.
- Doors & Door Fixtures**
Brill Co., The J. G.
Consolidated Car Heat. Co.
General Electric Co.
Morton Mfg. Co.
- Doors, Folding Vestibule**
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.
- Drills, Track**
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
- Dryers, Sand**
Elec. Service Supplies Co.
- Ears**
Ohio Brass Co.
- Electrical Wires and Cables**
Amer. Electrical Works
Amer. Steel & Wire Co.
Roebling's Sons & Co.,
J. A.
- Electric Grinders**
Western Electric Co.
- Engineers, Consulting, Con-
tracting and Operating**
Allison & Co., J. S.
Archbold-Brady Co.
Beeler, John A.
Buchanan & Layng Corp.
Bureau of Commercial
Economics, Inc.
Byllesby & Co., H. M.
Day & Zimmerman, Inc.
Drum & Co., A. L.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Orr, Joe R.
Railway Audit & Inspe-
ction Co.
Richey, Albert S.
Robinson & Co., Dwight
P.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Corp., The
J. G.
- Engineering**
Equipment Engineering Co.
Engines, Gas, Oil or Steam
Allis-Chalmers Mfg. Co.
Westinghouse E. & M. Co.
- Fare Boxes**
Cleveland Fare Box Co.
Johnson Fare Box Co.
Nat'l Ry. Appliance Co.
- Fare Registers**
Ohmer Fare Register Co.
- Fences, Woven Wire and
Fence Posts**
Amer. Steel & Wire Co.
Cyclone Fence Co.
- Fenders and Wheel Guards**
Brill Co., The J. G.
Consolidated Car Fender Co.
Elec. Service Supplies Co.
St. Louis Car Co.
- Fibre and Fibre Tubing**
Westinghouse E. & M. Co.
- Field Coils (See Coils)**
- Floodlights**
Elec. Service Supplies Co.
- Forgings**
Brill Co., J. G., The
- Frogs & Crossings, Tee Rail**
Bethlehem Steel Co.
Ramapo Ajax Corp.
- Frogs, Track (See Track
Work)**
- Frogs, Trolley**
Ohio Brass Co.
- Fuses and Fuse Boxes**
Consolidated Car Heat. Co.
General Electric Co.
Westinghouse E. & M. Co.
- Fuses, Refillable**
General Electric Co.
Johns-Manville, Inc.
- Galvanizers, Hot Dip**
Jos. P. Cattle & Bros.
- Gaskets**
Westinghouse Tr. Br. Co.
- Gas Producers**
Westinghouse E. & M. Co.
- Gas-Electric Cars**
General Elec. Co.
Westinghouse E. & M. Co.
- Gates, Car**
Brill Co., The J. G.
St. Louis Car Co.
- Gear Blanks**
Bethlehem Steel Co.
Brill Co., J. G., The
- Gear Cases**
Chillingworth Mfg. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
- Gears and Pinions**
Bemis Car Truck Co.
Bethlehem Steel Co.
Elec. Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion
Co.
- Generating Sets, Gas-Electric**
General Electric Co.
- Generators**
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.
- Girder Rails**
Bethlehem Steel Co.
Lorain Steel Co.
- Gong (See Bells and Gongs)**
- Greases (See Lubricants)**
- Grinders and Grind Supplies**
Indianapolis Switch & Frog
Co.
- Guard Rail Clamps**
Ramapo Ajax Corp.
- Guard Rails, Tee Rail &
Manganese**
Ramapo Ajax Corp.
- Guards, Trolley**
Elec. Service Supplies Co.
Ohio Brass Co.
- Haps, Trolley**
Elec. Service Supplies Co.
More-Jones Brass Metal Co.
Nuttall Co., R. D.
Star Brass Works
Thornton Trolley Wheel Co.
- Headlights**
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.
- Headlining**
Haskelite Mfg. Co.
Panelyte Co.
- Heaters, Car (Electric)**
Consolidated Car Heat. Co.
Gold Car Heat. & Lig. Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter
- Heaters, Car, Hot Air and
Water**
Elec. Service Supplies Co.
Smith Heater Co., Peter
- Hydraulic Machinery**
Allis-Chalmers Mfg. Co.
- Instruments Measuring, Test-
ing and Recording**
Elec. Service Supplies Co.
General Electric Co.
Johns-Pratt Co.
Westinghouse E. & M. Co.
- Insulating Cloth, Paper and
Tape**
General Electric Co.
Irvington Varnish & Ins.
Co.
Okonite Co.
Stand. Underground Cable
Co.
Westinghouse E. & M. Co.
- Insulating, Silk & Varnish**
Irvington Varnish & Ins.
Co.
- Insulation (See also Poles,
Electric Ry. Equipment
Co.)**
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins.
Co.
Okonite Co.
Westinghouse E. & M. Co.
- Insulation Slots**
Irvington Varnish & Ins.
Co.
- Insulators (See also Line
Materials)**
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins.
Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse E. & M. Co.
- Insulator Pins**
Elec. Service Supplies Co.
Hubbard & Co.
- Jacks (See also Cranes,
Hoists and Lifts)**
Elec. Service Supplies Co.
- Joints, Rail
(See Rail Joints)**
- Journal Boxes**
Bemis Car Truck Co.
Brill Co., J. G.
Fort Pitt Steel Castings Co.
St. Louis Car Co.
- Junction Boxes**
Horne & Ebling Corp.
Std. Underground Cable
Co.
- Lamps, Guards and Fixtures**
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
- Lamps, Arc & Incandescent
(See also Headlights)**
General Electric Co.
Westinghouse E. & M. Co.
- Lamps, Signal and Marker**
Nichols-Lintern Co.
Ohio Brass Co.
- Lanterns, Classification**
Nichols-Lintern Co.

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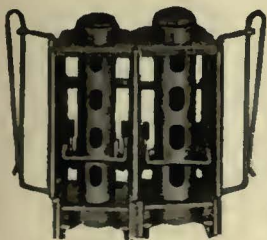
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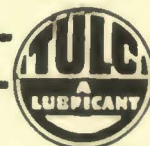
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St. Louis Car Co.
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Universal Lubricating Co.

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Universal Lubricating Co.

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Bemis Car Truck Co.

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Wm. Wharton, Jr. & Co.

Manganese Steel Guards
Ralls
Ramapo Ajax Corp.

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Track Work**
Bethlehem Steel Co.

Manganese Steel Switches
Frogs & Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.

Meters (See Instruments)

Molding, Metal
Allis-Chalmers Mfg. Co.

**Motor Buses (See Buses,
Motor)**

Motors, Electric
Allis-Chalmers Mfg. Co.
Westinghouse E. & M. Co.

Motors and Generators, Sets
Allis-Chalmers Mfg. Co.
General Electric Co.

Motormen's Seats
Brill Co., J. G.
Elec. Service Sup. Co.
Heywood-Wakefield Co.
St. Louis Car Co.
Wood Co., Chas. N.

Nuts and Bolts
Barbour-Stockwell Co.
Bemis Car Truck Co.
Bethlehem Steel Co.
Hubbard & Co.

Oils (See Lubricants).

**Omnibuses (See Buses,
Motor)**

Oxygen
International Oxygen Co.

**Oxy-Acetylene (See Cutting
Apparatus, Oxy-Acetylene)**

Packing
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

**Paints and Varnishes (Insu-
lating)**
Irvington Varnish & Ins.
Co.

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Woodwork**
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Ingersoll Rand Co.

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Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

**Pins, Case Hardened, Wood
and Iron**
Bemis Car Truck Co.
Elec. Service Sup. Co.
Ohio Brass Co.
Westinghouse Tr. Brake
Co.

Pipe Fittings
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Sup. Co.

Pole Line Hardware
Bethlehem Steel Co.
Ohio Brass Co.

Poles, Metal Street
Elec. Ry. Equipment Co.
Hubbard & Co.

Pole Reinforcing
Hubbard & Co.

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Weyerhaeuser Sales Co.

**Poles, Ties, Posts, Piling &
Lumber**
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Southern Cypress Migr'a
Asn.
Weyerhaeuser Sales Co.

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Bell Lumber Co.
Elec. Service Supplies Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Elec. Ry. Equipment Co.
Elec. Service Sup. Co.

Postheads
Okonite Co.

Power Saving Devices
National Ry. Appliance Co.
Railway Improvement Co.

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Pumps
Allis-Chalmers Mfg. Co.

Pumps Vacuum
Ingersoll Rand Co.

Punches, Ticket
Intern'l Register Co., The
Wood Co., Chas. N.

Rail Braces & Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.

Rail Joints—Welded
Lorain Steel Co.

Rails, Relaying
Foster Co., L. B.
Hyman-Michaels Co.

Rails, Steel
Bethlehem Steel Co.
Carnegie Steel Co.
Foster Co., L. B.

**Railway Paving Guards,
Steel**
Godwin Co., Inc., W. S.

Railway Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Ratton
Brill Co., The J. G.
Elec. Service Supplies Co.
McGuire-Cummings Mfg.
Co.
St. Louis Car Co.

Registers and Fittings
Brill Co., The J. G.
Elec. Service Supplies Co.
Intern'l Register Co., The
Rooke Automatic Register
Co.
St. Louis Car Co.

Reinforcement, Concrete
Amer. Steel & Wire Co.

**Repair Shop Appliances (See
also Coil Banding and
Winding Machines)**
Elec. Service Supplies Co.

**Repair Work (See also
Coils)**
General Electric Co.
Westinghouse E. & M. Co.

Replacers, Car
Elec. Service Sup. Co.

Resistances
Consolidated Car Heat. Co.

Resistance, Wire and Tube
General Electric Co.
Westinghouse E. & M. Co.

**Retrievers, Trolley (See
Catchers and Retrievers,
Trolley)**

Rheostats
General Electric Co.
Westinghouse E. & M. Co.

Roofing Car
Pantasote Co., Inc.

Roofs
Haskellite Mfg. Co.
Sanders, Track
Brill Co., The J. G.
Elec. Service Sup. Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.
Horne & Ebling Corp.
St. Louis Car Co.

**Scrapers, Track (See Clean-
ers and Scrapers, Track)**

**Screw Drivers, Rubber
Insulated**
Elec. Service Sup. Co.

Seats, Bus
Brill Co., J. G., The
Heywood-Wakefield Co.
St. Louis Car Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Heywood-Wakefield Co.
St. Louis Car Co.

Seating Materials
Brill Co., J. G.
Heywood-Wakefield Co.
Pantasote Co., Inc.
St. Louis Car Co.

Second Hand Equipment
Electric Equipment Co.
Hyman-Michaels Co.
Transit Equipment Co.

Shades, Vestibule
Brill Co., The J. G.

Shovels
Brill Co., The J. G.
Hubbard & Co.

**Side Bearings (See Bearings,
Center and Side)**

Signals, Car Starting
Consolidated Car Heat Co.
Elec. Service Sup. Co.
Nat'l Pneumatic Co., Inc.

Signals, Indicating
Nichols-Lintern Co.

**Signal Systems, Highway
Crossing**
Nachod Signal Co., Inc.
Wood Co., Chas. N.

Signal Systems, Block
Elec. Service Sup. Co.
Nachod Signal Co., Inc.

**Slack Adjusters (See Brake
Adjusters)**

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Anderson Mfg. Co., A. &
J. M.
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
More-Jones Brass & Metal
Co.
Nuttall Co., R. D.

Smokestacks, Car
Nichols-Lintern Co.

Sockets & Receptacles
National Metal Molding Co.

**Snow-Plows, Sweepers and
Rooms**
Brill Co., The J. G.
Consolidated Car Fender Co.
McGuire-Cummings Mfg.
Co.
St. Louis Car Co.

**Soldering and Brazing Ap-
paratus (See Welding
Processes and Apparatus)**
Irvington Varnish & Ins.
Co.

Solderless Connector
Frankel Connector Co.

Special Adhesive Papers
Irvington Varnish & Ins.
Co.

Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co.

Spikes
Amer. Steel & Wire Co.

Splicing Componds
Westinghouse E. & M. Co.

**Splicing Sleeves (See Clamps
and Connectors)**

Springs, Car and Truck
Amer. Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Fort Pitt Spring & Mfg.
Co.
St. Louis Car Co.

Sprinklers, Track and Road
Brill Co., The J. G.
McGuire-Cummings Mfg.
Co.
St. Louis Car Co.

Steel and Steel Products
Carnegie Steel Co.

Steps, Car
Brill Co., J. G., The
Morton Mfg. Co.

Stokers, Mechanical
Babeock & Wilcox Co.
Westinghouse E. & M. Co.

Stop Signals
Nichols-Lintern Co.

**Storage Batteries (See Bat-
teries, Storage)**

Strain, Insulators
Anderson, A. & J. M. Mfg.
Co.
Ohio Brass Co.

Strand
Roebling's Sons Co., J. A.

Superheaters
Babeock & Wilcox Co.

**Sweepers, Snow (See Snow
Plows, Sweepers and
Rooms)**

Switches, Selector
Nichols-Lintern Co.

Switches, Tee Rail
Ramapo Ajax Corp.

**Switches, Track (See Track
Special Work)**

Switches and Switchboards
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

**Tapes and Cloths (See Insu-
lating Cloth, Paper and
Tape)**

Tee Rail Special Track Work
Bethlehem Steel Co.
Ramapo Ajax Corp.

Telephones and Parls
Elec. Service Supplies Co.

Terminals, Cable
Std. Underground Cable Co.

**Testing Instruments (See In-
struments, Electrical Meas-
uring, Testing, etc.)**

Thermostats
Consolidated Car Heat. Co.
Gold Car Heat. & Ltg. Co.
Railway Utility Co.
Smith Heater Co., Peter

**Ticket Choppers & Des-
troysers**
Elec. Service Supplies Co.

Ties, Mechanical
Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel
Barbour-Stockwell Co.
Carnegie Steel Co.
International Steel Tie Co.

**Ties, Wood Cross (See Poles,
Ties, Posts, etc.)**

Tire Steel
Bethlehem Steel Co.

**Tools, Track & Miscella-
neous**
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Hubbard & Co.

**Trenches, Acetylene (See
Cutting Apparatus)**

**Towers and Transmission
Structures**
Archbold-Brady Co.
Westinghouse E. & M. Co.

Trackless Trolley Cars
Brill Co., J. G., The
St. Louis Car Co.

Track, Special Work
Barbour-Stockwell Co.
Bethlehem Steel Co.
Ramapo Ajax Corp.

Transfer (See Tickets)

Transfer Tables
American Bridge Co.

Transformers
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

**Treads, Safety, Stair, Car
Step**
Morton Mfg. Co.

Trolley Bases
Elec. Service Supplies Co.
General Electric Co.
More-Jones Brass & Meta
Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Bases, Retrieving
Elec. Service Supplies Co.
Nuttall Co., R. D.
Ohio Brass Co.

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

Trolley Material, Overhead
Anderson, A. & J. M.
Mfg. Co.
Elec. Service Supplies Co.
More-Jones Brass & Metal
Co.
Ohio Brass Co.

Trolley Wheel Bushings
More-Jones Brass & Metal
Co.

Trolley Wheels & Harps
More-Jones Brass & Metal
Co.
Thornton Trolley Wheel Co.

**Trolley Wheels (See Wheels,
Trolley)**

Trolley Wire
Amer. Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
Roebling's Sons Co., J. A.

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
McGuire-Cummings Mfg.
Co.
St. Louis Car Co.
Taylor Elec. Truck Co.

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

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

Turbines, Water
Allis-Chalmers Mfg. Co.

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

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

Varnished Papers & Silks
Acme Wire Co.
Irvington Varnish & Ins.
Co.

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

Welded Rail Joints
Aluminn-Thermic Corp.
Ohio Brass Co.

Welders, Portable Electric
Ohio Brass Co.

Welding & Cutting Tools
International Oxygen Co.

**Welding Processes and
Apparatus**
Aluminn-Thermic Corp.
General Electric Co.
International Oxygen Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

**Wheel Guards (See Fenders
and Wheel Guards)**

**Wheel Processes (See Machine
Tools)**

Wheels, Car, Cast Iron
Bemis Car Truck Co.
Carnegie Steel Co.

Wheels, Wrought Steel
Carnegie Steel Co.

Wheels, Trolley
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
More-Jones Brass & Metal
Co.
Nuttall Co., R. D.
Star Brass Works.

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

Wire Rope
Roebling's Sons Co., J. A.

Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
General Electric Co.
Okonite Co.
Roebling's Sons Co., J. A.
Westinghouse E. & M. Co.
Std. Underground Cable
Co.

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as hard here, as on the
very surface. (This is one
of the great
difference between
tool steel
hardening and case
methods)



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Tool Steel Quality

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"Differential Two-Car Train. Trailer dumping load clear of trench."

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Standard on Fifty Railways for

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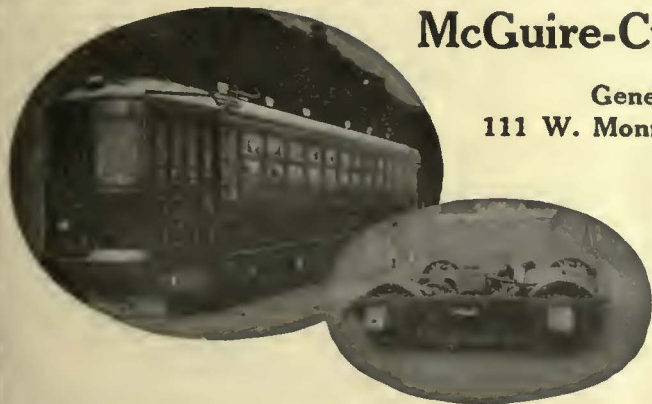
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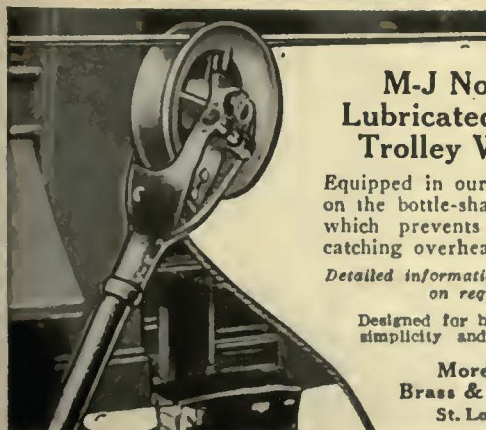
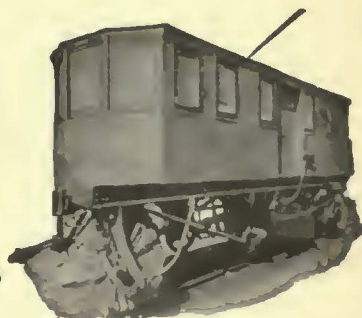
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General Offices:
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Lubricated Type
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Designed for high speed,
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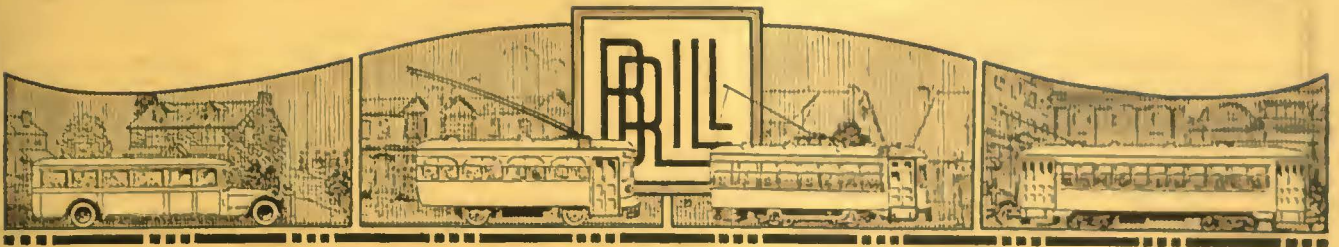


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Traction companies are getting from
50,000 to 100,000 miles from the Thor-
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Letters from users ring with praise of the
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Seating accommodations are provided for 62 passengers; the cars measure 48 feet long overall, 8 ft. 7 in. wide over posts, and equipped with quadruple 50 H.P. motors weigh 59,000 lb.

Catalog No. 277 contains a complete line of modern transportation equipment.

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*— and now 150 more
 Another order just received
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 Control — makes a total
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**100 More Equipments ^{3/1/24}
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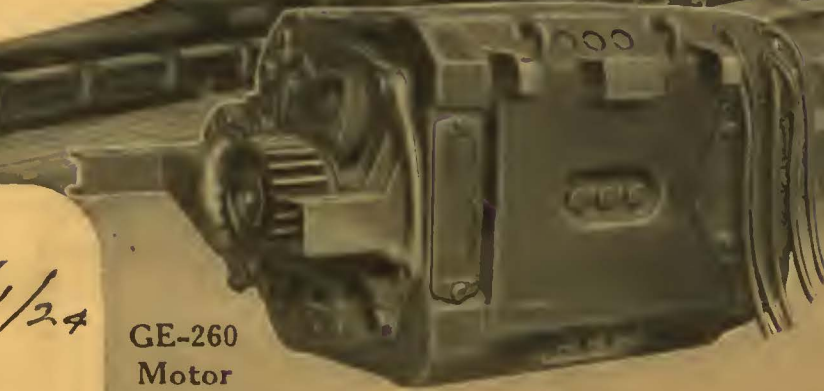
The 100 two-motor GE-260 Equipments with PC-10 double-end Control recently ordered for the Subway Division of the Interborough Rapid Transit Company are duplicates of 398 Equipments which have been in service since 1917.



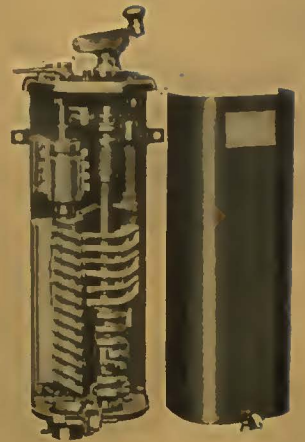
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GE-260
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PC-10
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GENERAL ELECTRIC