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ELECTRIC RAILWAY JOURNAL

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APRIL 23, 1927

Mr. Manager, You, Too, Are Interested

ATTENTION of electric railway managers is directed to the competition for maintenance men announced in the April 16 issue on pages 700-701 and this week on page 743. Fifteen cash prizes are offered for the best ideas which help to decrease costs, improve workmanship or avoid delays.

You, Mr. Manager, have an interest in this competition. Its purpose is to stimulate to greater interest in their work those charged with maintenance responsibility, and to promote interchange of ideas among maintenance men.

Departmental officers and employees are notably reticent in telling about their own accomplishments. A suggestion from the management will help to overcome this tendency. It will help to stimulate enthusiasm—and that is the first step toward improved performance. The JOURNAL is trying to do its part by offering these prizes. Encourage your men to enter the contest. Here is a topic to bring up at your next staff conference!

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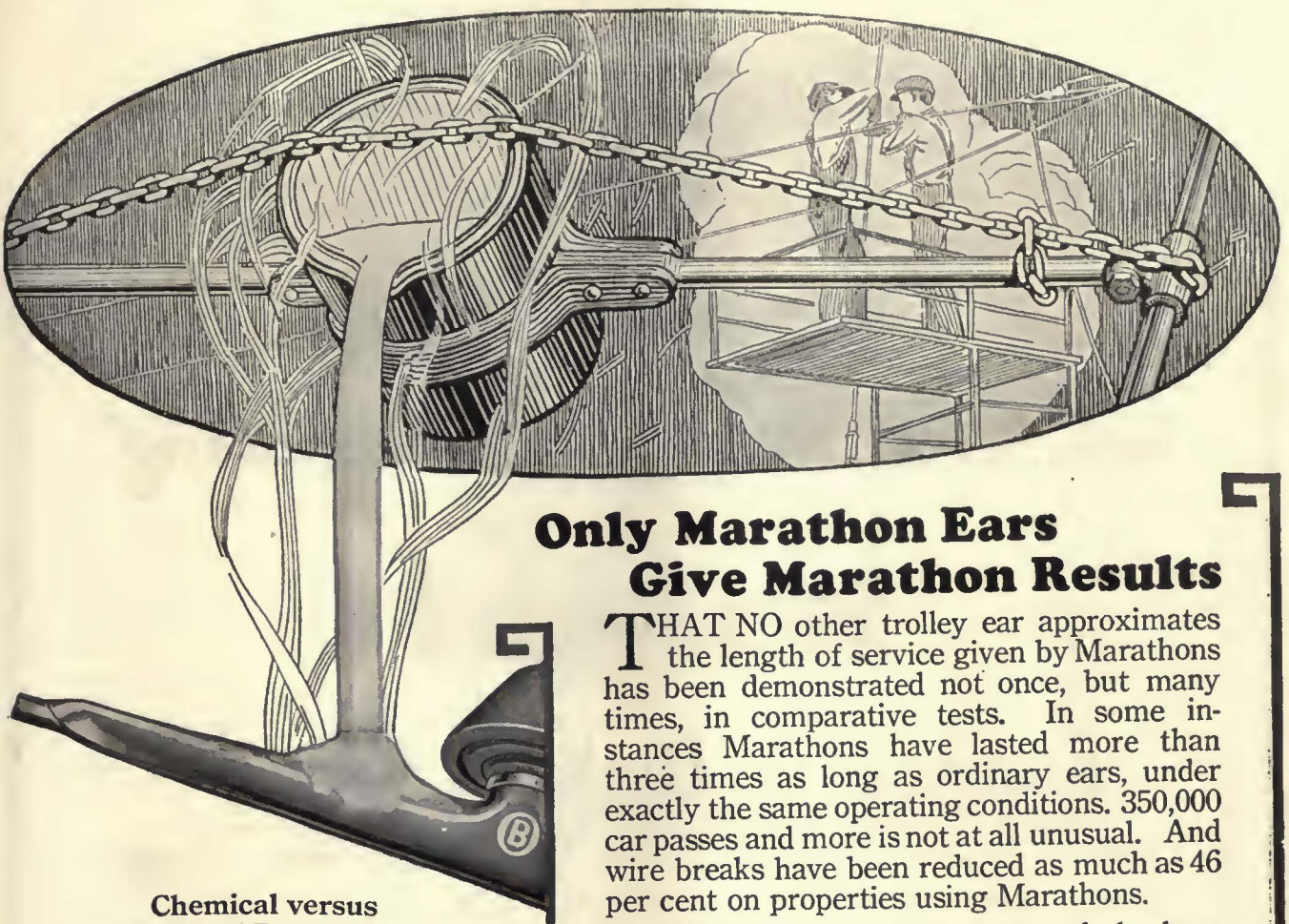

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Service tests, laboratory tests, and the long list of properties which have indicated their preference by repeat orders—all prove that only Marathon Ears give Marathon results.

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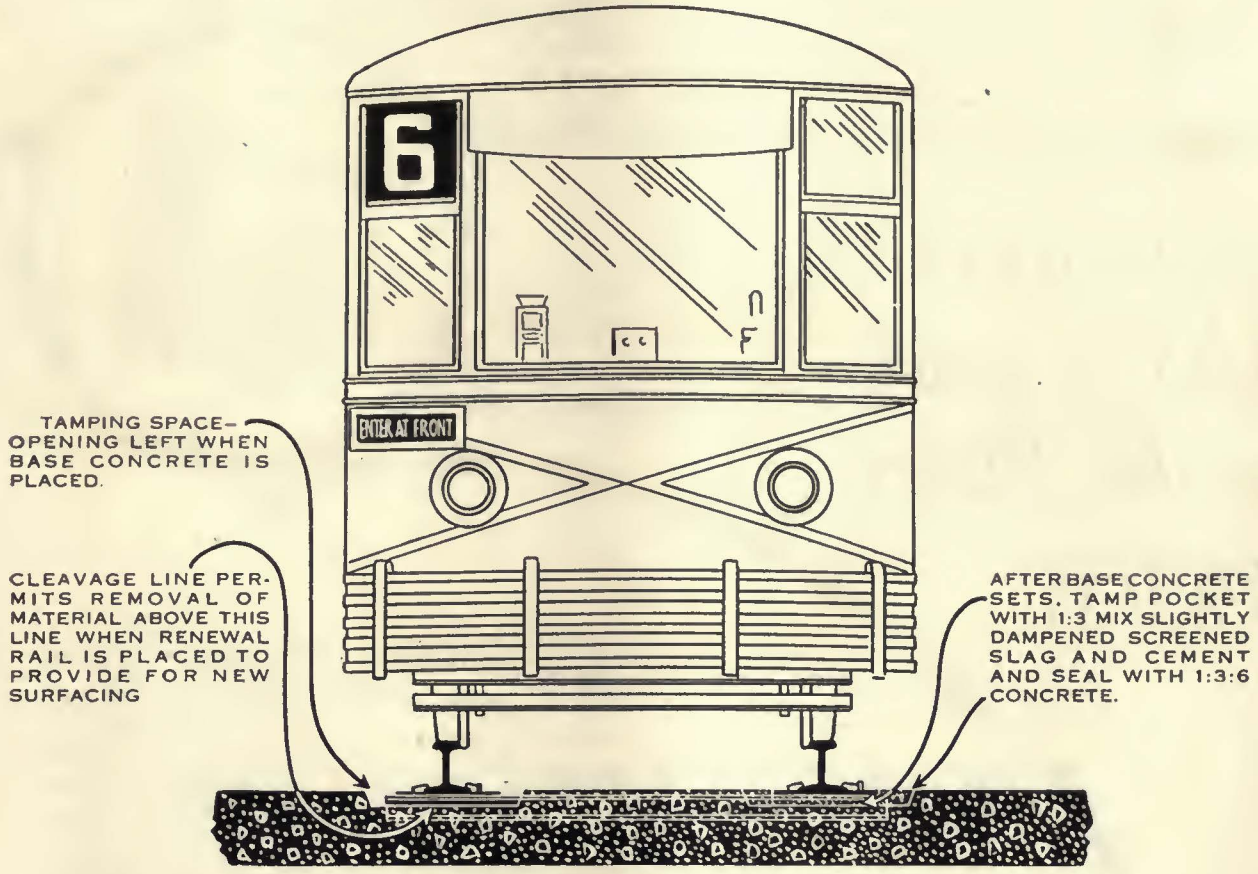

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Look it up in your "Paved Track Note Book"

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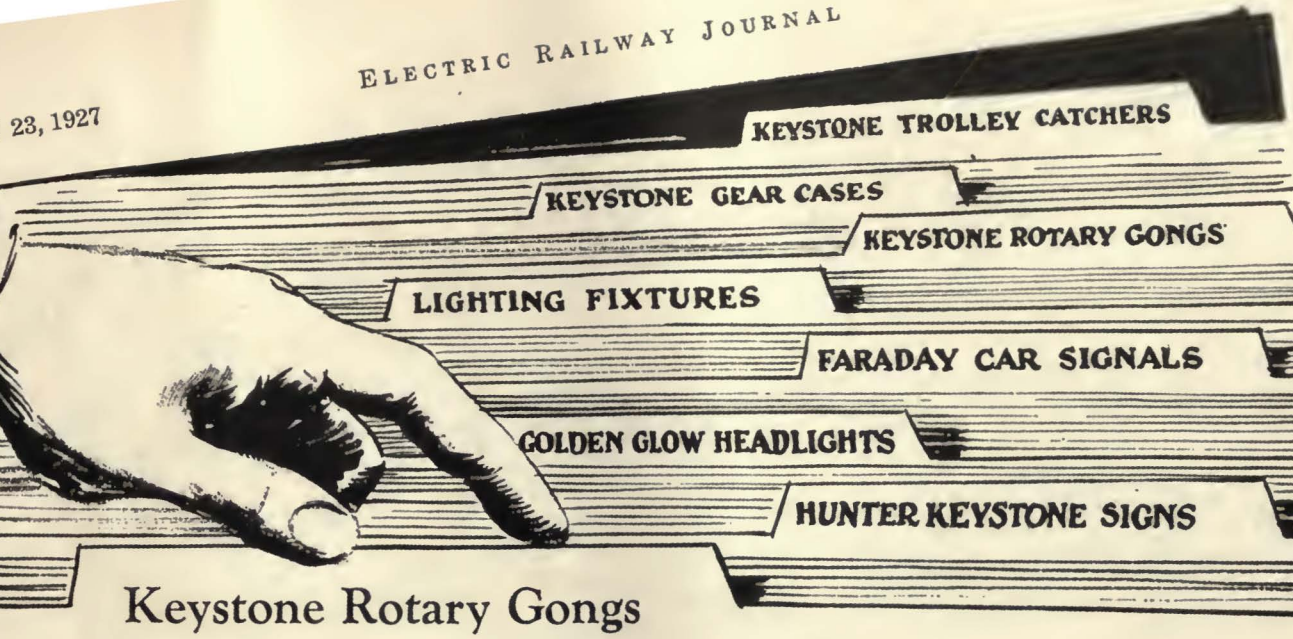

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So safe!

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Mack connecting rods are.

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Lightness combined with strength. That's the Mack connecting rod.

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Dependability such as they demand can result only from the use of the finest materials—refined by peerless engineers and painstaking manufacturing.

For example—the Mack connecting rod is one of the refinements—light, rugged, balanced—that the Northland Construction Company appreciates.

Mack Ruggedness insures dependability

Mack Trucks, Inc.

International Motor Company

25 Broadway, New York City

Ask us another!

1. What is a modern car?
2. Is efficient door and step control essential in this car?
3. How can door and step equipment increase earnings?
4. Does this equipment increase safety?
5. How does efficient door and step control help to increase speeds?
6. How can this equipment increase comfort?
7. How does efficient door and step control contribute toward courteous treatment of passengers?
8. What is the circulating load and what problem does it solve?
9. How can the circulating load be operated with only one man in charge?
10. Can large as well as small cars be operated in this way?

See answers to these questions on page 27.

CURVED SIDE Construction

A space-saving Comfort-promoting feature of BALANCED DESIGN

Curved Side Construction has done three things for Cincinnati NEW Cars.

It has lent an attractive and "speedy" line to their external appearance.

It has permitted approximately *seven and one-half* inches additional space for seats and aisles, with ample roof and body clearance to meet all operating conditions.

And it has resulted in greater lateral stiffness, which, with the "stretch" incidental to curving of the side sheet material, results in permanently smooth, wave-free panels.

When you order your NEW cars, built to the Cincinnati principle of BALANCED DESIGN, you gain the advantages of many such new and valuable features of construction, *each accurately balanced in its relation to the whole for a definite service requirement.*

We will gladly explain in greater detail to any interested electric railway executive.

CINCINNATI CAR COMPANY
Cincinnati, Ohio

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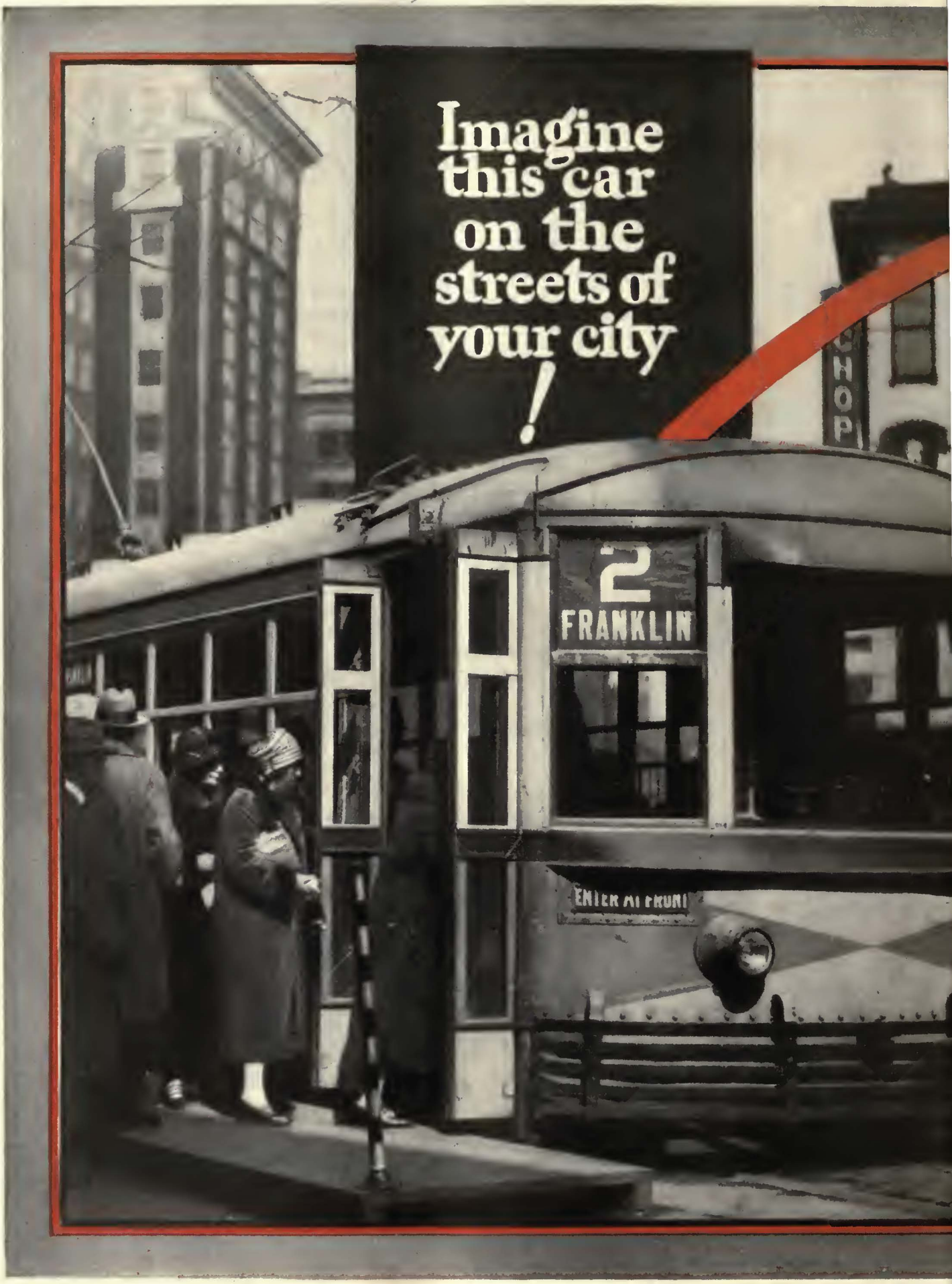
A step ahead of the modern trend

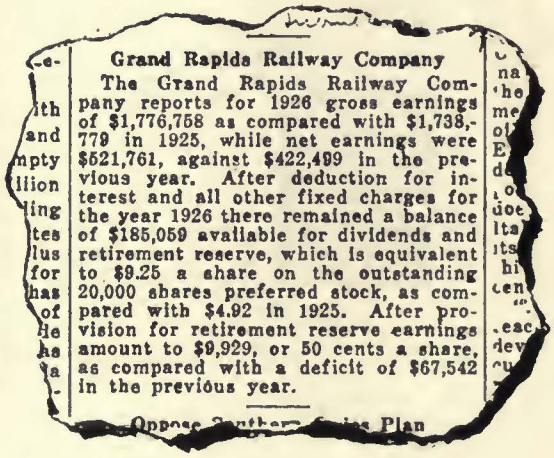

Imagine this car on the streets of your city!
2
FRANKLIN
ENTER AT FRONT
SHOP

Here's what happened with St. Louis cars in Grand Rapids

With revenue decreasing and operating costs mounting, if ever a property needed help Grand Rapids surely did. But by the use of modern equipment Grand Rapids helped itself! By the purchase of 27 new, modern light-weight St. Louis cars the trend of traffic, operating costs and public opinion was immediately reversed in favor of the railway.

The Grand Rapids Railway operating in a city of 150,000—is the type of property which has suffered most from automobile competition. But with the advent of its new St. Louis cars, revenue immediately increased; platform, power and maintenance costs decreased, trainmen took pride in the performance of their cars and are improving their relations with car riders. From the Mayor to the news boy, every citizen of Grand Rapids became a booster. These cars attracted patronage and the cooperation of the press. Goodwill was re-established on a mutual basis.

Did the investment in new cars pay? Were it not for the fact that similar results are being obtained in many other cities by St. Louis Quality Cars, what happened in Grand Rapids would seem phenominal.



Grand Rapids Railway Company

The Grand Rapids Railway Company reports for 1926 gross earnings of $1,776,758 as compared with $1,738,779 in 1925, while net earnings were $621,761, against $422,499 in the previous year. After deduction for interest and all other fixed charges for the year 1926 there remained a balance of $185,059 available for dividends and retirement reserve, which is equivalent to $9.25 a share on the outstanding 20,000 shares preferred stock, as compared with $4.92 in 1925. After provision for retirement reserve earnings amount to $9,929, or 50 cents a share, as compared with a deficit of $67,542 in the previous year.

built by

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Quality Cars

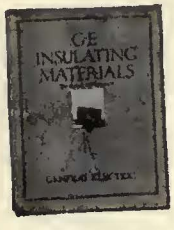
Varnish Treated Cloth *weather the storms*

Electrical surges or poor operating conditions prove the economy of G-E Varnish Treated Cloths and Tapes. They withstand punishment. They protect your motors—keep them out of the shop—and they lower maintenance costs.

Their excellence begins with an acid free mechanically strong base cloth—*no starch filling*. This is literally soaked in G-E Varnish until every fiber is impregnated and cloth and varnish are one homogeneous material. The result is a high insulation value for *continued* service.

G-E Varnish Treated Cloths and tapes were developed in G-E Laboratories to insulate General Electric apparatus. They are used in G-E Railway Motors. You can buy lower priced treated cloths and tapes, but real economy—first cost plus period of service—dictates General Electric.

IN THIS CATALOG



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GENERAL ELECTRIC

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INCREASED public confidence and patronage come when motorcoach arrivals and departures are regularly on time.

It is imperative that motorcoaches operate on schedule—imperative that every part and item of equipment contribute to the maintenance of up-to-the-minute service.

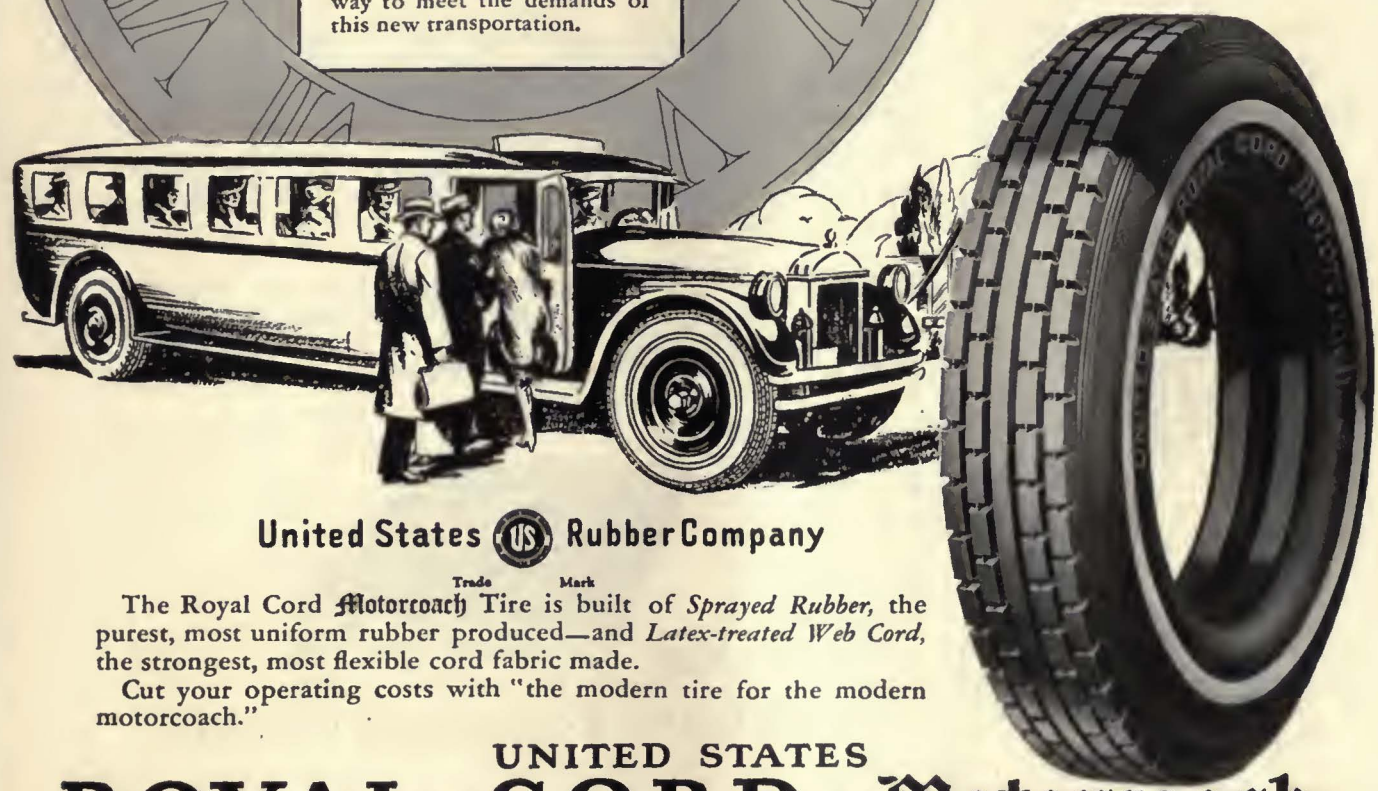
In materials, in design and in construction the Royal Cord Motorcoach Tire is made specifically to meet motorcoach requirements—to minimize tire trouble—to maintain up-to-the-minute schedules—to stand up on the roughest type of road—to operate at the "lowest cost per tire mile."

When the old-style bus was little more than a converted truck, it used converted tires—tires not specifically built for motorcoach service.

When it became the modern motorcoach, the converted tire no longer served its needs.

The Royal Cord Motorcoach is a *motorcoach* tire. Months of study of actual field operating conditions—of laboratory experiments—were made before it was designed.

It is a *new* tire—a tire with a *specific* purpose—fitted in every way to meet the demands of this new transportation.



United States Rubber Company

Trade Mark

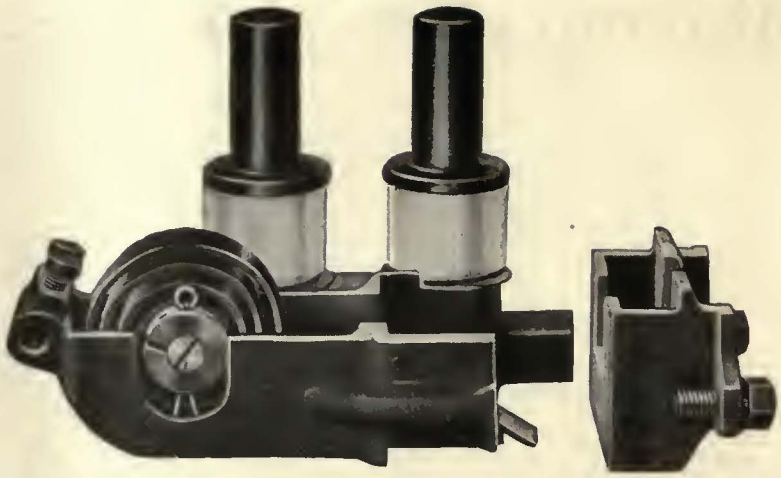
The Royal Cord Motorcoach Tire is built of *Sprayed Rubber,* the purest, most uniform rubber produced—and *Latex-treated Web Cord,* the strongest, most flexible cord fabric made.

Cut your operating costs with "the modern tire for the modern motorcoach."

UNITED STATES

ROYAL CORD Motorcoach

UNITED STATES TIRES ARE GOOD TIRES



Why ? scrap the whole thing when only one part is worn

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This is the efficient way; it's the modern way, because it's the way which provides for scrapping only what's actually worn, and preserving what's useful for further service. It's the way to improved maintenance at less cost because it enables you to renew the carbon-way of a brush holder more often, and thus avoid the chance of failure on the road.

G-E Renewable Carbon-way Brush Holders are standard on all the modern G-E Motors—and are available for earlier types also.

A General Electric policy of long standing is the development of every maintenance-reducing device that research and engineering skill can produce. Brush holders with the wearing part made renewable are among the results of this policy, by which the electric railways have profited.

For

Original Equipment Quality

330-11

GENERAL ELECTRIC

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, *Editor*

Volume 69 New York, Saturday, April 23, 1927 *Number* 17

History Was Made in Springfield, Mass. Last Week

SUCCESSFUL demonstration of the experimental worm-drive car built under the auspices of the Springfield Street Railway, Springfield, Mass., which was reported in last week's issue, has created a great deal of discussion among electric railway men. Many are enthusiastic regarding the possibilities of this new design. Others are frankly skeptical. Between these two groups lies the great majority of the industry, whose attitude may be properly described as one of watchful interest.

The performance of the experimental car exceeded every reasonable expectation. In judging the results of the demonstration account must be taken of the radical changes which were made from conventional design practice. These included not only the truck, axles and brakes but also many features of the control and miscellaneous devices on the car. Even the lines of the body were radically changed from customary practice. All of these factors must be considered in judging the significance of the Springfield demonstration.

The new car accelerated smoothly and rapidly. The automotive type brakes, with diaphragms mounted on the axles and with internal expanding shoes in brake drums bolted to the wheels, performed efficiently and entirely without noise. The spring suspension cradled the body nicely against rough track and low joints. Over special work the familiar clank and rattle was replaced by a not unpleasant metallic click.

From the standpoint of noise reduction, the car did not seem to live up entirely to what had been anticipated for this design. This was true particularly on the interior of the car. While there was a distinct reduction of street noise to a pedestrian on the adjacent sidewalk, there was a hum on the interior which increased in intensity as the car picked up speed.

Even in this respect, however, there seems little cause for disappointment on the part of those responsible for the new car. It must be remembered that the wheels were solid steel, with no deadening pads of rubber or other noise-absorbing material. A special deep-dished plate section was used to bring the tread under the axle bearings, and this had the effect of making the wheel into a bell rolling on its edge. The sound of the flange rubbing in the rail groove was consequently amplified. Furthermore, the motors used were an adaptation of vehicle motors. They were wound for 300 volts and permanently connected in series for operation on trolley voltage. Some of those present during the demonstration were inclined to attribute part of the hum to the motors. If that is so, further development may be expected to show considerable improvement.

Some of those who are inclined to be skeptical regarding the possibilities of the worm-drive car contend that there has been no actual reduction in unsprung weight in comparison with modern types of conventional truck and motor assemblies. Here again it is important that premature judgment be withheld. It is to be expected that the axle manufacturer played safe in these first experimental equipments. In addition, the axles used are a direct application of heavy automotive vehicle practice. As the requirements for street railway conditions are better understood further refinement of the design may reasonably be expected. There is also another type of shaft-drive construction for street cars which is still untried in this country under modern conditions. That is the use of bevel-gear drive instead of a worm. Whether bevel-gear construction would have any advantages in weight reduction over the worm is hard to determine at this early stage in development.

Will the new type of construction stand up under the severe conditions encountered in street car operation? Nobody knows. Will the maintenance of worm-drive axles, roller bearings and differentials prove excessive in comparison with conventional truck construction? Nobody knows. But the industry does know that a design which materially reduces noise, which may be developed to decrease the pounding on expensive special work and joints and which gives the passenger a smooth and comfortable ride is very much to be desired if it will stand up in service. It is safe to say that equipment maintenance could be permitted to increase considerably if it resulted in decreased track maintenance. It would be a good investment if the change helped to eliminate from the public mind the idea that the electric railway is obsolete and on the way out.

The Springfield Street Railway is entitled to a great deal of credit for taking the brunt of responsibility in pioneering an improved type car. It is perhaps a reflection on the industry as a whole that the men on this comparatively small property, while going through the throes of a change in ownership, had the courage to spend good money in developing a car which they felt was needed. The benefit to be derived by Springfield is small in comparison to the possibilities which are opened up to the rest of the industry—both manufacturers and operators. Regardless of the final verdict on this first shaft-drive car, electric railway history was made in Springfield last week. The men who backed their convictions with courage to go ahead are entitled to frank commendation by every one who has faith in the electric railway industry.

Get Out the Broom and Dust Cloth

EVERYWHERE over this broad land of ours windows are being raised; blankets are being hung on wash lines; every room in the house is topsy-turvy; the male members of the household are told that they are in the way; their favorite pipes must be excavated from the ash barrel. In short, en masse the housewives of the nation are engaged in spring cleaning.

As the women generally are the most practical of the human race, we should follow their example, bearing in mind that around May 1 the industry usually indulges in clean-up week. It is a fearsome job. The long winter months seem to take a malicious delight in making unsightly every nook and cranny of shops, office buildings, stations, street cars and carhouses. Winter's greatest ally in this respect is the heating plant, whose function seems to be airily to deposit soot and grime on windows, curtains, in bins and corners. The principal assistant of the heating plant is cold weather, which continually urges man to hibernate.

The clinging snow has stopped the scythe and grub hook that ordinarily we would employ on the right-of-way. Sleet and rain have washed off last summer's paint. Slush has left its mark on the underframes of our rolling stock. The winds of November and March have made leaf storehouses of our interurban stations. In the corners of our cars, especially near the sand containers, the reverend dirt lays down the gauntlet of battle. The cars may have been cleaned each day, but we must remember they were cleaned in a cold carhouse.

But what's the use of arguing when our duty is plainly laid out for us? Nature is cleaning up. Man is coming forth attired in new raiment. The home is feeling the merciless swish of brush and dust cloth. So it's plainly our duty to get out the brush and dust cloth, soap and water bucket, grub hooks and pruning knife. Roll up your sleeves and get to it.

Relief of Traffic Congestion Demands Action, Not Words

REALIZATION of the seriousness of the transportation problem in our large cities is brought home by the address of J. Rowland Bibbins before the Chicago traffic meeting, published in this issue. Unless there is co-ordination of all forms of local transport so as to obtain the greatest good for the greatest number, all of the residents are bound to suffer, and suffer greatly.

Mr. Bibbins points out that the use of streets indiscriminately for all classes of traffic can lead only to confusion. It is not generally known that freight traffic is being carried on city streets to so great an extent as seriously to hamper the movements of passenger vehicles, but those who have given the matter careful consideration are aware that this is so. Then, too, use of the streets for loading and unloading these same freight vehicles reduces the capacity of the streets for those moving to a great degree. Add to this the parking of passenger vehicles, and it is small wonder that free circulation of vehicles is next to impossible.

Heed should be given to the conclusion that it is not enough to plan for the future. It will take years and millions of dollars to carry through projects involving extensive street widening, double-decking, subway construction and the like. In the meanwhile every effort should be made to get maximum use of the existing streets, which Mr. Bibbins has found out are by actual count often carrying only from 25 to 50 per cent of their possible capacity. While there are several alternatives to the proposals for increasing street capacity presented in the article, it will be necessary to make some decisions in the immediate future and to carry them through, for every day of delay adds its quota to the congestion and makes the solution of the problem that much more difficult.

Corporate Readjustment Favorable to Future Financing

THINGS are happening in the electric railway financial world. This the record of events shows. Even considered singly they are significant, but a week's news that spreads on the pages of history the details of the voluntary readjustment of the financial structure of the Grand Rapids Railway, refunding operations in Denver and Cincinnati and the new Boston issue surely contains particulars worth pondering.

The railway at Grand Rapids helped materially to blaze the way in new things mechanical with new cars and in its efforts more intensively to sell transportation. Now it has come to the front again with a scheme for strengthening its financial structure. Financial papers refer to the plan as a reorganization. That is hardly the correct designation. It is a voluntary readjustment, the details have been given in the JOURNAL, whereas the term reorganization connotes something that is not voluntary.

It is the philosophy behind this move rather than the details that is of interest to the reader. The readjustment is dictated because of the large floating indebtedness of the company and the lack of a medium for doing any financing other than by the sale of first mortgage bonds. The feeling is that in view of the company's present condition, bonds cannot be issued in sufficient amount or be sold at advantageous prices.

The cause of the present floating indebtedness dates back to June 1, 1919, when $3,700,000 three-year bonds became due. These bonds were intended to refund long term 5 per cent bonds issued in 1900. The net increase in the debt of the company junior to the first mortgage bonds is $1,446,199, represented by $700,000 of 7 per cent gold debentures, $198,045 of car trust notes, $69,977 in increased amount of paving assessments not due, $58,218 of increased accounts payable, $245,458 of advances payable and $174,500 of bank loans.

The payments on the first mortgage bonds and on the car trust notes constitute cash requirements of about $178,000 a year. This is contrasted with payments of $140,000 under the plan of readjustment. Not only that, but it is anticipated the consummation of the plan will enable the company again to sell its first mortgage bonds at prices more nearly approaching par. In fact, an agreement for the sale of $200,000 of the first mortgage bonds has been made contingent upon the readjustment plan being declared operative. The sale of preferred stock locally may even be in prospect based in part on the results of the readjustment and the fact that for the twelve months ended Feb. 28, 1926, the gross income of the company increased $97,263, attributed largely to the reduction in operating expenses resulting from the use of the new Grand Rapids type of one-man rail coaches placed in service on June 30, 1926.

Conditions in Money Market Have Made Refunding Easy

IT IS not such a far cry from the readjustment in Grand Rapids to the sale by the Boston Elevated Railway of ten-year 5 per cent bonds at 103¾ and interest to yield 4.90 per cent and the sale by the Cincinnati Street Railway of 5½ per cent first mortgage gold bonds at 100 and accrued interest to yield 5½ per cent. It might be objected that both of these companies are operating under terms and conditions unduly favorable to them. This is, of course, in part the explanation for the ability of these railways to finance at the favorable prices at which these securities are being marketed, but the entire explanation is not to be found in these operating contracts. Neither is the explanation for the favorable financing to be found in the steady rise of bond prices. That tendency, however, is propitious for all borrowers with a balance sheet that will withstand the scrutiny of the bankers. Of particular interest, however, is the feeling that bond prices generally are likely to continue at high levels for some time to come. This is forecast not only by the U. S. Treasury operations but by comparatively easy money, large and steadily mounting gold reserves with a downward trend in commodity prices. It does not appear to be going too far to predict that as bond prices continue to advance investors will more and more turn to the better grade of electric railway securities for yields which they feel their funds should command. And in that event companies like the ones in Cincinnati, Boston and Grand Rapids, to mention just a few that have set their houses in order, will be in the best condition to borrow at favorable rates.

Cast Thy Bread Upon the Waters— It May Return Next Day

RECENTLY the local superintendent was taking a visitor over the routes to show how nicely his trolley and motor-bus services were being dovetailed. The outermost part of the area had been reached, possibly a half mile or more from a house, when a limousine was seen careened in the roadside ditch. Promptly he stopped his own car at the scene of the trouble and found that the chauffeur and woman rider were in a dilemma regarding what to do next. The lady did not care to be left alone on the open road while the chauffeur trudged for help. On the other hand, neither car carried towing equipment strong enough to drag the limousine out of the ditch.

The superintendent was equal to the occasion. He told the lady that he would hustle back to town at once and send his company's wrecking car to her aid with the compliments of the management. So promised, so done. The visitor ventured to praise him for his courtesy, but he said it was all in the day's work. It was bread cast upon the waters, to return, perhaps, after many days.

"Came dawn and a new day," as they say in the movies. With the day came the postman and with the postman a letter in fashionable, feminine hand. It was from the lady whose car had been retrieved from the ditch. And who was she? None other than a relative of one of the most influential men of the town. She had made no secret of the fact that her friendly Samaritan was the chief of the local transportation concern and was satisfied that the corporation he represented must be a human and worthy one. Of such is the Kingdom of Good Public Relations.

Tax Burdens for Our Stepbrothers and Possibly Us

OUT in Ohio the tax leviers are at it again. As usual, their prey is the public utilities. The upper branch of the Ohio Legislature has passed a bill to increase the excise tax on intrastate gross receipts of several of the public utilities from 1.2 per cent to 1.5 per cent on the dollar. Action by the House is expected soon.

Here is what the measure means to certain public utilities in the Buckeye State, according to a recent speech made by Senator Atlee Pomerene before the committee on taxation of the Ohio body:

"It is estimated that their gross receipts (water, gas, heating, telephone and electric light utilities, etc.) for the coming year will be about 7.6 per cent in excess of what they were last year. For the year 1930, carrying out these estimates of increase in accordance with the general increase during the past several years, it will be found that under the 1.2 per cent levy the increase in state revenue from this source will be about 93.5 per cent. And for 1935, assuming that the utilities' rate of growth during the past ten years is continued during the next ten years, the sum of money which the utilities must pay into the state treasury under the 1.2 levy will be increased 423.5 per cent. If the proposed 25 per cent increase in the excise tax be imposed by raising the rate from 1.2 to 1.5 cents on the dollar, the present year's increase in money which the utilities would have to pay in excise tax would amount to 34.5 per cent over last year. In 1930 the increase would be 141.9 per cent, and in 1935 it would be 554.5.

All of which, summed up, resolves itself into the fact that if the 1.5 per cent rate becomes effective, the utilities, which in 1925 under the present rate paid $2,413,000 in round figures, will pay to the tune of $15,797,000 for 1935.

Bearing these figures in mind, there are found, in addition, the following interesting sidelights:

1. While the increase in the total state tax valuation (1910-1925) was 410 per cent and on all utilities amounted to 481 per cent, the increase on electric light and power, gas and telephone industries amounted to 807 per cent.

2. The total value of credit in round numbers included mortgages, accounts receivable, notes, bonds, etc., listed for taxation in the entire state for 1924 was only $366,000,000; money on deposit and listed for taxation totaled $269,000,000, whereas an examination of the bank statement reveals that the total amount of money on deposit throughout the state was about ten times that amount.

3. The total tax, state, local and federal, paid by electric light and power, gas and electric railway companies in Ohio has increased 31.06 per cent in six years.

4. The funded debt of the Ohio counties and other political subdivisions has increased 385 per cent since 1910.

Is it necessary to go any further? Are we not presented with the old pussyfooting practices of making the other fellow pay; with burdening the ultimate consumer with the hocus-pocus of robbing Peter to pay Paul? And lastly, another orgy of bad issues, which are not backed by solid financial practice.

What is apparently in store in the way of further burdens by our stepbrothers may be imposed on us at any minute. Because the electric railway field is not the sufferer it is no reason to relax our vigilance.

Passengers entering one of the five new cars recently delivered to the Williamsport Passenger Railway from the Philadelphia works of the J. G. Brill Company. The group shown in the picture is the Citizens' Traction Committee of Williamsport, inspecting the cars before they were placed in service.

Williamsport Rehabilitates Following Citizens' Recommendations

Attractive new cars are provided in Pennsylvania city, following constructive report by citizens' committee and co-operative attitude between city and railway. Extensive rehabilitation program undertaken. Company given increased fare and relief from paving

FOLLOWING several months of intensive study, the traction investigation committee, a group of representative citizens appointed by the Mayor of Williamsport, Pa., some time ago found that the transportation situation in the city needed not only an improvement of the physical properties but an improvement of the laws that govern the corporation. The committee was equally as frank in recommending one as the other.

So pertinent were the recommendations that immediate action was obtained. Shortly after the report was submitted, the city removed the obligation to pave within the track areas. The company has also started an extensive rehabilitation program requiring large immediate expenditures. This includes the erection of a new carhouse, the purchase of new cars, the rehabilitation of several other cars and extensive reconstruction of certain tracks.

The four underlying railway companies have been consolidated into the new Williamsport Railways Company in compliance with one of the recommendations. The fare increase recommended was held up voluntarily by the company until its share of the program was well under way. Application was filed with the Public Service Commission for the increase. This was granted and went into effect on March 1, 1927.

Upon completion of the new carhouse and shop an "open house" was held on Jan. 22, 1927. More than 2,000 citizens visited the new shops of the company and employees explained the many features of the building and officers told of the change that has taken place in the entire transportation situation of Williamsport. In the evening a dinner was given by General Manager L. W. Heath to presidents and other officers of the various local clubs and associations of the city. The work of the traction investigation committee was reviewed and a report of the progress made during the first year was presented.

The Committee's Findings

Six representative business men were appointed by the Mayor of Williamsport in July, 1925, to investigate the traction situation. The committee was formed at the request of the four operating companies that such a body be appointed to investigate, advise and if possible to offer some solution of the problem that would permit the continuance of the service so that they could earn a fair profit.

The findings of the committee herewith presented in abstract are of interest in that they show a comprehensive understanding of the situation.

Tracks in certain sections of the city were found in excellent condition, but in others they were in such poor condition that it was held they should be immediately replaced. The carhouse on West Fourth Street was found to be inadequate and in bad physical condition. Construction of a new carhouse was recommended.

Of the 37 cars owned, some were of a type that could

The exterior of one of the 32 cars rehabilitated in Williamsport. Dash floodlighting is in conformity with the new cars recently purchased

be rebuilt and modernized. Five of the old cars were in very poor condition and it was recommended that they be scrapped and written off. Others were good only for extra service and could not be economically operated on regular schedules. The committee also found that the major portion of the trolley wire and feeder system was in good condition.

Largely due to automobile competition, the number of riders has decreased steadily during the last five years.

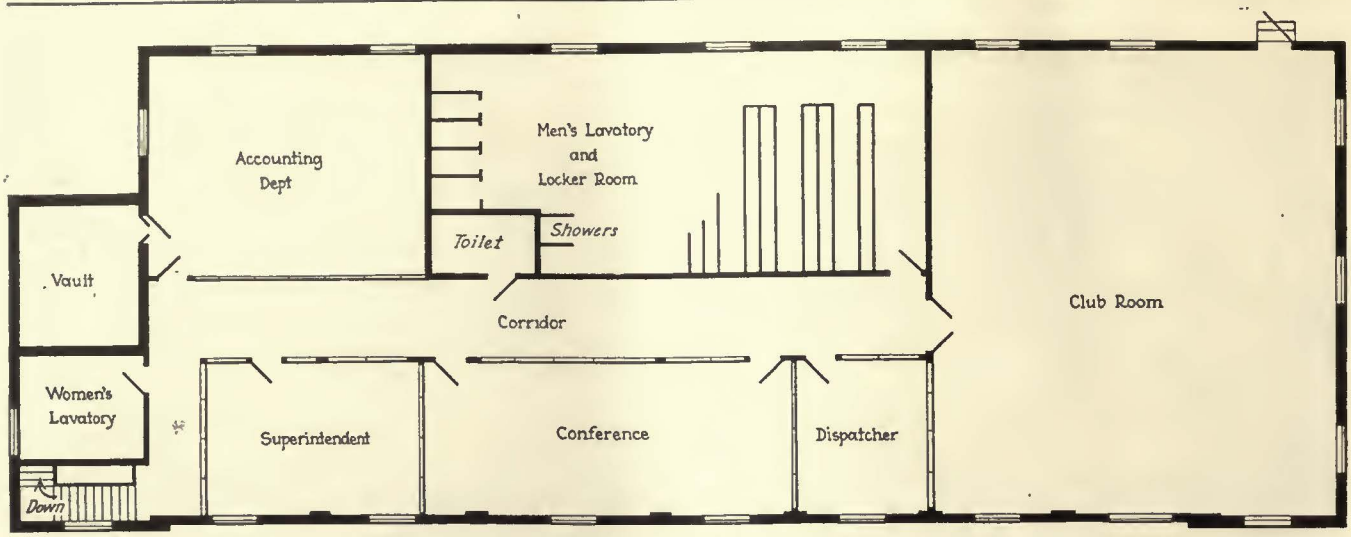
The statement of consolidated income shown elsewhere indicates a general falling off in net returns, so that the rate of return on the investment had decreased gradually from 4.7 per cent in 1920 to 1.3 per cent for the first few months of 1925, according to the committee's report. It is obvious that with this low rate of return the street railway system could not continue to grow and properly serve the city of Williamsport without a substantial increase in gross revenue. For this reason, the committee recommended an 8-cent cash fare, with two tokens for 15 cents and a $1.25 weekly pass. It is explained that the company originally took the position that a 10-cent cash fare was necessary with the same ticket and pass rates, but agreed to a trial on the basis of the committee's recommendations.

The committee compared several appraisals of the company's properties made during recent years and

From the interior of one of Williamsport's new cars both passengers and motorman are afforded an excellent view through the large vestibule window

Many of the old cars in Williamsport have been rehabilitated to conform in general design to the new cars purchased

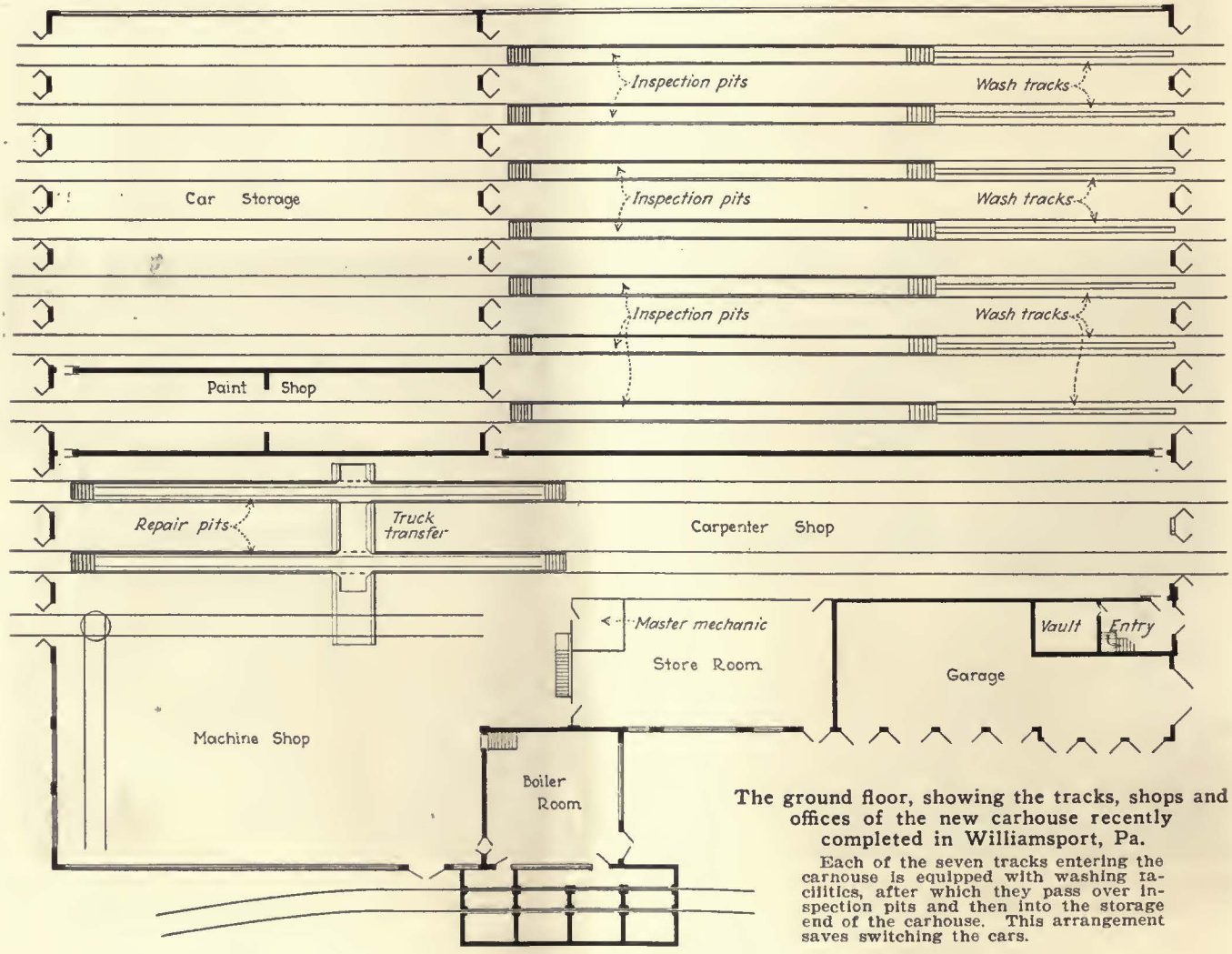
All platform equipment is housed in mahogany cabinets on the new cars. The seats are of full spring construction and covered with genuine leather. Note the absence of bell cords and register rods.



On the second floor of the new carhouse are the company's offices and employees' club room, as shown by the plans

found them in close agreement. A valuation as of Dec. 31, 1924, totaling $1,533,023 was finally determined as a basis on which a fair return should be earned. The committee further investigated the cost of power purchased from the Pennsylvania Light & Power Company and found this to be at approximately the same rate as paid by other railway properties under similar conditions throughout the state of Pennsylvania. A further finding was to the effect that the street railway system was being operated economically and that no substantial reduction in operating expenses could be made.

To provide adequate service, the committee recommended the immediate purchase of five new cars, the rehabilitation of 32 others, numerous routing and track changes, and the construction of a new carhouse, all totaling $245,770. It held that other items for track reconstruction and extensions, amounting to



The ground floor, showing the tracks, shops and offices of the new carhouse recently completed in Williamsport, Pa.

Each of the seven tracks entering the carhouse is equipped with washing facilities, after which they pass over inspection pits and then into the storage end of the carhouse. This arrangement saves switching the cars.

Williamsport Citizens' Committee makes possible paving relief granted in ordinance of Dec. 30, 1926.

SECTION 3. The grantee shall repair any damage to street paving within its roadbed, as hereafter in this section defined, caused by the construction, maintenance or operation of its street railway, and in such cases shall restore and replace such street pavement so damaged in good order and repair. Whenever any street or streets, upon which the tracks of the grantee are laid or shall hereafter be laid, shall be paved, repaved or repaired, the additional cost of such paving, repaving or repairing occasioned by the existence of such tracks on such streets shall be paid by the grantee. Such additional cost shall be deemed to be the difference between the cost per square yard or other unit of paving, repaving or repairing within the roadbed of the grantee and the cost of a similar unit outside of said roadbed. The term roadbed, as herein used, shall mean that portion of the street between the rails of each track and for such distance outside of the rails as the ties under the rails shall extend beyond the rails. The grantee shall have the option of doing the work within the limits of its roadbed in the same manner and with the same material as is used in other portions of a street being paved, repaved or repaired, or in such manner and with such materials as shall be agreed upon with the City Council, and for doing such work the grantee shall accept from the city, as full payment for such work, such sum as will equal the cost of paving, repaving or repairing in the same manner an equivalent area outside of the grantee's roadbed. The snow and ice removed from grantee's tracks, and constituting an interference with public travel, shall be removed by the grantee.

$69,000, should immediately follow, and that within the course of the next five to ten years additional expenditures totaling $193,000 will probably have to be made.

At the time the report was presented the local street railway companies paid a city tax of $50 annually for each car operated. Competing transportation mediums pay no such tax and therefore it was recommended that this burden should be reduced to $1 per car per year. The committee also recommended that the company be relieved of the paving burden which exists today as a heritage of horse car operation.

BUSES NOT CONSIDERED FEASIBLE AS SUBSTITUTE

Motor buses for transportation service in Williamsport were carefully considered as a substitute for trolley cars. The committee agreed that the fare under such conditions would have to be at least 10 cents. It felt that it would be impracticable to operate buses outside of the paved street areas, and that in the winter months, because of deep snows, such service would not be as reliable as car service. If buses were used, it held many large residential sections would be left without common-carrier transportation, which would restrain city development. The downtown streets in Willimsport are fairly congested with traffic at the present time and with the substitution of buses for street cars this condition would be greatly aggravated, according to the report, as several buses would be required for each street car replaced. Four buses are now operated by the railway company as a supplement to its rail service.

The committee concluded this portion of the study by strongly recommending the continuance of street railway service with the additions and improvements recommended. No public benefit was found in the operation of four separate street railway companies, and the necessary ordinances to provide a suitable working agreement for a new company, consolidating all of the four companies, were recommended.

The wages paid conductors and motormen on the local

Modern carhouse, shop and office recently completed in Williamsport, Pa. Considerable attention and expense were devoted to architectural design

Part of the track reconstruction program under way following recommendations of the Williamsport Traction Committee that will extend over several years

railways were below what they should be, in the opinion of the committee, and an increase of 4 cents per hour was recommended.

Emphasis was laid on the fact that the operation of a street railway system is a mutual matter between the city served and the company. The city cannot grow without good transportation and the company cannot live without earning enough properly to maintain its facilities and to pay interest on its securities. Every recommendation was strongly urged by the investigating committee as necessary to provide good service.

The report as submitted was accepted by the Mayor, the City Council and also by the Public Service Commission of the Commonwealth of Pennsylvania. Shortly after its submission, the City Council passed an ordinance relieving the companies from the paving burden. Plans were immediately formulated by the companies to carry out their share of the recommendations. The new carhouse and shop has since been completed. Five cars were ordered last year and were delivered to the property during December and much of the recommended reconstruction work on the tracks and other property is under way.

Five Attractive Cars Purchased to Improve Service

After careful consideration of the factors involved, the Williamsport Passenger Railway decided upon the purchase of five light-weight, one-man, two-man cars arranged for double-end operation as being best suited for its requirements. The cars, built by the J. G. Brill Company of Philadelphia, Pa., are of semi-steel construction, seat 44 passengers, and combine several new features which make them stand out prominently. A brief description appeared in the Jan. 8 issue of ELECTRIC RAILWAY JOURNAL, page 103.

PRINCIPAL WEIGHTS AND DIMENSIONS OF FIVE NEW CARS PURCHASED BY WILLIAMSPORT PASSENGER RAILWAY FROM J. G. BRILL COMPANY

Weights:	
Car body	19,460 lb.
Trucks	9,600 lb.
Equipment	9,820 lb.
Length over all	42 ft. 2 in.
Width over all	8 ft. 8 in.
Height, rail to trolley base	10 ft. 10½ in.
Truck centers	19 ft. 8 in.
Truck wheelbase	5 ft. 4 in.
Wheels	26 in. diameter
Seating capacity	44

A bright and attractive color combination was used, consisting of a golden orange body with vestibule, letterboard, window sash and posts finished in cream. This combination of colors harmonizes well with the green roof and black trucks. Dull mahogany interior finish is used with an agasote headlining finished in ivory with trimming of Valdura red and tan enamel.

The Brill No. 201-B seats give the appearance of individual cushions and backs. They are of heavy upholstered construction, with deep spring cushions, padded backs, and are covered with genuine leather. With a width of 36 in. and a 30 in. spacing between seats comfortable riding space for two passengers is insured. The cars have seven transverse seats on each side and four longitudinal seats, one in each corner, all finished alike. The floors of wood are double on both sides of the 30-in. aisle. Within the aisle area, a single thickness of flooring is used with a flexible punched leather mat constructed in two pieces that extends the full length of the car body in the recess.

Instead of glass in the upper sash, Haskelite panels covered with metal on the outside and wood inside are used. The interior is finished to match the balance of the wood trim and the outsides of the panels are painted the color of the sash. With this arrangement, the use of curtains was considered unnecessary.

Thermostatic control of the fourteen cross seat heaters manufactured by the Railway Utility Company is used, the thermostat being set to hold the temperature between 55 and 60 deg. F. when the outside temperature is lower. Individually controlled vestibule heaters are also installed.

A combination electric tail and stop light, manufactured by the Electric Service Supplies Company, is used in conjunction with a dash floodlight on each end. This stop light shows red when the brakes are applied and the car is coming to a stop.

The four-part, two section, air-operated folding doors and folding steps provide an easy unobstructed exit and entrance. The doors at the right of the motorman are operated from the brake valve through Safety Car Equipment Company's ball check engine, and the rear door by means of a selective valve through a National Pneumatic Company engine. All rear doors are interlocked with the air brake and are balanced, during an emergency brake application, so that they may be opened by hand.

Interior illumination is provided by five Electric Service Supplies Company compensating dome lights, installed on the center line of the ceiling, and equipped with 94-watt lamps. The compensating panels are located to permit of easy access and ready inspection.

Four Westinghouse 510-A motors and control are used with Westinghouse brakes and General Electric air compressor. Trucks are Brill light-weight type 177-E-1.

The motorman's front vestibule sash is of unusual width to give clear vision. It is hinged at the top and carried on brackets so that it may be tilted out like an automobile windshield. The platform apparatus is all inclosed in a mahogany finished cabinet so that no parts are exposed except the controller handle, air valve and gauge. An upholstered seat with adjustable back is provided for the operator. A recess in the center of the cabinet gives the operator leg room so that his position is comfortable and all operating controls are within convenient reach.

By the installation of mirrors within the vestibules on the frieze board, and outside of the vestibules on the corner post, a clear view of the interior and the rear step is obtained at all times. The motorman's hand-operated window cleaner affords a means of providing him with good vision under the most severe weather conditions.

New Carhouse and Shop Completed

The site selected for the new carhouse and shop is in a well built up part of the city, and attention was given to the architecture so that it would blend well with surrounding buildings. The building as constructed is of two stories, steel frame, red brick and art stone trim, with steel frame windows extending the entire length on each side so that ample light is insured. It is 260 ft. long by 200 ft. wide and has a storage capacity for 45 cars in addition to shop and servicing areas.

The first floor is divided by a fire wall extending the full length of the building. On one side are located the wash tracks, inspection pits, paint shop, and storage space. On the other side is the carpenter shop, truck and machine shops, store room, garage, master mechanic's office, boiler room, and store room.

Seven inspection pits are provided, and each track on the West Third Street side is provided with car washing facilities. It is planned to wash cars every three days. After each washing they are run over the pits and inspected. These pits are heated by direct radiation, which will help in the drying process as the cars stand over them during winter months. The interiors of the cars are cleaned by the washing and vacuum process. The pits are well illuminated to facilitate the inspection and light repair work.

Two cars can be placed in the paint shop at once and closed off from the outside, or by means of the center fire door either side of the shop can be isolated from the other.

Heating is by hot air from the unit heater system, each unit being equipped with motor and fan for passing the air through the steam coils of each heater. The temperature is regulated by a thermostat.

On the second floor of the carhouse are the offices of the company and a club room for the employees.

Cars Rebuilt for "Shore Fast Line"

Improved Appearance and Greater Passenger Comfort Have Resulted from Reconstruction of Rolling Stock on the Atlantic City & Shore Railroad

DURING the past several months the cars of the Atlantic City & Shore Railroad, Atlantic City, N. J., have been undergoing thorough overhauling and refitting. Changes have been made to increase the comfort of the passenger, reduce noise and improve the appearance of the car, inside and out.

Plush seats have replaced the cane seats formerly used. This was done by installing new seat covering on top of the old rattan. The process consisted of placing,

High-speed, multiple-unit cars of the "Shore Fast Line" have been improved in appearance by the installation of sheet steel over the old wood side sheathing

Installation of drop steps in place of fixed wood steps has reduced accidents by eliminating projection and has made passenger ingress and egress easier

Plush-covered seats and magnesite flooring have improved the appearance of the car interior. The ceiling is white with gold ornamentation

in order, a $\frac{5}{8}$-in. layer of felt, a 1-in. layer of woven hair, a layer of cotton and one of 16-oz. duck. On the outside standard Pennsylvania Railroad plush was used. New plain green pantasote curtains have been installed.

The ceilings are white with gold ornamentation. Cherry woodwork inside the car has been thoroughly cleaned and freshened up. Sash in the monitor deck has been sealed and Garland ventilators installed.

Over the old wood floor a new flooring of magnesite has been laid. This is $\frac{3}{4}$ in. thick, laid on a foundation of $\frac{3}{4}$-in.-mesh chicken wire. Two transverse and two longitudinal expansion joints have been provided. In this process the old trapdoors have been permanently closed, and work on the motors and trucks must now be done by raising the car body.

Steps Brought Within Body Lines

On the platforms O. M. Edwards drop steps have replaced the old fixed wood steps. This has made it possible to bring the steps within the lines of the car body and has reduced the number of accidents as well as made passenger entrance and exit easier. In the process of installing these drop steps it was necessary to remove the outside platform knees. The center knees were therefore reinforced with 4-in. x 4-in. x $\frac{1}{2}$-in. steel tees extending from the bolster to the bumper and anchored to the end sill.

On the outside of the car No. 16 sheet steel has been placed directly over the old wood sheathing, with four panels on each side. Sheet steel also has been used to cover the old wood dashers.

Altogether about 1,000 lb. has been added to the weight of each car. This is believed by the management to be unobjectionable because the cars operate principally over steam railroad right-of-way where the track is obliged to carry heavy freight trains every day and is constructed accordingly.

An Indirect Argument

OWNERS of automobiles in the territory served by the Beaver Valley Traction Company, New Brighton, Pa., have a chance to compare the cost of operating their cars with cost of street car rides if they use the expense cards that have been distributed by General Manager C. D. Smith. "We are not finding fault with the automobile," he writes, "but are just bringing about an understanding."

AUTOMOBILE EXPENSE CARD

Month of_____ Year_____

Speedometer Reading—First Day.....

Speedometer Reading—Last Day.....

Total Mileage for Month.....

Liability, Fire, Theft and Collision insurance costs should be listed monthly at one-twelfth of insurance cost. Finance charges should be listed monthly at one-twelfth of cost. Depreciation should be listed monthly at one-thirty-sixth of price paid.

Date	Tires	Gas	Oil	Parts	Labor	Tubes	Parking	Wash	Daily Total
1									
2									
30									
31									
Total									

Depreciation and Insurance.....$.....

Finance Charge and Garage Rent..$.....

Grand Total—Cost For Month.....$.....

The last figures show the cost of operation for the month. If you desire the cost per mile divide the cost of operation by the number of miles. If you desire to ascertain the cost per day divide the total cost by the number of days in the month.

A year's supply of these cards will be furnished upon request. Kindly write the

BEAVER VALLEY TRACTION CO., NEW BRIGHTON, PA.

Problems of Mass Traffic

By J. Rowland Bibbins
Consulting Engineer, Washington, D. C.

Broad consideration of the entire transportation problem in cities shows that all elements, both freight and passenger, must be taken into consideration if real relief and provision for future growth are to be obtained. In this article, abstracted from a paper presented at a conference held in Chicago on April 13 under the auspices of the National Automobile Chamber of Commerce, Mr. Bibbins points out the magnitude of the problem and the multiplicity of elements involved.

"TRAFFIC" as generally discussed is simply another name for "mass transportation," though rarely so understood. It is worth while to broaden our conception for the moment to examine base principles, trends and future needs to see whether the real problem will be met by any other policy of approach than sound technical planning, based upon transportation experience.

For the traffic problem of today seems to be the result of bad planning of yesterday and lack of appreciation today of transportation essentials.

Look at the following perspective:

Per 1,000,000 persons, the average large city covers 107 square miles, while the metropolitan district covers 364 square miles; the average length of streets is 800 to 2,000 miles; the average street railway track is 300 to 500 miles; the average motor registration is 100,000 to 400,000 vehicles. Population of a large city doubles in five to 40 years, say 30 on the average. In this time city land values increase about three times; city passenger traffic, rail and motor about four times; railroad freight tonnage about seven times; railroad passenger traffic about eight times. Motor registration in the United States doubled in the last 4½ years, with a decreasing rate of increase.

Therefore study now the problem of doubled population without stopping to quarrel just when it will take place. The above perspective of the physical problem today and the clear trends of traffic growth tomorrow are sufficient, for the purpose of this discussion, to put to the acid test the propriety of any opportunist policy, i.e., whether superficial or fundamental measures are in the best interests of the community as a whole, and whether, in our mad scramble for relief, the right emphasis is being placed upon the various elements of the problem.

My perspective of any traffic and transportation problem involves all these elements: rail, transit, bus, truck, taxicab, automobile, horse, pedestrian, and even water transport—all to be co-ordinated in a city-wide, well-integrated, unified, transport system, both passenger and freight, with "track and service" capacity adjusted to local needs, particularly to recognize the differentials in speed and bulk of these various transport agencies.

At the outset, I submit the debatable proposition that the private automobile is not by any means the greatest part of our problem; but that freight transport, which has been almost entirely neglected, looms very large in the picture, especially in the central district.

Time is the first essential—home to work. The 30-minute time zone practically controls the main settlement of our denser city areas. Five minutes saved expands the zone 1 mile; fifteen minutes, 3 miles. Thus, double the populated area can be brought within the 30-minute time zone at the same cost. Here is the basic answer to traffic congestion, and motor competition.

It needs no demonstration that the widespread use of private motors in rush-hour transportation is due largely to the demand for speed, increasing with the spread of our cities. Troublesome as it is, the private motor is fulfilling an economic need, complementary to established public agencies which may not fill that need.

An ideal transport system is essentially based upon speed (and fare) differentials: (1) railroad suburban service, steam or electric, to central terminals or through-routed; (2) rapid transit on private rights-of-way, surface outside, and elevated, depressed or subway inside; (3) automobiles and taxicabs; (4) buses, express and local; (5) by "Shanks' mare." And the last is by no means unimportant, for our surveys show that more than 25 per cent of our major industrial employees walk to work. And industries are being relocated to make this possible.

Now, in practice we are trying to run express, local and freight services on surface streets already cluttered by business. A modern transit system handles 20 per cent of the total traffic in the maximum rush hour, and at least the entire population once every day. Rapid transit system peak loads run from four to ten times midday movement. In large cities, rush-hour tripper cars can make only one load-trip during each rush period. While central district traffic will always be heaviest, cities are developing more and more through-riding and crosstown riding, entirely outside the center.

Transit routing and terminals are thus of fundamental importance, though many systems still adhere, mainly by necessity, to the "town-pump" system of focusing all service and transfer facilities at the center, which involves the serious question of franchises.

After years of study of transit and traffic and the practical aspects of city planning, zoning and motor transport, I submit the proposition that the electric car, mainly surface transit, is still the essential backbone of passenger mass transportation. Each form of motor transport, however, has its particular part to play in a properly unified system of differential speeds, fares and services. In view of the existing paving situation, mounting taxation and financial condition of our cities, it seems idle to talk now of replacing the transit system by buses, except in very specific instances and localities. The automobile must play its part, largely complementary, rather than competitive.

By the same token, it is the clear responsibility of the electric railway industry and city officials to develop

transit by every known means to maximum schedule speed and capacity, as the greatest single contribution to the reduction of central traffic congestion. No adequate city plan or traffic plan will survive the acid test of experience and public need, unless it recognizes these transport elements in true perspective. We shall not by fiat clear our streets of 14,000,000 city motors, nor shall we relegate to the scrap heap 30,000 miles or more of urban railways.

Freight Transport on City Streets a Serious Problem

The volume of motor freight is exceedingly difficult to estimate, although we know that all of our package or l.c.l. freight requires one or more terminal handlings in our cities. Little progress has yet been made in night haulage of commodities and construction materials, also little progress as yet in consolidated motor tracking to increase the loading efficiency of the city truck, and little or no progress in the scheduling of retail merchandise during off-peak hours for consolidated motor delivery to reduce waste mileage, and avoid peak congestion. Clearly, the tendency of local freight transport is more and more toward the public streets.

I have found in some downtown cordon traffic counts that truck and delivery movement in a large city is perhaps 50 per cent of the automobile movement, in many districts exceeding that of autos. Thus, bearing in mind relative speed, bulk, and character of drivers, it is perhaps not an exaggeration to say that motor freight transport has grown to be perhaps as serious a part of the traffic congestion problem as the private auto. Yet it has received very little, if any, detailed study and consideration. I submit it to be deserving of equal consideration in the traffic-transit plan, not so much by virtue of its volume, but by its obstructive nature.

"Express and Local" Service

Coming now to specific matters, the only way to insure needed speed differentials is by traffic segregation in the thoroughfare plan with different streets so far as available for transit (which usually means business streets) for fast traffic (usually automobiles and bus) and for slow heavy-duty trucking. A detailed examination of most city street systems will reveal possibilities for securing this segregation. The policy of concentrating all traffic on dense transit streets simply defeats all fast transportation, both rail and rubber.

To secure these speed differentials with existing facilities, we must have limited-stop service for expresses, meaning skip-stops. The bus, although less mechanically suited to frequent stops, will probably have to do this service and stop at the curbs, thus raising the transit schedule speed, perhaps to 15 m.p.h. outside of the central zone. It appears from experience that large-capacity buses, especially double-deckers, can not make the high schedule speed demanded in mass transportation, largely due to design restrictions and unavoidably slow loading and unloading. The small-capacity unit really fulfills a good purpose on a transit trunk. The real reason seven-passenger jitneys have survived in Detroit is because they are needed. Making only two or three stops per mile, they are today able to double the street car speed and far exceed the local buses. Large-capacity buses of course have their field, especially in developing new routes, distinctly not on transit trunks.

Adequate continuous paving lies at the bottom of practical traffic segregation, needing no signs, signals or policemen. A relief route well laid out and reconditioned will immediately be discovered and used.

As there are approximately 1,000 miles of city pavements per 1,000,000 city people, here is perhaps the major economic problem of traffic which has been generally sidestepped, i.e., to provide "tracks" for our growing motor transport system.

Any thoroughfare plan must be financed, presumably on the basis of relative usage and wear. The fact is that thousands of miles of old light pavements have suddenly been thrown into heavy duty service for which they were never designed. It thus appears that financing traffic street pavement at $50,000 or more per mile is a far larger problem than financing railway track at $65,000 per mile, exclusive of pavement. It will not do to waive the matter aside as one of general taxation, and the cost of motor "tracks" will soon have to be recognized as part of the cost of transportation by rubber, as well as rail.

> AFTER years of study of transit and traffic and the practical aspects of city planning, zoning and motor transport, I submit the proposition that the electric car, mainly surface transit, is still the essential background of passenger mass transportation. Each form of motor transport, however, has its particular part to play in a properly unified system of differential speeds, fares and service.

Terminals.—Railroads cannot operate without terminals. But we are expecting the same from traffic, an impossibility. I refer to day storage as distinct from short-time parking as one of our "essentials." This very practical problem has been utterly neglected. A few de luxe garages charging 75 cents to $1 per day will have no appreciable effect upon congestion. A day storage service at not more than 25 cents will have to be developed if real results are to be expected. Garaging has thus become a major national utility, and the community itself may have to undertake at cost some form of self-supporting garage service.

Wider Roadbed.—Railroads usually had the foresight to provide a 100-ft. right-of-way against their future needs, and expanded by adding one, two or three tracks. But street widening is daily becoming financially more prohibitive. The efficient method of "arcading" to widen roadways to double present capacity while still preserving the old air rights has made no progress, yet wholesale arcading would probably cost not more than 25 per cent as much as full street widening.

The alternative is double-decking, even more finan-

cially strenuous. The South Water Street double-deck improvement along the Chicago River, known as Wacker Way, cost $30,000,000 a mile, the same as the London widening, Kings Highway to the Strand. Although in Chicago the benefit assessment practically absorbed the damages awarded, it is clear that few cities can undertake such an ambitious program over large areas with an additional complicatioh of ascending ramps and the problem of ventilation of the lower level. This has received little consideration, although we introduced it in the design of Wacker Way.

Railroads run on standard gage. Similarly, the old decimal system of street width must give way to a design adjusted to the number of lanes needed and paved accordingly. And the standard width should be adjusted further according as the streets are to handle street cars, buses or trucks, or motors only, for there is 3 ft. difference in the widths of these vehicles, or over 50 per cent of the standard auto width. The relative volume of movement should control; thus a transit street operating 30 seconds rush-hour headway should be more liberally designed than one operating ten minute headway; similarly with buses and trucks.

Street widening, in the absence of local benefit assessment and excess condemnation, is thus the most serious economic problem. We shall never catch up with the budget under present methods. New York City's budget is increasing as the cube of the population, property values as the 2.7 power. Main city land values, the basis of all tax revenue, increase much slower than the square, and in the central high value districts about proportional. Thus, the vicious economic circle is started—first, raising the assessments, which in turn force up the skyscraper, which in turn raise the assessment again—the circle has become a spiral. The day population is concentrated beyond all bounds of efficient mass transportation and sidewalk capacity. Witness one building proposed in New York, holding a young city of 14,000 people, which alone would absorb one-third of the capacity of an entire subway line. This raises the very serious question, whether rapid transit really relieves or simply concentrates central congestion, although through-routing as distinct from loop terminals undoubtedly spreads commercial business. It must spread. For I have recently discovered that high-building cubage is increasing as the square of the population, i.e., four times today's in 1950.

At the very center of this circle lies the real crux—land values and taxation.

Operating Efficiency

For the present, our one hope is efficiency. A railroad superintendent operating on two tracks of a four or six-track system would promptly be fired. Yet we are doing just that thing in traffic. And my closing proposition is that until we devise some equitable source of further public revenue for vast public improvements higher efficiency in mass transportation, rail and rubber, is our main avenue of present escape. In one large city with 90-ft. streets and 60-ft. pavement, I found within the mile square only 25 per cent traffic efficiency assuming solid parking or perhaps 12 per cent clear. This city was actually encouraging one-line traffic each way, and could easily have doubled its capacity. I think we must come to parallel lanes marked with white paving blocks, or flat white metal plates. Now, the capacity of our streets is reduced at least 50 per cent by "meandering," or straddling lanes, and big buses are notoriously offenders in this respect.

The reversible center line on heavy traffic streets has at least been tried in Cleveland with success. The New York elevated delivers express service with three tracks, reversing the center track morning and evening, making it equivalent to four tracks for express and local. By this simple means, present streets can be increased from 50 to 100 per cent rush-hour peak capacity when capacity is most needed.

In comparison, one-way streets are generally an economic blunder, and in any case, should be in pairs, rather than singly, though cutting the total street capacity to half. Reversible street operation, morning and evening, is clearly impracticable, but reversible center line is practicable.

We all grumble when the Capitol Limited or the 20th Century is held up at some block signal, yet I venture the assertion that probably 50 per cent of the total crossing time and capacity of our city traffic intersections is being wasted by badly adjusted "stop-and-run" signals or in hand control by waiting for "stragglers." Yet railroad signal practice pointed the way 30 years ago. The Chicago system of progressive interlocking movement and especially with independent control of each and every intersection, not only as to period, but as to time ratio or balance of traffic, is the one outstanding encouraging development, an adaptation of railroad and subway transportation experience.

> WE MUST have both safety and speed. But this never will be realized until mass transportation, both rail and rubber, is designed and operated collectively along modern transportation lines and so conceived in the city plan.

Short Signal Intervals Needed

The shortest possible signal interval is essential for maximum volumetric efficiency. This can only be determined by "calibrating" a traffic crossing under different load conditions, just as a voltmeter is calibrated for accurate reading. It is general observation that the usual run of signal installation has retarded transit and traffic movement throughout the country and diverted traffic from the logical artery to those less suited. Example, one of our largest cities installed a stop-and-run system, 100 seconds cycle, on its main business trunk carrying rush-hour car service at 22 seconds headway. Result, which any transportation man could foretell, from 2 to 3 minutes added trip time to every car entering the business district. This is not efficient transportation or planning. It is not enough to hide behind the slogan "order and safety." We must have both safety and speed. But this never will be realized until mass transportation, both rail and rubber, is designed and operated collectively along modern transportation lines and so conceived in the city plan.

New cars of this type placed in service Jan. 1, 1927, on the Fitchburg & Leominster Street Railway have reduced operating expenses about 15 per cent and increased the gross revenue

Rehabilitation Increases Riding

on the Fitchburg Railway

By Emerson W. Baker
President Fitchburg & Leominster Street Railway, Fitchburg, Mass.

During past year track has been rebuilt, new rolling stock bought and rotary converters installed in old power house. Energy is now purchased. Operating expenses have been reduced about 15 per cent

NOT much more than a year ago the Fitchburg & Leominster Street Railway, with its 40 miles of track serving these two Massachusetts cities and also Lunenburg, Shirley and Ayer, was on the verge of bankruptcy. Buses were being given the preference by the traveling public and street railway patronage was fast disappearing. As a member of the law firm of Baker & Baker, counsel for the company, the writer had become thoroughly acquainted with its problems. To meet this emergency a plan of reorganization was carefully worked out. Today, scarcely more than twelve months since the reorganization was effected, the Fitchburg & Leominster Street Railway is coming back into its own.

Before the advent of the automobile this railway was one of the most prosperous properties in the entire state. Its bonds were gilt edged and its notes were sought by banks. Its tracks and equipment were well maintained. Its income was constant and adequate and its dividends were regular and satisfactory. For years the stock sold at many points above par. But with the coming of the auto this situation gradually changed. The income shrank from year to year until it seemed almost as though there would be no stopping point.

The company had a funded debt of $400,000 and more than $700,000 of unsecured notes, as well as $450,000 of stock. Before the bonds came due on Feb. 1, 1921, they were extended until Feb. 1, 1926, with interest at 7 per cent. The notes carried interest at 6 per cent. This made the annual fixed interest charges about $70,000.

In the spring of 1925 it was apparent that something

drastic must be done if the railway was to be saved. So the writer, purely as a volunteer but with the knowledge and friendly co-operation of a noteholders' protective committee, went about the state and talked with as many of the bondholders as possible. He pointed out to them that unless they gave some assistance on Feb. 1, 1926, they would find the street railway company on their hands and would be faced with a serious impairment in the value of their bonds. Somewhat later a meeting was held at Fitchburg attended by a large majority of the bondholders. There were present also representatives of the noteholders and stockholders. They appointed committees to represent each group and delegated to G. A. Gaskill of Worcester and the writer the duty of formulating a definite and constructive plan of reorganization.

As finally worked out this plan contemplated a five-year test period to determine what could be done. The bondholders were asked to accept 5 per cent and 4 per cent instead of 7 per cent. The noteholders were asked to accept 1, 2, 3, 4 and 5 per cent interest for the first, second, third, fourth and fifth years. The stockholders were asked to place their stock for five years with trustees who should be designated by the protective committee and should vote the stock and elect officers during this period.

Five Studebaker buses of this type have been in service for several months and are proving more satisfactory than the heavier vehicles formerly operated

On Sept. 23, 1926, the plan became operative. The directors met and elected E. W. Baker as president, B. N. Hodges as treasurer, and L. H. Cushing as manager.

Track was in very bad condition and in some places almost unsafe for operation. A large repair gang was immediately put to work on the roadbed at a weekly cost of about $1,000. A number of lines were rebuilt, the work continuing until halted by cold weather. While this large increase of the payroll was a severe drain on the resources of the company, it was considered so essential to get the track in good condition that there was no alternative. This spring it is proposed to do further work on the track, replace light rails with heavier rails, put in new ties wherever needed and ultimately to have smooth, properly aligned track everywhere on the system.

The cars were almost all ancient, broken down and hardly usable, costing an excessive amount for repairs needed to keep them running. It seemed imperative that the public be given something better in which to ride. Immediately after the reorganization, the company ordered four new 26,000-lb. cars costing $13,000 each. These were built by the Wason Manufacturing Company. It was far from clear how the cars could be paid for even though the terms were only one-quarter down and the balance distributed over a period of five years. By exercising rigid economy, however, the company was able to accumulate sufficient funds to make the first payment, and by Jan. 16, 1927, all four cars were in active service. Four more of the same type ordered in February, 1927, have just been delivered.

Snow-fighting equipment was not dependable and was worn out. This was a serious difficulty because nowadays the best riding occurs on New England street railways during the winter months. A second-hand but satisfactory and effective sweeper was purchased for $1,500. This has proved adequate to take care of the snow problems during the worst storms of the past winter.

The carhouse and power house were dilapidated and their roofs leaked badly. They have been temporarily repaired. Later it will be necessary to put on new roofing, but the expense will not be heavy. One end of the carhouse where buses were sheltered was open to the weather and the heating was inadequate. This has been boarded up and doors installed so that it is now protected and properly heated.

Power house equipment was practically worn out. The steam boilers, originally high-pressure units, had been forced to reduce pressure from time to time by the state inspectors and were in danger of being con-

ANALYSIS OF OPERATING EXPENSES

	1927		
	January	February	Total
Maintenance of way and structures	$2,704.48	$2,879.07	$5,583.55
Maintenance of equipment	2,970.07	2,446.82	5,416.89
Power	6,532.98	5,968.00	12,500.98
Transportation expense	11,164.21	9,054.96	20,219.17
Traffic	165.59	114.42	280.01
General expense	2,016.42	2,355.48	4,371.90
	$25,553.75	$22,818.75	$48,372.50

	1926		
	January	February	Total
Maintenance of way and structures	$2,082.17	$5,941.90	$8,024.07
Maintenance of equipment	2,507.31	2,843.43	5,350.74
Power	7,744.84	7,267.60	15,012.44
Transportation expense	11,080.92	10,263.16	21,344.08
Traffic	69.57	67.49	137.06
General expense	3,513.52	2,949.09	6,462.61
	$26,998.33	$29,332.67	$56,331.00

SUMMARY OF REVENUE AND EXPENSES

	1927		
	January	February	Total
Operating revenues	$33,883.75	$30,678.60	$64,562.35
Operating expenses	25,553.75	22,818.75	48,372.50
Income above expenses	$8,330.00	$7,859.85	$16,189.85
Interest	2,768.00	2,768.00	5,536.00
Taxes	960.23	960.23	1,920.46
Net income	$4,601.77	$4,131.62	$8,733.39

	1926		
	January	February	Total
Operating revenues	$33,945.13	$29,896.02	$63,841.15
Operating expenses	26,998.33	29,332.67	56,331.00
Income above expenses	$6,947.80	$563.35	$7,511.15
Interest	5,887.23	5,887.33	1,774.56
Taxes	1,047.60	1,107.59	2,155.19
Net income	$12.97	*$6,431.57	*$6,418.60

* Deficit.

demned at any moment. The books showed that energy was costing about 2 cents per kilowatt-hour, but the expense probably was even greater than that. A contract was made with the Fitchburg Gas & Electric Light Company to buy energy at a much lower figure. Three modern rotary converters were installed in the old power house. These operate effectively and satisfactorily in place of the machinery which has been removed. Another rotary converter is used as a booster in the Cleghorn district of Fitchburg. All the old machinery has been sold for junk. The converters cost about $10,000 completely installed, but the company has four years in which to pay for them. They are expected to be adequate for its needs for a long time to come. It has been estimated by the engineers that the net saving in energy cost will amount to some $10,000 to $25,000 a year.

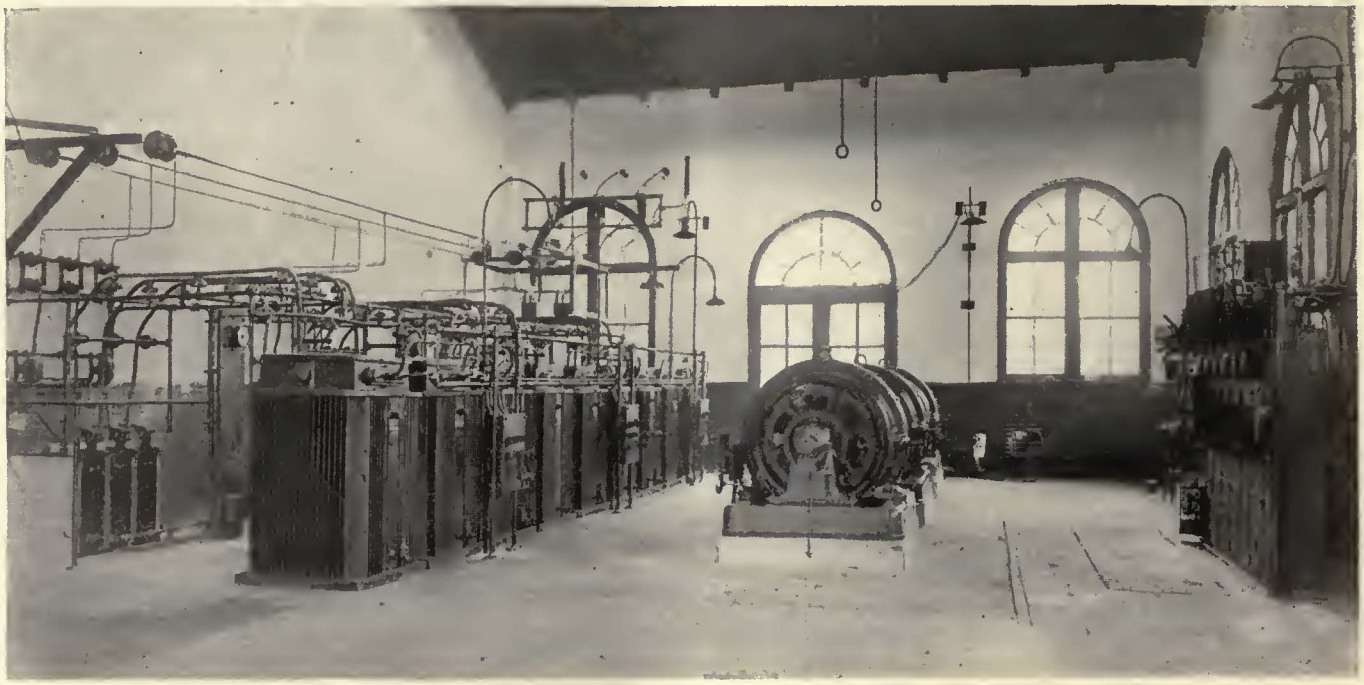
Overhead wire in places was found to be thin and weak. In the spring it is planned to secure some used copper trolley wire for replacement purposes and install it where it is most needed. At a relatively small expense this problem will be solved for the time being.

Whalom Park is owned by this company and is one of the best located natural parks in the state. Its woods were seriously damaged by cyclones a few years ago. Its popularity has been even more adversely affected, however, by the failure to keep up the general tone of the park. It is proposed as soon as the weather permits to repair and repaint the buildings, especially Whalom Inn, and to make them clean and attractive. Only the best amusement features will be tolerated and a conscientious effort will be made to regain for the park the splendid reputation which it formerly enjoyed.

Use of buses presented a complicated problem. In the fall of 1925, because of competition by independent operators and the unwillingness of the city government to protect the railway, the old management felt obliged to go into the bus business. Five 28-passenger buses were leased. These were permitted to parallel the car lines. Roughly speaking, with reference to the period from September, 1925, to the time when the present management took charge, these buses increased the expenses of the railway about $75,000 and added less than $2,000 to the income. It was obvious, therefore, that there would have to be some radical change of policy with respect to bus operation. It was felt that the buses were too heavy and too expensive to operate and that duplication of service was unwarranted and unwise. The lease, therefore, was discontinued and instead the company is operating four light-weight 21-passenger Studebaker buses. Routes have been revised so that the buses are acting as feeders to the principal rail lines.

Large rent was being paid for the offices uptown. This seemed an unnecessary expense and the office has now been moved to the power house, where ample room is available. The dispatcher's office is also located under the same roof.

A study of the records showed that about $5,000 was being paid annually for insurance premiums based on valuations which had long since ceased to be correct. Policies have now been adjusted to suit the present situation and an annual saving in premiums has been effected, amounting to about $3,800.



Rotary converters installed in Fitchburg & Leominster power house, replacing old steam-generating equipment

Taxes had been paid annually to the several cities and towns amounting to about $13,000. These were based on valuations which may have been proper when the company was making money but which were considered in excess of the worth of the property at the time of reorganization. Agreements have been negotiated so that the gross annual taxes henceforth will not exceed $6,000. This cannot be made to apply to the past, or to the taxes now in arrears, but it is expected that in the future there will be a saving of about $7,000 annually.

When the present management took charge it was discovered that the line from North Leominster to Ayer was operating at a large loss. This line was promptly abandoned. For a time buses were substituted, but finally the Boston & Maine Railroad took over the operation of this route, thereby permitting the street railway to concentrate its efforts in its local territory.

Other unprofitable outlying lines have been discontinued also. The mileage of track in operation Jan. 1, 1927, was 25.35 as compared with 41.63 a year before. Daily car-miles have been reduced from 1,845 to 1,685.

Notwithstanding the reduced trackage over which service is now rendered, the gross income for December, 1926, was greater than for any month in recent years. This increase is believed to be due in large part to the four new and attractive cars. The first two months of 1927 show a comfortable increase over the corresponding months of 1926. Moreover, operating expenses have been reduced about 15 per cent as indicated in the table on page 739.

Net Income Substantially Increased

Thus the net income for January and February was about $15,000 higher in 1927 than in 1926. Within the next few months it is planned to rehabilitate the remainder of the company's rolling stock so that ultimately there will be available sixteen well painted, clean and attractive cars. The management believes that the street railway has a definite and vital place in the life of the community and that nothing thus far has been devised to take its place. The original enthusiasm for rubber-tired vehicles is abating somewhat and the public is beginning to realize that buses are inadequate to handle the transportation in Fitchburg, where the bulk of the traffic is carried during the rush hours.

The policy of the management has been one of entire frankness with the public. It is felt that the railway belongs to the people. Neither the president nor any of the directors receives a dollar for his services. The old idea that the street railway was a kind of financial octopus which fastened itself upon the public, an enemy always ready to attack and to be attacked, no longer prevails in Fitchburg. The public recognizes the attitude of the new management. Indications are that patronage will continue to increase and that a sound and prosperous transportation system will be established.

Energy Consumption Accurately Measured

Survey Made to Determine Constant for Every Type of Passenger or Freight Car Operated by Nine Electric Railways in the Dayton Central Power District

ENERGY used in the operation of all cars in the central district of Dayton, Ohio, is supplied by the Dayton Power & Light Company from its Fourth Street power plant. Nine separate electric railways operate cars through this district, and in order to allocate properly the energy charges it is necessary to determine the consumption for each type of equipment.

In May, 1921, a comprehensive survey of this nature was conducted by the Economy Electric Devices Company, establishing constants for each type of equipment operated. Since these constants were based upon the energy consumption at the car, the bill rendered by the power company was in excess of the figured energy consumption, due to line loss, etc. During the first year following the survey this excess was a comparatively small amount, but shortly thereafter it began to increase until the latter part of 1926, when the excess amounted to approximately 30 per cent of the total. Accordingly, another survey was undertaken to establish new constants.

Because of the thorough manner in which the 1921 survey was conducted it was unnecessary during the recent investigation to go into as much detail as the first time. Quite a number of the cars operating in Dayton are equipped with Economy meters, hence the procedure was much simplified. On cars so equipped the meters were used in checking the old constants, the cars being in regular service. Otherwise a portable meter was used and the car operated as a special through the district. A relation was established between service and special cars by comparing similar types of equipment, and it was possible thereby to check the present energy consumption against the old constants.

Constants for freight equipment were obtained in a like manner. Most of the freight motor cars operating in Dayton are equipped with Economy meters. By riding these trains the investigators were able to obtain the energy consumption of the various freight motor cars hauling different numbers of trailers. By analyzing the data thus obtained constants were derived for light freight motors and for freight trailers. While the energy consumption of a freight train does not vary directly with the number of trailers hauled, the differential is small, and in order to simplify the bookkeeping a single constant was established for all freight trailers.

Practically all of the rolling stock used in city service is now equipped with electric heaters. The exact amount of energy used for electric heat by each company was difficult to determine due to differing standards of heating on the various properties. The amount of heating energy used in proportion to the motor energy in the central district is high, because of the length of time required to move the cars through this area.

Temperature of the outside air is a factor which largely affects the energy consumption of heaters, and it is obvious that as much heat will not be required during a moderate day as on an extremely cold day. This presents an accounting difficulty. The old system required that all trips be reported as "heat trips" during the heating season. It was thought by the investigators that a well-defined relation exists between the average monthly temperature and the amount of energy used for heat and that a more accurate method of calculation should be used. In the following tabulation is shown the per cent of trips recommended to be reported as heat trips during each of the seven months of the year when heaters are used.

Month	Mean Monthly Temperature	Per Cent of Trips to Be Reported as "Heat Trips"
August	73.4	0
September	72.6	0
October	47.0	30
November	40.9	60
December	29.6	100
January	28.8	100
February	33.7	75
March	33.9	50
April	45.6	25
May	62.8	0

Figures were developed by this survey showing the energy consumption for motors and heaters on each type of car operated by each of the nine railways. By the use of these revised constants and the recommended proportion of heat trips it is believed that the total energy consumption can be accurately divided and the proper amount allocated to each railway.

The Readers' Forum

Standard Specifications Should Be Utilized

80 PARK PLACE
NEWARK, N. J., April 18, 1927.

To the Editor:

I recently read with considerable interest an article in the Feb. 12 issue of the *Electrical World* covering the high points of an address by C. F. Hirshfeld, chief of the Detroit Edison Company's research department, before the third annual meeting of the public utility group of the National Association of Purchasing Agents at Detroit in January, 1927. This article contains several thoughts that should be of sufficient value to call to the attention of the purchasing agents and engineers of the electric railway industry.

The first is the need for co-operation between them and the necessity for each thoroughly understanding the viewpoint of the other. The next thought that seems to me to be of particular value, especially to the engineer, is the desirability of utilizing existing standard specifications, such as those of the American Society for Testing Materials and the National American Standards as adopted by the American Engineering Standards Committee. It is quite probable that, except in certain very special cases, all practical requirements will be met by one of these standard specifications, which, as Mr. Hirshfeld states, have passed through the trial of fire and the test of actual use over a period of years. They are generally accepted as representing the best commercial manufacturing practice, and if individual engineers are going to continue to insist on using their own particular specifications much of the benefit of standardization will be lost. Mr. Hirshfeld has well stated the case when he expresses the belief that "Mr. Engineer cannot take offense when Mr. Purchasing Agent asks him to explain why the standard material or equipment which many manufacturers are prepared to furnish is not good enough, and he is no proper engineer if he cannot produce a proper answer. There are exceptional cases where something better than the nationally accepted standard is required, but fortunately they are few and far between."

Perhaps a large part of the difficulty can be attributed to a lack of proper knowledge on the part of the engineer as to just what materials are covered by national standard specifications or by those of our national associations, and of their specific requirements. It is quite probable in many cases that he has never taken the trouble to study them and compare them with his own and attempt to convince himself that they would meet his requirements equally as well as his own specifications. The solution of the problem would seem to be a thorough knowledge on the part of the purchasing agent of the various existing standard specifications, at least by title, so that he could then be in a position to call them to the attention of the engineer when the latter submits his own particular pet. There must also be a willingness on the part of both officials to confer on such matters so that each may have a chance to obtain the viewpoint of the other.

The last important matter discussed by Mr. Hirshfeld has to do with a practice in vogue in some purchasing departments of pitting one vendor against another after bids have been received, for the purpose of securing percentage reductions from the first quotations. He calls it "the questionable satisfaction of 'persuading' them into a reduction," and states as his experience that "the cleverer salesmen serve up to you exactly the sort of dish that your past performances lead them to think that you want." It is quite probable that a great many purchasing agents, if they made an honest analysis of the situation in their own cases, would have to admit the truth of this conclusion. It is only once that a vendor will submit a bona-fide quotation and find that in order to secure the order he has to cut an amount equal or approximately equal to his estimated profit. Once it becomes known that this is the practice employed in making purchases, and such news spreads around rapidly, original quotations are submitted on the basis that such cuts will be asked for and the saving to the company becomes imaginary rather than real. It may even mean an increase in cost. The practice certainly creates bad feeling among the vendors and it should be condemned as strongly as possible. It has a decided disadvantage when employed in the case of prices being obtained for use of a contractor in an estimate when competing with other contractors for a job. The result is that the vendor submits lower quotations to the purchasing department which awards contracts upon the basis of original quotations than to the firm which insists upon the bargaining process after receipt of quotations, and the effect on the bid of the latter is too evident to require discussion.

HOWARD H. GEORGE,
Chairman Committee on Way and Structures,
American Electric Railway Engineering Association.

Agrees on Need of Research Department

PITTSBURGH RAILWAYS
PITTSBURGH, PA., April 19, 1927.

To the Editor:

The letter by H. S. Williams, assistant superintendent of equipment Department of Street Railways, City of Detroit, published in the March 26, 1927, issue of ELECTRIC RAILWAY JOURNAL, page 575, was read with a great deal of interest.

It is believed that such a research department is very necessary to the proper functioning of the American Electric Railway Association. Such work as is being done in Joliet, Ill., and Springfield, Mass., on more modern design of street railway equipment is a sign of the need of such a department in the association.

The entire expense of work of this sort should not be borne by individual properties, but should be divided among the companies composing the industry. The only way this may be done is through the establishment of a research department in the association.

W. T. ROSSELL,
General Manager.

St. Joseph Belt Line Half Finished

THE belt line, a 22,000-volt power transmission line which is being constructed by the St. Joseph Railway, Light, Heat & Power Company, and when completed will entirely encircle St. Joseph, is half finished. More than $75,000 has been expended on it and almost that much more will be used in finishing the job, which will take two or three years more. The big substation on Cook Road, north of the city, was completed and put in operation in December, 1926, and its completion marked the last work on the belt line last year.

MAINTENANCE MEN, Here Is Your Opportunity—

Go After a Prize!

First Prize	. .	$200
Second Prize	. .	$100
Third Prize	. .	$50
Twelve Monthly Prizes,		$25 Each

IN ELECTRIC RAILWAY JOURNAL'S Maintenance Data Contest you may win the money; you are sure to acquire greater prestige. Help to increase interest in the work of the maintenance man!

For the benefit of new readers and those who may have missed the announcement in last week's issue of ELECTRIC RAILWAY JOURNAL, the conditions for competing for the various prizes offered in the Maintenance Competition are restated in condensed form. Full information will be found in the April 16, 1927, issue, pages 700-701.

Three capital prizes will be awarded for the three best maintenance ideas submitted before Aug. 1, 1927. These are: First prize, $200; second, $100, and third, $50. In addition twelve monthly prizes of $25 each will be awarded, one each month beginning with the May 21, 1927, issue. Articles submitted will be published in the Maintenance Data Sheet Section of ELECTRIC RAILWAY JOURNAL, and a minimum of $5 will be paid for each article published.

ANY employee or official of an operating electric railway or electric railway bus subsidiary may compete for the prizes.

Each contestant may submit any number of items he desires. Each will be judged separately.

The prizes will be awarded primarily on the value of the idea presented and its adaptability to maintenance work on electric railways. The form of presentation will be judged only as to the clearness with which the method or device is described and illustrated.

The author does not necessarily have to be the originator of the idea or device. An article may be submitted by several persons or by a department and need not be written by the person in whose name it is submitted.

Articles may describe any maintenance practice or device used by any department of an electric railway, such as the maintenance of rolling stock, buses, shop equipment, or methods and equipment for overhead line repairs, power distribution and power generation devices, signal work, track and way maintenance, etc.

Articles should be preferably 100 to 200 words in length and should be accompanied by one illustration. Brevity consistent with a proper presentation of information will be given weight in judging articles. In no event should they be longer than 400 words, with not more than two illustrations.

MANUSCRIPTS should be mailed to the editor of ELECTRIC RAILWAY JOURNAL, Tenth Avenue and 36th Street, New York, N. Y. To be eligible for the capital prizes the envelope must bear a postmark dated before Aug. 1, 1927. Photographs or sketches that accompany the manuscript may be in pencil, or blueprints will be accepted. Each item submitted should bear the name or names of the individual or individuals by whom it is submitted and to whom awards are to be made. Photographs, sketches and manuscripts should be marked so that should they become separated they can be identified readily.

Monthly prizes will be judged by the committee, to be announced later, after the articles are published in the Maintenance Data Sheet Section, the best item being selected each month from those appearing in the issue in the month devoted to Maintenance and Construction.

The announcement of the winner each month will be made in the issue devoted to Maintenance and Construction, the third issue each month, following the one containing the items.

The winners of the capital prizes will be announced in the Annual Convention Number of the ELECTRIC RAILWAY JOURNAL to be published in September, 1927.

ELECTRIC RAILWAY JOURNAL offers these prizes to help maintenance men win the recognition in the industry which they deserve. Enter the contest now. Send in as many of your maintenance practices as you like. The JOURNAL will pay $5 for each item published, whether or not it wins a prize. The more items you send in the more chances you have of winning a capital or a monthly prize. Get started early. Articles to be published in the Maintenance and Construction issue for May will have the first chance to win one of the $25 monthly prizes. Maintenance men, here is your opportunity!

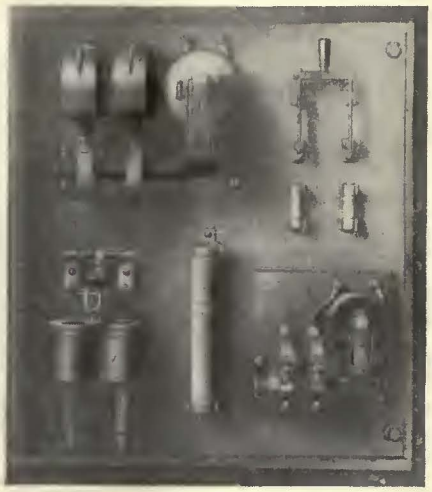
Maintenance Notes

Convenient Truck for Armatures

WITH a capacity of eight large-sized armatures, a truck has been constructed in the shop of the Grand Rapids Railway, Grand Rapids, Mich., for running into the oven and supporting the armatures while they are being baked. The truck, which runs on a stationary track between the dipping tank and the oven, can be readily pushed by the workman. The top of the truck is covered with galvanized iron and has holes arranged so that the armatures can be set on their end bells with the commutator ends up just as they are received from the dipping tank. By particular care in spacing the holes the truck is arranged to accommodate different types of armatures.

The baking oven used was constructed in the shop. It is of sheet steel with a height of 6 ft., length 6 ft. and width 5 ft. Each side is made as a complete unit so that it is portable and can be set up quickly. The sections are made with a ¾-in. x 3-in. x 4-in. angle framework covered with No. 20 gage sheet steel and No. 16 gage galvanized sheet inside. An inside lining of 2-in. Johns-Manville panel cell asbestos insulation is used between the sheets.

The oven is heated electrically with six 110-volt, 3½-kw. heaters in series across the 600-volt trolley circuit. Thermostatic heat control is used, the control panel being located



The oven control apparatus is covered with a glass door

on the side of the oven. This is fitted with a glass door so that all equipment can be seen readily. Thermostats inside the oven are set so as to indicate the temperature at the commutator neck, as it appears that the solder in the leads is the limiting temperature. Heaters have baffles so as to direct the heat through the trucks and thus prevent its escape at the sides.

For ventilation the oven has four 2-in. x 4-in. adjustable louvers and a 5-in. stovepipe from the center of the oven leading outside the building. A damper inside controls the amount of ventilation.

The dipping tank is located under the floor and is 18 in. diameter by 46 in. deep. It is piped to a large barrel outside the building so that it can be refilled easily as the varnish is used. The float has a sheet iron tube, closed at one end. The armature shaft fits into the tube as far as the wiper ring so that varnish cannot get on the shaft when dipping. A similar float used in Montreal for keeping shafts free from varnish was described in ELECTRIC RAILWAY JOURNAL for April 17, 1926, page 676.

Convenient type of armature truck used for handling armatures between dipping tanks and into oven

Barber Pole Stripes for Safety

ANTICIPATING accidents occurring to passengers entering the drop platform cars of the Memphis Street Railway, Memphis, Tenn., 1¼-in. diagonal black and white stripes have been painted on the end sills. Twenty-five cars were converted recently for one-man operation, and in order to provide for the easy entrance and exit of the passengers it was found necessary to rebuild the cars with drop platforms. The stripes are visible immediately on boarding the car. A lamp installed in a cabinet at the right makes the stripes visible at night.

Barber pole stripes on the end sills prevent accidents. A lamp makes the stripes visible at night

"Four out of every five have it." Prevent "pyorrhea of your gear teeth" by better maintenance of the gear center distance.

Around the World Without a "Pull-in"!

GOING farther than the distance around the world without a pull-in is the record set by the average street car of the Georgia Power Company during 1926, and it is a record of which many larger companies might be envious.

In 1921, when systematic improvement was begun on the street railway system in Atlanta, the average number of miles per pull-in was 3,002. Now, at the end of five years, the number of miles driven without a pull-in has increased to 26,041. Putting it one way, this is an increase of approximately 800 per cent. Putting it another way, it means that each street car in the city runs a distance equal to that around the world before it has to be pulled in for repairs.

At the present time Atlanta is leading the "Southern League" of street railway companies in mileage per pull-in, the average for Little Rock being 15,848 miles, for Birmingham 13,694, for Memphis 9,889, for Mobile 8,633, for Dallas 6,954 and for Covington, Ky., 5,686. Other cities show even less mileage per pull-in.

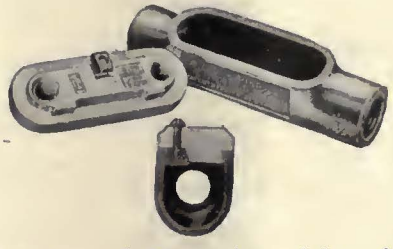
Incidentally, Atlanta is leading a good many other cities in the matter of pull-ins. The figures speak for themselves.

New Equipment Available

Wedge-Nut Fastening for Condulet Cover

FASTENINGS without screws which might project inside so as to injure wiring are a feature incorporated by the Crouse-Hinds Company, Syracuse, N. Y., in a new line of Obround condulets. The particular innovation of this line is the method by which the cover is fastened. The inside surface of the condulet at the opening has a slight bevel and the condulet cover is also provided with a corresponding bevel. After the cover is in position it is fastened by what is termed a wedge nut. This nut has beveled surfaces, one side of which fits against the bevel of the condulet while the other side is against the similar surface of the cover. By tightening a single screw on the outside the nut is drawn against the beveled surfaces and the wedging action holds the cover firmly in position.

Some of the advantages claimed are that the wedge nut holds the cover securely in position and it cannot become loosened by vibration. The cover openings are also unobstructed by any lugs necessary for fastening and therefore it is easy to pull conductors into conduits and there are no screws to project inwardly and so injure the conductors. The unobstructed cover opening provides a large wiring chamber which makes splicing and taping easy. The covers and wiring devices can be installed in inaccessible places, as they can be turned to bring the fastening screws outward and a few turns of the screwdriver clamp the covers securely. The cover and wiring devices are complete units so there is no danger of losing small parts. These condulets are furnished in the various sizes and designs which are standard by the Crouse-Hinds Company for other condulets.



New type of Obround condulet with wedge nut fastening

Flexible Mounting for Electric Hoist

MOUNTING in a fixed position, either overhead or on the ground, is possible with a new "Lo-Hed" electric hoist announced by the American Engineering Company, Philadelphia, Pa. It also can be placed on skids and used as a portable hoist. The hoist is suitable for such purposes as a car puller, hoist, derrick or elevator.

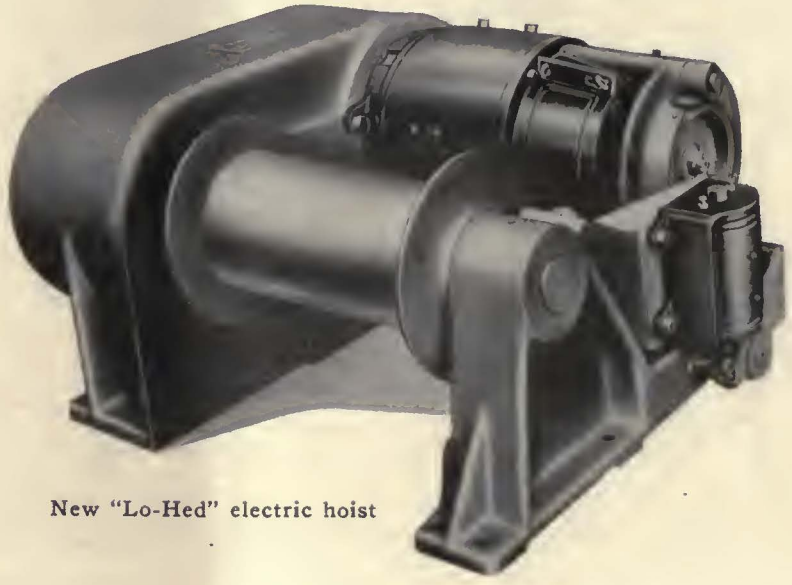
The standard machine has a smooth drum, driven by a motor through a chain of spur gears, all mounted on a common bedplate. It is furnished in sizes for handling loads from 500 lb. to 4,500 lb.

The motor and gears are inclosed completely. Gears are of drop-forged, heat-treated steel, run in an oil bath. Hyatt "high duty" roller bearings are mounted on the ends of all gear shafts. The cover of the gear case is removable.

The drum has large flanges, which prevent the rope from jumping the ends and give maximum stowage capacity. One bearing of the drum shaft is splash lubricated from the gears and the other has an Alemite fitting.

The motor has ball bearings and is especially designed for hoist service. Either d.c. or a.c. motors can be furnished. The controller is of the single-speed, reversing-drum type.

When desired, certain modifications in the hoist can be made by the manufacturer, such as the inclusion of grooved drums, push button and remote control, holding and lowering brakes, extension shafts with additional heads and either air or steam motors.



New "Lo-Hed" electric hoist

American Association News

Way and Structures

PROGRESS made in the formulation of recommendations to be presented to the standing committee on way and structures was outlined by the chairmen of the various special committees at a meeting held at association headquarters, New York, on April 7 and 8. The special committee on review of existing standards presented a progress report. Chairman George reported that he had written to the chairman of the A.R.E.A. rail committee requesting information as to the action taken by the A.R.E.A. on the request of the A.E.R.E.A. to make certain revision in its open-hearth girder rail specifications, but that the information had not been received. The chairman will follow this matter up with another inquiry if the information which is requested is not received within a reasonable time.

Mr. Alden requested that the Manual be modified to fix the tolerances for rail template fit as follows:

"No variation will be allowed in dimensions affecting the fit of the joint bars except that the fishing template approved by the purchaser may stand out not to exceed $\frac{1}{4}$ in. laterally."

After the matter had been thoroughly discussed by the entire committee and the proposed revision explained by sketches on the blackboard, it was moved to amend the motion by changing the permissible variation to $\frac{3}{32}$ in. instead of $\frac{1}{4}$ in. The motion as amended was carried without dissenting vote. The committee decided that this matter should be referred to the executive committee as soon as a letter ballot had been taken.

Mr. Merker submitted six designs of existing special expansion joint designs in actual use at various locations in Brooklyn, and called attention to the fact that the special requirements of each particular situation generally made necessary a special design each time an expansion joint was required. It was decided that the matter of expansion joint design be referred to special way and structures committee No. 2 for investigation and report as a part of next year's program.

Mr. Ryder reported that the committee on special trackwork had held a meeting at which the following subdivisions of the work were considered: (1) Switch tongue design; (2) hard center plate design; (3) design of iron binding for iron-bound special trackwork.

Mr. Ryder stated that it was the committee's intention to concentrate its efforts on subjects Nos. 1 and 2, as No. 3 could not be worked out until after No. 2 had been disposed of. His committee submitted a full-sized detail of switch heel design showing the hold-down device. Mr. Entwisle expressed the opinion that certain modifications of the proposed design would have to be made in order for it to be effective.

Mr. Merker submitted a progress report of the special committee on rails, but owing to the fact that the way and structures committee had not had an opportunity to study this Mr. Merker was requested to send a copy to each member of the standing committee, and the latter are then to submit individual written discussion to the chairman of the special committee.

COMING MEETINGS OF *Electric Railway and Allied Associations*

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

April 27-29—American Welding Society, eighth annual meeting, Engineering Societies Building, New York City.

May 3-5—United States Chamber of Commerce, annual meeting, Washington, D. C.

May 6—American Electric Railway Association, Metropolitan Section, Engineering Societies Building, New York City, 8 p.m.

May 9—National Conference on City Planning, Washington, D. C.

May 11-12—Central Electric Railway Master Mechanics' Association, meeting, Webster Hall Hotel, Pittsburgh, Pa., 9 a.m.

May 18-19—Central Electric Traffic Association, meeting, Tuller Hotel, Detroit, Mich., 9 a.m.

May 31—June 1-2—Canadian Electric Railway Association, annual convention, Winnipeg, Man.

June 6-8—American Association of Engineers, annual convention, Tulsa, Okla.

June 19-23—International Street and Interurban Railway Association, annual conference, Copenhagen, Denmark.

June 24-25—New York Electric Railway Association, annual meeting, Hotel Champlain, Bluff Point, N. Y.

June 29-July 1—Central Electric Railway Association, summer meeting, Book-Cadillac Hotel, Detroit, Mich.

June 30-July 1—Tramways and Light Railways Association, annual meeting, Bath, England.

July 27-29—Association of Equipment Men, Southern Properties, 12th semi-annual meeting, Atlanta, Ga.

Oct. 3-7—American Electric Railway Association, annual convention and exhibit, Public Auditorium, Cleveland, Ohio. Exhibits open Oct. 1 at noon.

Mr. Baker reported for the special committee on track drainage that he had prepared a tentative questionnaire on the subject which was to be sent out at an early date to the maintenance of way members of all A.E.R.E.A. committees this year. He stated that his committee had reviewed preceding reports on the subject that had been referred to them, but that the information was now obsolete and would have to be revised and brought up to date, which the above questionnaire was designed to do.

The committee on bus garage design has decided that the study of "Effect of Garage Design on Insurance Rates" was the most important assignment and that it should be given first consideration. The members have decided to study also the three following subjects, leaving the others referred to them for future attention: (1) Door design; (2) bus washing facilities; (3) ideal layouts for various street frontage conditions.

Mr. Wysor reported that there had been no meetings held but that the rail corrugation committee is slowly collecting data. He reported that the Westinghouse company is making tests covering the determination of hardness tests on corrugated rail to determine the variation in hardness between the crest and trough of the corrugations. He also reported that the services of Professor Ewing had again been retained this year. It was stated that the committee will again submit only a progress report at the October convention.

Terminal Work Held Up

No report of the committee on joint bus and railway terminals was submitted but Chairman George reported that the special committee chairman had resigned and that an invitation had been extended to another member of the committee to serve as chairman and that it was hoped to get the work of this committee under way at an early date, although it was hardly probable that any definite progress could be made this year.

Mr. Spencer gave a record of the installations of chrome-nickel steel special trackwork, which will be covered by the report of his committee. He stated that he had arranged for a series of weldability test specimens to be made by the Canadian Steel Foundries, Ltd., and that Bethlehem Steel Company, Lorain Steel Company, and William Wharton, Jr. & Company, Inc., had also signified their willingness to make similar tests. It has not been definitely decided whether to have the various manufacturers make these weldability tests on specimens in their shops or to have the specimens sent out to several railway companies for welding tests.

The entire subject was carefully dis-

cussed and it was the general opinion that the welding should be done by three railway members on identical test specimens, with the same welding wire and under as nearly the same conditions as practical, the operator being the only uncontrolled variable. It was suggested that it would probably be desirable to introduce artificial cupping in the test specimens in order to reproduce more accurately the actual field conditions, and that the welding should also be made on a ground surface. The discussion was informal and no definite action was taken by this committee.

Seven-Inch Rails Used Extensively

Mr. Alden submitted a tabulation showing the rollings of the various 7-in. girder rails by the Lorain Steel Company for a period of five years and stated that he would prepare comparable data from the Bethlehem Steel Company. This showed that over 50 per cent was the A.E.R.E.A. standard, with an additional 15½ per cent covering the A.R.E.A. standard heavy 7-in. section for use in paved streets. A little less than 9 per cent was the 116-lb. rail sections L.S.-434 and 494. Of the remainder, the greatest percentage was sections L.S.-103-478 and B.S.-103-287-A, which comprised 11.16 per cent of the total. Mr. Alden stated that it was his belief that the Bethlehem figures would show at least as high a percentage from their total rollings and that his committee would probably recommend this 103-lb. section for adoption as a standard light section girder rail, without modification.

Mr. Gailor submitted a tentative draft of a set of specifications which had been prepared as the result of the study and investigation made by the special committee on arc welding and which was now in its hands for study and criticism. He said that the rules of procedure for welding operations are now being studied by the committee. Mr. Ryder gave a comparison between the chemical requirements of the various grades of welding rods in this tentative specification and those for similar grades in the specifications of the American Welding Society. It developed that there were no radical differences.

New Code of Instructions

Mr. Burke read a letter sent out by Mr. Harvey to the members of the committee on pavement giving the tabulation of the replies that he had received to a questionnaire he had sent out, and also his summary of these replies.

The chairman called the attention of all members of the way and structures committee and all chairmen of special committees to the new code of instructions or rules governing committees, activities and the preparation of reports.

The date and place of the next meeting were discussed. It was agreed to hold it at association headquarters in New York on June 9 and 10, 1927.

Members and chairman of special committees present were H. H. George, chairman; C. A. Alden, E. B. Entwisle, W. G. Hulbert, H. F. Merker, E. J. McIlraith, E. M. T. Ryder, A. T. Spencer, W. W. Wysor, S. Clay Baker, E. P. Roundey, W. R. Dunham, Jr., and C. F. Gailor.

Power Generation and Conversion

PROGRESS reports were presented at a two-day meeting of the committee on power generation and conversion of the Engineering Association held at association headquarters, New York City, April 4 and 5. Those present were W. E. Bryan, chairman; L. D. Bale, sponsor; C. A. Butcher, H. W. Codding, H. A. Kidder, Otto Naef, F. W. Peters, R. L. Weber, G. I. Wright, F. B. Davenport representing C. E. Bennett; C. L. Gerhardt representing G. W. Saathoff, and E. G. Sohlberg.

Extended discussion was given to the subject of ventilation. Table No. 6 of last year's committee's report was expanded to show the computed temperature rises at 100 per cent and 125 per cent rated load. The handbook figures for watts per square foot radiation per degree centigrade were found to differ from actual test results. This was thought to be because test figures took into account not only radiation, but absorption by the building structure as well. It was decided to use a figure of 0.450 and compute the temperature rise at 100 per cent rating on the basis of this figure.

This year's assignment on ventilation provided for a study of the conditions under which natural ventilation was desirable on the one hand and forced ventilation on the other. In view of the very great variation as to air temperatures, size and construction of buildings, loads to be carried, etc., it was felt that no definite line of demarcation could be drawn and that the report should state the various factors to be considered when designing the scheme of ventilation, and only in a general way the conditions requiring forced ventilation.

Graphs have been prepared for 600-volt rectifiers and converters for both 25 and 60 cycles. The difference in the two was found to be due to the difference in transformer design. Since transformer efficiency can be varied by design and since the efficiency of the rectifier itself is independent of the frequency, it was desided to use one curve for both 25 and 60-cycle rectifiers. It was decided that this year's report should include a table showing the protection necessary or advisable for automatic operation of converters and rectifiers. A questionnaire has been sent out to a number of companies operating rectifiers in this country and answers from these will be tabulated.

Fire Prevention

RULES for employees were considered by the sub-committee on fire prevention of the American Association insurance committee that met at association headquarters in New York on April 8, with the following present: F. J. Petura, A. D. Knox, J. H. Moran, N. H. Daniels, B. L. Tomes and H. B. Potter, chairman.

The committee discussed the "Rules for Instructions to Employees for Fire Prevention" which are given in Manual Section B100-23, and decided that mention of this section should be made in its report. A complete discussion on the subject of fire prevention was held and at its conclusion it was decided that each of the sub-committee members would submit a draft of a report for use in preparing the final report.

The committee also considered the replies that had been received to the insurance questionnaires sent out some time ago, and urged prompt compliance with the committee's request to fill out and return these questionnaires at the earliest possible moment.

Hotel Reservation Blank for Cleveland Ready

APPLICATIONS for hotel reservations for the convention of the American Electric Railway Association at Cleveland, Ohio, next October, together with a statement of rates at the various hotels during the period of the convention, will be mailed from association headquarters in New York early during the week commencing April 25.

Bus Operation

MEMBERS of the committee on bus operation of the Transportation & Traffic Association met in Chicago on April 8 to discuss progress reports of the four sub-committees. The one on fares and fare collection was presented in a letter from E. D. Dreyfus, its chairman. It was the opinion of the members in attendance that this report should contain the practices of operating companies in establishing, determining and collecting fares. It was the thought of R. N. Graham, chairman of the main committee, that if the expressions of opinion of the members were incorporated in a report it would materially benefit present and prospective operators of bus lines, both city and intercity.

Out of questionnaires sent out to 51 companies operating buses, 46 have been returned, according to Mr. Graham. Material in these answers would assist the sub-committee in preparing a more comprehensive report on the subject of fares. D. L. Fennell, Kansas City, suggested that the sub-committee study the question of fares and perhaps work out a formula by which it would be possible to establish equitable rates for various bus services. A. R. Myers, Erie, Pa., suggested that the sub-committee work out such a formula based upon the density of population, riding habit and amount of service.

All of this discussion resulted in a motion by P. E. Wilson, Cleveland, that the sub-committee be directed, first, to analyze the data on fares and fare collection as contained in the questionnaires; second, to summarize this information for city, interurban and charter service, and, third, to make recommendations as to a definite policy to be followed by member companies. It was the opinion of the committee that the rate of fare must be based on the cost of service and should not follow in the footsteps of the early electric railway fare which was based upon a coin, rather than upon the cost of service. Mr. Fennell stated that now is the time for the electric railway industry to break away from the old practice of a coin for a fare. As this subject was

considered the most important of the four, Mr. Graham increased the membership on the sub-committee by adding to it H. M. Bollum, Minneapolis; A. R. Myers, Erie, Pa.; Adrian Hughes, Jr., Baltimore; H. G. Monger, Milwaukee, and B. W. Arnold, Highwood, Ill. These men were asked to write to Mr. Dreyfus and co-operate with him and D. A. Scanlan in preparing a comprehensive report.

Progress reports were read by the sub-committees on equipment; methods, practices and economics of bus operation, and bus operating rules and instructions to personnel. Discussing the latter subject, Mr. Wilson made a motion that the program committee be requested to make arrangements for D. A. Scanlan, Akron, Ohio, to give a demonstration at the Cleveland convention of the Northern Ohio Traction Company's school for bus drivers' instruction.

Members present at the meeting included R. M. Graham, chairman; B. W. Arnold, vice-chairman; D. L. Fennell, S. W. Greenland, M. L. Harry, Adrian Hughes, Jr., H. M. Bollum, Thomas Noonan, E. S. Pardoe, members, and Paul E. Wilson and A. R. Myers, sponsors.

News of Other Associations

Traffic Congestion a Paramount Issue

CITY governments have thus far failed to take adequate steps to cope with the traffic problem, according to speakers at a conference held under the auspices of the National Automobile Chamber of Commerce at Chicago on April 13. Mayors, safety commissioners and other city officials were gathered there to consider the problem of traffic regulation from the executive standpoint. Various speakers emphasized the fact that traffic congestion has ceased to be merely a petty annoyance and has now become a major economic problem. Traffic is increasing so rapidly that a situation is likely to arise in a few years requiring the expenditure of much larger sums to provide relief than will be needed if the problem is attacked now.

Every city of 25,000 or more population should have at least one official whose sole duty it is to devote his time to traffic problems, according to Miller McClintock, director of the Erskine Bureau of Street Traffic Research. Congestion has reached its present seriousness, he said, because municipal officials have not attacked it with the same success that they have had in tackling other problems.

A discussion of signals and signs was led by E. J. McIlraith, staff engineer Chicago Surface Lines. Automatic signals, he said, are preferable to traffic policemen wherever conditions justify the expense. To be of any value, however, these signals must be properly timed. Too many cities buy signals like so much hardware and stick them up where it is most convenient, with little regard for time intervals or their relation to other signals. He urged municipal officials to obtain competent engineering advice before signals are installed. Co-ordination of lights to permit continuous flow of traffic at a certain specified speed is the latest development in traffic signaling, he said. This is putting a much needed curb on the driver who endeavors to "beat the lights."

The traffic problem is likely to get worse before it gets better, in the opinion of J. Rowland Bibbins, consulting engineer, Washington, D. C. He pointed out that the private automobile is not the only phase of the problem, but that freight transportation, which has not been greatly developed yet, looms large in the picture of the future. Local freight transportation will tend more and more to use the public streets, he said. He suggested that the best way to speed up traffic is by segregating it by classes, making some streets available for rapidly moving vehicles and others for slow, heavy trucking. Mr. Bibbins' paper appears in abstract elsewhere in this issue.

Central Electric Traffic Association

IN ACCORDANCE with the action taken, the Central Electric Traffic Association will hold its next regular meeting at the Tuller Hotel, Detroit, Mich., May 18 and 19. The opening session will be called to order at 9 a.m. Eastern Standard time.

Members are requested to submit subjects for discussion to the secretary as soon as possible in order that the docket may be mailed from his office not later than May 2.

C.E.R.A. Program Discussed

SUBJECTS for the summer meeting of the Central Electric Railway Association to be held at Detroit, June 29-July 1, were discussed at a meeting of the program committee of the association held in Cleveland, Ohio, on April 15. All members were present.

The tentative program includes a session on track construction and maintenance, with a talk on the general subject of standardization and elimination of waste; a session on better business methods for electric railways, city, interurban passenger and freight; one on electrical overhead construction, and one on financing. An address is planned for Wednesday evening.

Entertainment proposed includes a trip through one of the automobile plants in Detroit on Wednesday afternoon; a boat trip to Bob-Lo Island, with a golf tournament, on Thursday afternoon, and a dinner-dance Wednesday evening. A trip around Detroit by motor coach for the ladies is also planned for Thursday morning.

Central Master Mechanics

MAY 11 and 12 the Central Electric Railway Master Mechanics' Association will hold its next regular meeting at Pittsburgh, Pa. The session of May 11 will be called to order at 9 a. m., Eastern Standard time, at the Webster Hall Hotel. The morning session will be taken up with reports from committees and many important matters are up for discussion by the membership.

At 2 p.m. the same day members will visit the shops of the Pittsburgh Railways, where an opportunity will be given to see the new Pittsburgh car washing system.

On the morning of May 12 there will be a visit to the plant of the Westinghouse Air Brake Company and in the afternoon the Westinghouse Electric & Manufacturing Company's plant will be visited.

Platitudes Will Not Solve Traffic Problem

TOO much guesswork about our traffic problems, too many attempts to apply quick cures based on opinion rather than detailed engineering study, were reasons assigned for the failure of most American cities to deal more effectively with the problems of traffic congestion by Miller McClintock, director of the Albert Russel Erskine Bureau for Street Traffic Research, speaking April 15 before the first annual Central States Safety Congress, held in Kansas City.

"Those who would solve the American city traffic problem by some vague formula are as certain to be disillusioned as the takers of patent nostrums which claim to cure all human ills," said Dr. McClintock. "Until American officials are willing to recognize the traffic problem for what it is—a detailed and complex engineering problem—little progress will be made.

"There is no single panacea for so complicated a situation. In fact, it may be said that there is no solution for the traffic problem. There is, however, a series of reliefs for it. An engineer taking charge of a complicated machine that has not been properly lubricated turns his attention to oiling the various bearings of the mechanism in order that the friction from a large number of sources may be reduced. So in dealing with the traffic problem of a great city it is impossible to attempt to bring a solution by the application of some general formula or single remedy. It is necessary to make a minute investigation of the sources of friction and to treat each individual contributor to the general problem in an individual and specific manner.

"Before the public can be educated in methods of street traffic operation which will relieve congestion and add to safety it is first necessary to develop the principles that should be taught. Once careful investigation in each particular city has been made there can be formulated a simple and uniform code of traffic regulation.

"Until this is done vague and general educational programs on public safety matters related to traffic can be of little value."

The News of the Industry

Passengers Petition Before Massachusetts Commission

The petition of passengers for decreased fares on the Boston & Worcester Street Railway was recently heard before the Public Utilities Commission. Edward R. Goodwin, who appeared for the petitioners said that the officials of the railway had increased the fares from 5 to 6 cents a zone on Feb. 15, 1927. He declared the Boston & Middlesex line, which serves Natick and Wellesley, charges 10 cents to Newton, while the Boston & Worcester charges 24 cents for the same trip. School children's tickets were also raised at the same time from 5 to 6 cents. For the railway, F. C. Lewis stated that the commuters' books had not been changed, the rate still being 3.7 cents per zone. James F. Bacon, counsel, pointed out that the company had lost $90,000 in the two years of receivership. Patrons had also appeared in protest of bus operation, in installing which the company had difficulty because of the necessity for securing the commission's permission. Bus service, he thought, would remedy some of the trouble. Decision was reserved.

Philadelphia Transit Plan Would Cost $519,300

Immediate extension of nine trolley and bus lines in various sections of the city of Philadelphia, Pa., is part of a recommendation made to the Public Service Commission on April 19 in a report filed by its Bureau of Engineering. The extensions cited as vital in 1927 by F. Herbert Snow, chief engineer of the commission, would entail a capital outlay of $519,300 by the Philadelphia Rapid Transit Company and additional operating costs of $287,950 a year. Dr. Snow's report follows a three months' exhaustive survey of the transit situation. The document is preliminary to a report which will cover criticism of existing service and a discussion of the taxicab situation, one-man trolleys and other phases of the Philadelphia Rapid Transit Company operations. In the increased service outlined by Dr. Snow 32 additional cars and two more buses would be required.

No Progress Reported in Seattle Revision Deal

Regarding the present negotiations of the city of Seattle, Wash., with the Puget Sound Power & Light Company for an extention of time for the payment of the principal of the bonds issued to that company when the city took over the local railway, Mayor Landes states that she has been assured that it would be impossible for the city to sell power to the railway at ½-cent a kilowatt-hour, as suggested by A. W. Leonard, president of the power company, in placing the offer for extension before the city. She states, however, that it is believed the power can be furnished at less than 1 cent, the present rate.

Los Angeles Interurban Fares in Effect for Four Months

In an order issued recently the California Railroad Commission authorized the Pacific Electric Railway, Los Angeles, Cal., to place in effect on one day's notice new rates of fare on its Glendale-Burbank line, the basis for determining these to be:

1. One-way fares shall be based on 2 cents per mile, using the nearest 5-cent multiple, minimum fare 10 cents except where the present one-way fare is 6 cents no change shall be made in such fare.
2. Round-trip fares shall be double the one-way fare where the one-way fare authorized herein is less than 15 cents. Where the one-way fare authorized herein is 15 cents or greater, the round-trip fare shall be 5 cents less than double the one-way fare.
3. Thirty-ride family commutation fares shall be 80 per cent of 30 one-way fares except that no 30-ride family commutation fares will be published between points where the one-way fare authorized herein is less than 15 cents.
4. Sixty-ride individual commutation fares shall be 120 per cent of the present 60-ride individual commutation fares except that no 60-ride individual commutation fares will be published between points where the one-way fare authorized herein is less than 15 cents.
5. Adjustments not specifically authorized in this order may be referred to the commission for determination.
6. These rates to remain in effect for a period of four months and longer if it is found that the revenue on this line does not lessen more than $4,000 per month, compared to the present revenue, but in no event are the temporary rates to remain in effect beyond the effective date of the decision on the original application.

The commission ordered the company to suspend during the pendency of those rates all ten-ride, week-day and monthly commutation fares now in effect on the Glendale-Burbank interurban line. The company was also ordered so to record the revenue that the effect may be analyzed.

The Pacific Electric Railway on Jan. 11, 1927, filed an application with the commission for an order granting permission to increase passenger rates and fares over practically all of its interurban and local railway systems. On March 8, 1927, authority was asked to put into effect, as a temporary experiment a schedule of reduced one-way, round-trip and 30-ride rates, with an elimination of all other commutation rates on a group of the shorter interurban lines.

During the hearings on the supplemental application, many of the communities protested the placing in effect of the proposed trial rates. Agreement was reached, however, between the applicant and representatives of the cities of Los Angeles, Glendale and Burbank that an experimental rate schedule as given above might be placed in effect on the Glendale-Burbank line.

Nebraska Company Seeks Higher Fares

The Omaha, Lincoln & Beatrice Railway, Lincoln, Neb., has asked the Nebraska Railway Commission for authority to increase its railway fares from 6 cents, plus 1 cent for the second zone, to 10 cents, plus a 2-cent zone fare. It also desires to sell four tokens for 30 cents, good on either its bus lines or cars, and for a 10-cent bus fare with 2 cents added for the second zone, which begins at 45th Street. The new rates asked are the same as those charged by the Lincoln Traction Company, with which it comes into active competition on the north side.

The company has never paid operating expenses, but under the management of J. M. Bramlette has been improving. Mr. Bramlette says that during the last twelve months, on a business exceeding $46,000, the company came within $1,606 of expenses.

Change Reported in Piedmont & Northern Route

Plans of the Piedmont & Northern Railway, Charlotte, N. C., to extend its service to points in North Carolina have been materially changed, according to a semi-official statement. It is probable now that the proposed extension from Charlotte to Winston-Salem and Durham will be built through the counties of Stanly, Randolph and Chatham instead of by way of Salisbury and Lexington. This route is 50 to 100 miles south of the one first proposed and is practically a direct route between Charlotte and Durham. It would leave Salisbury, Lexington, Winston-Salem and Greensboro far to the north.

It is learned that the application of the company to the Interstate Commerce Commission of extension of lines has been withdrawn and the reason given is that holders of land along the right-of-way proposed from Charlotte to Lexington have asked prices that the company considers exorbitant. The Southern Railway, however, operates from Charlotte to Lexington and on to Greensboro, part of its main line, and from Greensboro to Durham and Goldsboro, its most important branch line. If the Piedmont & Northern were built that way it would parallel the Southern practically all the way.

Pennsylvania Senate Defeats Paving Bill

The Senate at Harrisburg, Pa., by a vote of 22 affirmatives and 25 negatives on April 11 defeated the bill of Senator Painter which would exempt electric railways from paving for a certain distance on either side of their tracks. A constitutional majority of 26 votes was needed to pass the bill.

1926 Payments Swell Chicago Traction Fund

Close to $50,000,000 is now held in the traction fund of the city of Chicago as a result of the payment on April 9 of $2,617,399 to the City Comptroller by the Chicago Surface Lines. The amount represents 55 per cent of the net earnings of the Chicago Railways and the Chicago City Railway for the year ended Jan. 31, 1927. The check from the Chicago Railways, which is now in the hands of receivers, was for $1,631,030, while that of the Chicago City Railway was $986,368.

Under provisions of the 1907 ordinance, which expired on Jan. 31, last, and was extended for six months by the City Council, the Surface Lines are required to contribute 55 per cent of their annual net receipts to the city, such funds to be used either for purchase of the lines by the city or for municipal subway construction. With the payments for last year and some $350,000 in accrued interest, the traction fund now amounts to $49,747,019. The city's share for 1926 is an increase of more than $500,000, or 23 per cent over the amount paid the previous year.

Rapid Transit Act Killed in St. Louis

The adjournment of the Missouri General Assembly before the Senate could vote on the measure caused defeat of the rapid transit enabling act for St. Louis, Mo. However, C. E. Smith, consulting engineer for the city, who has made a study of the rapid transit needs, has expressed the belief that the Mayor under the existing city charter has the power to appoint a commission, subject to approval by the Board of Aldermen, and to provide funds for a complete survey of the city's transportation needs, the drawing of a definite subway or elevated plan, and to do practically everything the defeated bill authorized.

The chief purpose of the dead measure was to grant the city the authority to designate subways and elevated systems public works, within the legislative definition of public works, and to assess part of the cost against property alleged to be benefited through the rapid transit system.

City Denies Claims in Omaha

Every claim made to the federal court with respect to the legality and the perpetuity of the franchise of the Omaha & Council Bluffs Street Railway is denied categorically by the city of Omaha in its answer to the suit filed by the Guaranty Trust Company, New York. On behalf of the bondholders the trust company contended that the franchise is perpetual and asked an injunction against interference with its rights or granting permits to bus lines. The answer of the city takes up each step in the corporate development of the company and alleges that in none of the transfers was the law obeyed. It is also claimed that the perpetual rights granted the original company were lost through foreclosure proceedings. The city also contends that the suit is prematurely brought since the city has taken no action to oust the company nor to issue permits for competing bus lines.

City Attorney VanDeusen proposes to test the matter in the state courts and will ask the Attorney-General to bring *quo warranto* proceedings to test the company's rights to use the streets, claiming its franchise expires in 1928. He has frankly pointed out, however, that the city must recognize that the company has occupied the streets for 60 years without molestation, and that court decisions are not strong in their support of the city's position.

Deathknell Probably Sounded for Boston "L" Legislation

The deathknell of all Boston Elevated Railway legislation for the present year was sounded recently when the House ways and means committee voted to report "reference to the next annual session" on the bill which has already been passed by the Senate to extend public control for fifteen years.

An order had previously been introduced by Alfred E. Bliss asking the Supreme Judicial Court for an advisory opinion as to the Constitutionality of proposals made sometime ago. The Bliss order would ask the Supreme Court to advise the Legislature on the following points:

1. If the period of the lease of the property and franchises of said company to the Commonwealth, as provided in Chapter 159 of the Acts of 1918, is extended for a term of years, may the General Court provide that the Commonwealth shall guarantee the payment of principal and interest of any securities of the company that the trustees may be authorized to issue for the purpose of effecting economies in the fiscal management of the company and of promoting more efficient service to the public?
2. Would the fact that such securities might be outstanding after the termination of said period of public operation and management render such a guarantee inconsistent with the sixty-second article of the amendments to the Constitution or any other constitutional provision?
3. Is it constitutionally competent for the General Court to exempt said securities in the hands of their holders from all taxes levied under state authority?
4. Is it constitutionally competent for the General Court to require the retirement of any class or classes of the company's stock by the exercise of the power of eminent domain, or otherwise?
5. Under any extension of the present system of public operation and management of said company would the provisions of the sixty-second article of the amendments to the Constitution apply to the receipts of the company during the period of such operation and management?
6. Would any such extension be repugnant to the provisions of the sixty-ninth article of the amendment to the Constitution of the Commonwealth?

As a result of the introduction of the order, the Senate laid on the table the bill for extending and improving rapid transit facilities in Metropolitan Boston, proposed by the Metropolitan Planning Division.

Railway Man Again Honored

J. P. W. Brown, vice-president and general manager of the Nashville Railway & Light Company, Nashville, Tenn., was recently elected president of the Chamber of Commerce of Nashville. This latest of his honors came to him in recognition of his public service record, which Nashville declared had not been exceeded by any other individual. In 1925 Mr. Brown was unanimously voted by all civic clubs to be Nashville's most useful citizen.

Seattle & Rainier Valley Makes Proposals

Proposal that it be relieved of the payment of a franchise tax after Jan. 1, 1927; that it no longer be required to carry policemen and firemen free, and that it be given an exclusive right to operate buses on Empire Way and Seward Park Avenue has been made to the City Council of Seattle, Wash., by the Seattle & Rainier Valley Railway. The railroad is already in arrears $70,000 on franchise taxes. It asks that the plan advanced by Councilman Oliver T. Erickson for the payment of this back tax be adopted. This plan provides that the income from transfers be converted and that the city agree that all such revenues be applied to franchise taxes already in arrears until the amount is paid.

In return for the concessions asked, the company agrees to pay up its delinquent franchise taxes, to reduce from 10 cents to 8½ cents, the fare charged for rides which include right of transfer to the municipal railway, giving the city a larger share of the fare collected in these cases, and to do certain paving between its tracks.

Date Set for Oral Arguments in Indianapolis Labor Case

The Indiana Public Service Commission has fixed April 29 as the date for oral arguments in the arbitration case of James Green, an employee of the Indianapolis Street Railway appealing to the commission on grievances including wages, working hours and changes of contract.

As a closing argument recently in support of his claim for arbitration of wage disputes the employers have submitted affidavits to the commission purporting to show that the railway actually earned $9.75 on each share of preferred stock last year. This was in contradiction to the report filed by the company with the commission. Howell Ellis, commissioner, directed the accounting department to study the two statements.

No-Accident Week in Boston a Success

The "no-accident week" conducted by the maintenance department of the Boston Elevated Railway, Boston, Mass., from March 7 to 12 was marred by only two accidents, as compared with four for the corresponding week of 1926. For the purpose of stimulating competition the department was divided into fourteen units, as follows: Surface lines, road; surface lines, Division 2; surface lines, Division 3; surface lines, Division 4; surface lines, central; rapid transit lines, road; building; equipment; service cars; signal division; tie and timber; George Street yard; steel erection; welding. All of these were free of accidents for week, excepting "equipment" and "tie and timber," each of which had one minor accident. There were 1,100 employees this year, as compared with 1,125 last year, therefore the ratios of employees to accidents were 555 this year and 281 last year.

Hearing on Binghamton Fare Petition

A public hearing was held on April 19 before Commissioner Brewster on petition of the receiver for the Binghamton Railway, Binghamton, N. Y., to increase fares on its lines in Binghamton, Endicott, Johnson City, Fort Dickinson and intervening territory. The present fare is 7 cents. The company seeks an increase to 10 cents cash fare or ten tickets or tokens for 75 cents. The commission is petitioned to "fix such other rate of fare as will in its judgment result in a fair return on the minimum possible value of the property determined in any way that the commission desires."

The city of Binghamton was represented by Herbert H. Ray, first assistant corporation counsel, who objected to the proceeding on the ground that the commission had no jurisdiction inasmuch as an action is now pending in the courts as to franchise limitation of fare in Binghamton. Mr. Ray said briefs in this proceeding would be filed with the Court of Appeals within a few weeks and argument would be made within ten days thereafter. Testimony was presented by Elmer F. White, auditor of the railway, as to the accuracy of statements filed with the petition. The villages of Endicott, Johnson City or Fort Dickinson were not represented. Adjournment was taken to May 16 at Syracuse in the Courthouse.

Property Owners Demand Trolley

Residents of the Gravesend section of Brooklyn prefer electric railway service to bus service so strongly that they have just helped subsidize an abandoned rail line to get it.

The line involved runs from Avenue U to Nostrand Avenue. It was abandoned some time ago by the Brooklyn-Manhattan Transit Corporation. Residents pleaded for return of service, and when the Brooklyn-Manhattan Transit suggested installation of a bus service they protested. Finally the Brooklyn City Railroad agreed to operate cars if the residents would put the track in condition. This they gladly agreed to do, putting up $10,000 for expenses. Service started on April 16.

Prospective Car Service Between Camden and Philadelphia

That the Philadelphia Rapid Transit Company, Philadelphia, Pa., is ready to start negotiations for the right to operate cars across the Delaware River Bridge between Camden and Philadelphia was announced on April 15 in a statement by W. K. Myers to the Bridge Joint Commission. Mr. Myers told the commission that the company had made an agreement with the Public Service Railway to lease the tracks recently authorized by the Camden City Commission in Fourth, Fifth and Mickle Streets on the New Jersey side. These would be connected with the bridge tracks and operated by a subsidiary of the Philadelphia Rapid Transit Company. Following a discussion of present and future toll rates the commission referred the proposal to the executive committee for future hearing. The decision was approved at the March meeting of the commission to notify the Penn-Jersey Rapid Transit Company, another P.R.T. subsidiary, that the bus operating agreement for the bridge would terminate July 1.

One-Man Car Study in Washington

The Public Utilities Commission of the District of Columbia began a study on April 16 of statistical data on the operation of one-man cars in the principal cities of the United States. This is in view of the warning of the Capital Traction Company and the Washington Railway & Electric Company that only an extended use of this type of car in the district would forestall an increase in fare. The former commission placed itself on record as opposed to any increase in the number of one-man cars.

Court Reduces Railroad's Highway Assessment

Assessments against the Missouri Pacific Railroad by Road Improvement District No. 1 of Franklin County, Ark., for the construction of a new highway obviously were arbitrary and excessive. So the United States Supreme Court held on April 18, thus upholding the lower court, although the case was reversed and remanded with instructions for new proceedings to determine the amount the railroad properly might be charged. The assessment was $75,686 and the Supreme Court holds that it should not have been in excess of $15,000. Rolling stock and other equipment of the railroad were included in the assessment. The high court held that while the railroad will benefit by the highway, in increased traffic, it also will have losses through automobile competition. It is left to the lower court to determine how much, within the maximum of $15,000, the railroad should pay.

Fitchburg Company to Operate Over Worcester Abandoned Line

The Fitchburg & Leominister Street Railway, Fitchburg, Mass., has decided to operate over the recently abandoned line of the Worcester Consolidated Street Railway between Fitchburg and Leominster for a 30-day trial to begin April 24. No attempt will be made to re-establish the service between Leominster and the Summit in Worcester.

News Notes

Excursion Season On.—The Interstate Public Service Company started on April 3 its first excursion of the season from Louisville to Indianapolis. These excursions have become a regular institution with the Interstate patrons. The excursions alternate each Sunday, the one on April 10 running from Indianapolis to Louisville. To advertise this service the company used four billboards located in various parts of Indianapolis, where thousands of people look upon them daily. The railway department has prepared a very attractive envelope enclosure that is being mailed out to about 2,500 producers and manufacturers in Louisville and Indianapolis.

Would Discontinue Service on One Line.—The Pacific Electric Railway has applied to the California Railroad Commission for permission to discontinue service, and to remove its tracks on its Urbita Springs line in San Bernardino County.

Token Sale Discontinued.—The Capitol District Transportation Company, Inc., bus subsidiary of the United Traction Company, Albany, N. Y., by special permission of the New York Public Service Commission discontinued on April 1 the sale of five metal tickets for 35 cents, each token good for one 7-cent fare. The company has an application pending for a 10-cent fare.

Fares Increased.—Application of the Bamberger Electric Railroad for an increase in passenger fares between Salt Lake City and Ogden has been granted by the Public Utilities Commission of Utah, on the showing that the gross income of the road has decreased from $184,597 in 1920 to $89,344 in 1926. The commission authorized an increase in both one-way and round-trip fares, amounting to approximately ½ cent a mile. On this basis the one-way fare between the two points will be raised, effective April 17, from $1 to $1.10, while the round trip rate will advance on the same date from $1.80 to $2. The increase does not in any way affect student fares, commutation fares and mileage books.

Motorman Pardoned.—Peter Tabor, a motorman on the lines of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., who had been sentenced to one year imprisonment for manslaughter in connection with an accident in which his car ran into a fire truck, killing one fireman and injuring several others, was granted a pardon recently by order of Governor Zimmerman. One newspaper had published a front-page editorial article stating that the punishment was too severe and alleging that the fire department was as much to blame for the accident as the motorman.

Ordinance Amendment Introduced.—At the request of the Pacific Northwest Traction Company, an ordinance has been introduced in the City Council of Seattle, Wash., amending the measure passed several months ago whereby the company was granted an extension of franchise to Jan. 1, 1950, and given the right to continue operation of its cars over the Westlake-Greenwood-Phinney Avenue municipal line and to extend its tracks on Stewart Street to its new terminal building at Eighth and Stewart. The proposed amendment provides that in event the city in the future should construct an elevated or subway along the route and require the railway to use the structure, the charge to the company should not exceed 25 cents per car-mile for the elevated or 40 cents for the subway.

Recent Bus Developments

Service Grows in Westchester

Leverett S. Miller, president of the County Transportation Company, a subsidiary of the New York, Westchester & Boston Railway, says the company's buses have been exceptionally well received and well patronized. Tentative plans are announced for electric railway abandonment in the Sound section of Westchester and the installation of motor coach service throughout this area of suburban cities and villages. Port Chester, N. Y., is the projected hub of the system. The carhouse of the New York & Stamford Railway in Port Chester is being converted into a modern terminal garage that will house upward of 74 motor coaches.

During March the County Transportation Company, a subsidiary of the New York, Westchester & Boston, made its appearance in the field of motor bus transit. On April 3 the local railway lines of the New York & Stamford Railway in Port Chester were abandoned and motor coach service was installed. On April 14 the County Transportation Company installed motor coach service for Milton Point in the Rye-Harrison-Rye Beach section of the county.

Indianapolis Street Railway Takes Over Peoples Motor Coach

The Indianapolis Street Railway, Indianapolis, Ind., asked permission of the Public Service Commission on April 16 to buy stock of the Peoples Motor Coach Company for $500,000. Filing of the petition followed agreement on the terms of sale between the railway and A. Smith Bowman, president of the coach company.

The petition declares that the street car company will merge the bus company and the railway to give the citizens of Indianapolis "adequate, sufficient, city-wide, comprehensive public service" and pledges that additions and extensions to the bus transportation system will be made "as public convenience and necessity may require." Due to independent operation, says the petition, there has been "a substantial and unnecessary duplication of expense" in furnishing required transportation, "which duplication could be eliminated by operating under a single management and with a single organization."

Robert I. Todd, president of the Indianapolis Street Railway, stated that the railway company was taking the Peoples Motor Coach Company over "as is." The present 10-cent fare schedule will remain in force until it can be determined just what has to be done.

The petition sets out that the railway company now operates about 30 buses and that the Peoples Motor Coach Company operates about 40 buses. The annual gross income of the motor coach company from passenger receipts is given as $425,000, and the net income as $15,000. Mr. Bowman said:

> Terms were agreed upon by the stockholders only with the distinct understanding that the present organization would be continued and the present service improved and extended. It will be a distinct advantage to Indianapolis if the present motor bus transportation provided by both the street railway company and the Peoples Motor Coach Company can be organized and operated together, with promise of such extension of lines and increase of service as shall be required by the growth of the city.

Charter Change in Louisville to Permit Bus Operation

Stockholders of the Louisville Railway, Louisville, Ky., have been asked by the directors to authorize a change in the charter of the company to enable it to operate buses, according to a letter sent out by James P. Barnes, president. This does not mean necessarily that the railway will go into the bus business, Mr. Barnes said. Buses are now operated through the Kentucky Carriers, an affiliated company.

The amendment which is proposed follows:

> 1. To operate direct or through subsidiary buses and other automobile vehicles supplementary to and also in co-ordination and conjunction with its rail lines for the carriage of passengers and freight within and without Louisville, Ky., to any extent that it may from time to time acquire local operating rights to do so, whether upon streets served with rail street cars or not so served to the end that it may furnish complete and comprehensive transportation for Louisville and its vicinity.
>
> 2. To acquire, buy, sell and transfer franchise and other operating rights.
>
> 3. To borrow money from time to time and to pledge its property and franchises to secure the various loans made by it.

Amended Contract Delays New York Bus Franchise

Another delay in the matter of awarding franchises for bus operation in New York City was necessitated on April 21 by the decision of the Board of Estimate to change the proposed form of franchise contract to give better protection in case the city should decide to recapture. Four weeks will be required under the law to advertise an amended form of contract. The board has set May 19 as the date when the bus matter will next come officially before it.

"Rubberneck" Service in Kansas City

Sightseeing bus tours of Kansas City are to be started on May 1, to run on twice-daily schedule and to begin each trip probably at the Union Station, according to a recent announcement of the Kansas City Public Service Company, operator of the railway and bus system.

The company will begin the service as the Kansas City unit of the Gray Line Motor Tours Association, under exclusive rights in the city.

Two buses will be assigned to the new service at the beginning. One of these, a single-deck coach of the street car type, and the other, a parlor coach, will start at 9.30 each morning, negotiating a 12-mile tour of the city in approximately one hour; beginning at 2 o'clock each afternoon one of these buses will cover a 25-mile tour in about 2½ hours.

Buses on Non-Profitable Runs.—The California Railroad Commission has granted a certificate to the Napa Valley Bus Company to operate auto stage service connecting Calistoga, Napa County, and Vallejo, Solano County, to be co-ordinated with the operation of train service by the San Francisco, Napa & Calistoga Railway, of which the bus company is a subsidiary. It is proposed to operate bus service in place of a number of non-profitable trains during the off-hours of traffic during the day, as a matter of economy to the railway and of convenience to the public. The commission denied the application of the California Transit Company for a certificate to operate auto stage service betwen Vallejo and Calistoga, finding the contention of public opinion in the Napa Valley that an unlimited bus competition would work disastrously to the railway is well grounded.

Petitions for Renewal of Bus Certificate.—In a petition filed with the Michigan Public Utilities Commission the South Shore Motor Coach Company sought renewal of the certificate of convenience and necessity granted in May, 1925, to operate intrastate passenger service between Benton Harbor, Mich., and the Michigan-Indiana state line, a distance of approximately 40 miles. This company is owned jointly by the Gary Railways and the Chicago, South Shore & South Bend Railroad. The recent service over this route, which is a part of a through route between downtown Chicago and Muskegon, Mich., consists of eight trips daily each way. Licenses for 35 motor coaches to be operated under the local permit are also sought in the company's application.

Bus Line on Madison Avenue Wanted.—A suggestion that Madison Avenue, New York City, be cleared of surface car tracks to make room for a bus line to be established for operation on Park Avenue was made on April 17 by the Fifth Avenue Association in a letter to the Board of Estimate. The association asked the board to delay decision on the award of bus franchises until the city had acquired the property and franchise rights of the Fourth and Madison Avenue surface lines, which have been offered to it by former Comptroller Charles L. Craig. The latter has options on this line and on the Ninth and the Eighth Avenue surface lines. The letter expressed general condemnation of the proposed bus system awaiting action by the Board of Estimate, in its discussion of the effect of the proposed crosstown routes on traffic on Park Avenue.

Asks Permit for Bus Line.—The Duluth-Superior Coach Company, a subsidiary of the Duluth Street Railway, Duluth, Minn., has asked for permission to operate a bus line between Superior and Duluth over the new Arrowhead bridge. The distance of the route is four-tenths of a mile. The company proposes to charge a 25-cent fare. The Minnesota Railroad and Warehouse Commission has taken the application under advisement.

Financial and Corporate

$2,500,000 Power Plant Sale at Kansas City

The sale of the power plant of the Kansas City Public Service Company, operator of the railway at Kansas City, Mo., was arranged between William G. Woolfolk, president, and Joseph F. Porter, president of the Kansas City Power & Light Company, purchaser of the plant, in a conference on April 14. The purchase price is announced as $2,500,000. Once the sale has been ratified by the Public Service Commission the railway will purchase power from the light company.

Anticipating the possibility of such a sale, the City Council inserted a provision in the recently voted railway franchise that any amount realized from the sale of the plant should be reinvested in the company's property within a period of twelve months.

According to Chester C. Smith, vice-president of the light company, two new frequency changers will be installed in the railway's plant, with a view to operating the railway from the Northeast power plant of the company in low-demand hours in the mornings. This would make it possible to shut down the railway plant six hours.

The amount to be realized from the sale is in addition to a sum of more than $1,250,000 which remains in the hands of the United States Court for the use of the company, said to be available within the next 60 to 90 days, after a similar amount in first mortgage bonds has been distributed among the personal injury claimants against the predecessor company, the Kansas City Railways.

Syndicate Takes B.-M.T. Bonds

Brown Brothers & Company, the Bankers Trust Company, J. & W. Seligman & Company and Hayden, Stone & Company, New York, were the purchasers of the $10,262,200 Brooklyn-Manhattan Transit Corporation 6 per cent bonds, due 1968, sold on April 19 by the War Finance Corporation. The bonds probably will not be offered to the public for several weeks.

The bonds acquired by the syndicate represent the balance of $19,000,000 bonds acquired by the War Finance Corporation on the reorganization of the B.-M. T. in 1923. The War Finance Corporation advanced $18,000,000 to the B.-M. T. in 1918 and on the reorganization acquired the $19,000,000 of bonds together with 25,000 shares of no-par $6 preferred stock in the B.-M. T. The preferred stock is still held by the War Finance Corporation.

Increased Excise Tax Bill Before Ohio Governor

The Ohio Legislature has passed the bill increasing the excise tax on certain public utilities from 1.2 per cent on gross intrastate receipts to 1.5 per cent. The bill is now before the Governor for his consideration and signature.

The utilities excise tax bill was a part of a program worked out by leaders of the Legislature to provide more revenue for the state. Other proposed items in the tax program include an increase in the gasoline tax of from 2 to 3 cents a gallon, an increase in the corporation franchise tax and the adding of ½ mill direct tax levy. The gasoline tax bill has passed the lower house. The direct tax revenue has passed both houses and the corporation franchise bill probably will be concurred in.

The increase in the excise tax will not affect electric railways as such, but will affect electric railways doing an electric light and power business.

International Utilities Would Buy Lethbridge Railway

An offer of $1,000,000 has been made to the city of Lethbridge, Alberta, Canada, by C. J. Yorath, Canadian representative, in behalf of the International Utilities Corporation, New York, for its 10½-mile railway system, electric light and power plants and all other capital assets. Another bidder for the Lethbridge Utilities is the Calgary Power Company. Both these proposals were turned down by the City Council.

Now the Calgary Power Company and the city are considering a proposal for co-operative conduct whereby the city would buy or sell power to the company as the situation warrants.

The International Utilities Corporation already controls the Canadian Western Natural Gas, Light, Heat & Power Company, familiarly known as the Calgary Gas Company, and the North Western Utilities, known as the Edmonton Gas Company.

Reorganization Terms Announced for Massachusetts Line

Conditions Reviewed Under Which Successor to Boston & Worcester Street Railway Will Be Organized—New Owners to Carry on Intensively, but Make No Predictions for Future

DETAILS have been announced of the plan for reorganization of the Boston & Worcester Street Railway, Framingham, Mass. The committee which drew the plan represents the first mortgage 20-year 4½ per cent gold bonds dated Aug. 1, 1903. Under the plan each depositor will receive the par value of his deposited bonds in new securities on the basis of 30 per cent in reorganization bonds, 30 per cent in preferred and 40 per cent in common.

The road appears to be in sore straits. This fact is not minced by W. Eugene McGregor, chairman of the bondholders' committee. Mr. McGregor says that the main problem of the officers of the successor company will be to adjust their policy to this situation created by the greater use of the private auto and the growth of the bus business. According to him the plan proposed provides means for the new financing necessary to convert "into realities whatever the possibilities may prove to be." While the situation is not such that the committee feels justified in making any predictions, there are possibilities. According to Mr. McGregor the fact that operation under receivership has shown a loss is neither surprising nor conclusive evidence of the future.

The chairman of the committee cites as bonds entitled to participate:

Boston & Worcester Street Railway first mortgage 20-year 4½ per cent bonds ($2,460,000 outstanding), accompanied by Aug. 1, 1923, coupons.

Framingham, Southborough & Marlborough Street Railway 5 per cent first mortgage bonds, dated Jan. 25, 1899 ($60,000 outstanding), accompanied by Aug. 1, 1923 coupons.

It is intended to form a new company in Massachusetts to acquire the property rights of the Boston & Worcester Street Railway and the property and rights, if any, now or formerly of the Framingham, Southborough & Marlborough Street Railway when sold under court authority.

The capitalization is subject to the approval of the Department of Public Utilities of Massachusetts. The engineer of the department has submitted a tentative estimate of $2,900,000. Using this as a basis, it is proposed that the new company shall have the following capitalization:

First mortgage 20-year 7 per cent bonds	$252,000
Reorganization bonds (to be secured by second mortgage)	756,000
Six per cent preferred stock	756,000
Common stock (an estimate merely, the total depending upon the total capitalization approved by the department)	1,388,000

A small amount, not exceeding $10,000, of 7 per cent prior preference stock may be issued. It is explained that this, if done, will be for the purpose of providing the directors of the new company with an additional possible medium for raising new money. It is further explained that under the Massachusetts statute it is important, if the use of such prior preference stock ever becomes practicable and desirable, that a few shares of such stock be issued at the beginning.

All the $252,000 of first mortgage bonds and part of the common stock are reserved for subscription, for the purpose of raising new money for expenses in connection with the receivership and reorganization, for working capital and for other purposes approved by the commission.

Bondholders who do not deposit their bonds will receive merely their pro rata share of the sale price less the expenses which are chargeable against this sale price. To provide the cash needed to pay non-depositing bondholders, a syndicate will receive in return

for the cash furnished for distribution to syndicate participants whatever the non-depositing bondholders would have received, including the rights to subscribe for first mortgage bonds with the common stock warrants.

The remaining $126,000 of first mortgage bonds and the remainder of the common stock are reserved for sale if the directors determine that the proceeds are necessary for the purposes of the new company. If sold before Feb. 1, 1929, these reserve bonds (each with a proportionate amount of common stock reserved) are first to be offered to holders of the warrant previously mentioned. Bonds so reserved which are not sold before that date will remain available for issue by the new company, but the common stock reserved and not utilized before that date will be distributed to holders of the warrants proportionately.

Assuming that all bondholders deposit their bonds and that the whole of the first half of first mortgage bonds is subscribed, the distribution of securities (on the basis of a capitalization of $2,900,000 plus the first mortgage bonds) will be as follows:

First mortgage 20-year 7 per cent bonds sold $126,000; available for future sale $126,000; total	$252,000
Reorganization bonds (to depositors on basis of $300 of reorganization bonds for each $1,000 of old bonds)	756,000
Six per cent preferred stock (to depositors on bonds of $300 preferred stock for each $1,000 of old bonds)	756,000
Common stock, to depositors on basis of $400 of common stock for each $1,000 of old bonds	1,008,000
Bonus with first half of first mortgage bonds (estimated)	190,000
Reserved as bonus for second half of first mortgage bonds if sold before Feb. 1, 1929, otherwise to be distributed to holders of warrants (estimated)	190,000

It is explained that the amount of common stock available for bonus depends on the decision of the Department of Public Utilities as to the capitalization.

It will be recalled that Franklin T. Miller, receiver of the company, applied to the Massachusetts Supreme Court some time ago for permission to curtail electric railway operation. In order to give the bondholders time to consider the adoption of the plan, Judge Crosby of that court has continued the petition to May 3.

Abandonment Sought in Auburn

At a meeting of stockholders of the Auburn & Syracuse Electric Railroad on April 15 it was decided to abandon as soon as possible all the railway lines operated by the company in the city of Auburn and from that city to Lakeside Park. The action was taken at the recommendation of the directors following the annual report for last year, which showed a net loss of $87,684. Passenger earnings have dropped from $265,090 in 1920 to $162,730 in 1926.

Had the company wished to continue operation of its lines in Syracuse it would be forced to meet expenditures totaling approximately $290,000 for track relaying, repaving and replacements.

City officials have announced their determination to oppose the company's plea for abandonment before the Public Service Commission unless adequate bus service is guaranteed. The city is served now by buses supplementing the railway lines. No definite provision has as yet been made for new buses under operation of the Auburn & Syracuse or other concerns.

Refunding in Denver

Tramway There Also Cuts Amount of Bonds Outstanding by $848,000 —Review of Operation

Arrangements were made recently by the Denver Tramway, Denver, Col., to reduce the outstanding funded debt of the corporation by $848,000 through a refinancing program arranged with Boettcher & Company and the International Trust Company, Denver. The plan provides that all of the company's first mortgage extended 6 per cent gold bonds and first mortgage improvement extended 6 per cent gold bonds, due April 1, 1927, and totaling $2,598,000 be acquired from the holders.

Upon acquisition by the company all of the bonds will be extended, with the mortgage liens by which they are secured, until Oct. 1, 1933, and will be deposited as collateral with the International Trust Company, trustee, as security for a new issue of $1,750,000 to be known as the Denver Tramway 6 per cent first (underlying) mortgage collateral trust sinking fund gold notes, which will mature Oct. 1, 1933.

The difference between the $2,598,000 in old securities to be acquired by the company and the $1,750,000 of the new issue represents a reduction of $848,000 in the funded debt in the hands of the public. The source of the funds necessary for this reduction was not disclosed in the company's statement, but the money is understood to be available from a cash fund set up through assessments levied on common stockholders at the time of the tramway reorganization in July, 1925, and from money carried over from the reorganization and accumulation of depreciation reserves.

The material reduction in the funded debt will not only increase the equity for the general and refunding bonds and the preferred stock but there will be a substantial saving in annual interest charges, which will be utilized to reduce further the liens prior to the junior securities.

Holders of the maturing bonds were given preferential opportunity to acquire the new notes on a 6.25 per cent basis.

In describing the new notes the tramway statement said in part:

The new collateral notes will be an unusually safeguarded medium-term investment at an attractive rate of interest, to be secured by a first lien on properties valued in excess of $5,900 for each $1,000 note, based on valuation of the United States district court, with earnings for 1926, before depreciation but after allowance for federal taxes, equal to 8.28 times the interest charges on all issues secured by underlying liens to be outstanding with the public after April 1, 1927.

Under this plan there will be outstanding with the public only $2,552,000 principal amount of issues secured by underlying liens on Oct. 1, 1933. Such underlying liens are followed by $6,443,500 principal amount of general and refunding mortgage bonds; $10,416,400 par value of preferred stock and 61,240.8 shares (no par value) common stock, now outstanding in the hands of the public. The depreciated value of all properties owned by system, as of Dec. 31, 1926, was $27,445,668, based on court valuation of $23,514,769 for the city transportation properties as of Dec. 31, 1922.

The $2,000,000 of Denver City Tramway 6s originally matured in April, 1919, at which time the issue was extended to April, 1924, and the interest rate increased from 5 per cent to 6 per

Conspectus of Indexes for April, 1927

Compiled for Publication in This Paper by
ALBERT S. RICHEY
Electric Railway Engineer, Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War	
				High	Low
Street Railway Fares* 1913 = 4.84	April 1927 **7.43**	Mar. 1927 **7.43**	April 1926 **7.36**	Fe 192 **7.1**	May 1923 **6.88**
Electric Railway Materials* 1913 = 100	April 1927 **148.0**	Mar. 1927 **152.1**	April 1926 **154.2**	Sept. 1920 **247.5**	April 1927 **148.0**
Electric Railway Wages* 1913 = 100	April 1927 **226.9**	Mar. 1927 **226.7**	April 1926 **224.7**	Sept. 1920 **232**	Mar. 1923 **206.8**
Am. Elec. Ry. Assn. Construction Cost (Elec.-Ry.) 1913 = 100	Apr.1 1927 **202.6**	Mar. 1927 **203.0**	April 1926 **201.3**	July 1920 **256.4**	May 1922 **167.4**
Eng. News-Record Construction Cost (General) 1913 = 100	April 1927 **209.0**	Mar. 1927 **208.8**	April 1926 **207.0**	June 1920 **273.8**	Mar. 1922 **162.0**
U. S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Mar. 1927 **145.3**	Feb. 1927 **146.4**	Mar. 1926 **151.5**	May 1920 **246.7**	Jan. 1922 **138.3**
Bradstreet Wholesale Commodities 1913 = 9.21	Apr. 1 1927 **12.53**	Mar. 1 1927 **12.55**	Apr. 1 1926 **13.11**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	Mar. 1927 **153.8**	Feb. 1927 **156.0**	Mar. 1926 **159.9**	July 1920 **219.2**	Mar. 1922 **138.7**
Nat. Ind. Conf. Bd. Cost of Living 1914 = 100	Mar. 1927 **164 1**	Feb 1927 **165.2**	Mar. 1926 **168.5**	July 1920 **204.5**	Aug. 1922 **154.5**
Steel Unfilled Orders (Million Tons) 1913 = 5.91	Mar. 31 1927 **3.553**	Feb. 28 1927 **3.597**	Mar 31 1926 **4.380**	July 31 1920 **11.118**	July 31 1924 **3.187**
Bank Clearings Outside N. Y. City (Billions)	Mar. 1927 **19.53**	Feb. 1927 **16.72**	Mar. 1926 **19.66**	Oct. 1925 **20.47**	Feb. 1922 **10.65**
Business Failures Number	Mar. 1927 **1852**	Feb. 1927 **1859**	Mar. 1926 **1888**	Jan. 1924 **2231**	Aug. 1925 **1353**
Liabilities (Millions)	**47 90**	**65.42**	**47 70**	**122 95**	**27 22**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 136 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

cent. In April, 1924, it was again extended to the present 1927 maturity with the 6 per cent interest continued. The bonds are a first mortgage on 103 miles and a second mortgage on 100 miles of the company's track.

The balance of the maturity is made up of $645,000 of Denver Tramway Power Company first improvement 6s, which originally came due in April, 1923, and were extended to April, 1924, also with an increase in interest from 5 per cent to 6 per cent. At the latter date a further extension to 1927 was secured.

Heaviest Traffic Ever

North Shore Road Again Breaks Records—Net Held Up Well —Improves Rolling Stock

Substantial progress was made in 1926 by the Chicago, North Shore & Milwaukee Railroad. According to the annual report of the company the volume of traffic, both passenger and freight, was the greatest in the history of the company and the gross revenue showed an increase of $718,197 over the previous year. The net income showed a decrease from the previous year of $49,203, owing to increased fixed charges resulting from heavy capital expenditures for additions to the physical property, particularly the building of the Skokie Valley route.

In 1926 the company carried 19,461,426 revenue passengers on its rail and auxiliary motor coach lines, an increase of 1,232,266 over the previous year. The freight business of the company totaled 656,754 tons, an increase of 120,659 tons over the previous year.

FACILITIES GREATLY INCREASED

The operating revenue was $7,568,362 and the gross income after deducting operating expenses and taxes was $1,814,290. The net income was $731,427. Dividends at the rate of 6 per cent on the $5,000,000 outstanding preferred stock and of 7 per cent on the $6,652,800 prior lien stock issued and outstanding amounted to $729,740. The report says:

> Construction of the new Skokie Valley route increased materially the fixed charges of the company, and while the new line greatly improved the Chicago-Milwaukee passenger service by reducing the running time of trains, and was a necessity because of the contemplated grade separation through the communities on the Shore Line route, some time will be required to develop the territory to make this line self-supporting.
>
> The outstanding feature of the year was the great increase in the facilities of the railroad to enable the company to give the public still better service, a policy which has been followed consistently under the present management.

Among the improvements made by the company during the year and noted in the report was the installation of an electrically operated refrigerator car service, said to be the first of its kind in regular use on any electrically operated railroad in the country.

A new method of handling freight in less than carload lots also was developed by the company during the year. It consists of specially built steel containers equipped with running gear, which after being loaded at the warehouse of the shipper are hauled through the streets by a tractor to the receiving stations of the railroad and there run on to flat cars to be hauled to their destination without having to dismount the bodies from the running gear. The method saves the time and cost of handling the merchandise at receiving stations.

ROLLING STOCK AUGMENTED

At the end of the year the railroad was operating 256 miles of single track, the opening of the new Skokie Valley route giving the company four main tracks from Chicago to Waukegan.

The company added to its rolling stock during the year twenty steel passenger coaches, three dining cars, five refrigerator cars and 24 freight cars. It now has a fleet of 47 motor coaches operating in connection with its rail lines and serving rural communities to a distance of 35 miles from the main railroad.

INCOME ACCOUNT OF CHICAGO, NORTH SHORE & MILWAUKEE RAILROAD FOR YEAR ENDED DEC. 31, 1926

Operating revenue:		
Passenger and special car revenue	$5,772,023	
Freight and express revenue	1,299,413	
Miscellaneous revenue	496,924	
		$7,568,361
Operating Expenses:		
Way and Structures	$507,586	
Equipment	410,955	
Conducting transportation	2,469,514	
Power	577,801	
Traffic	300,354	
General and miscellaneous	1,378,633	
		$5,644,845
Net revenue from railway operation		$1,923,516
Net auxiliary operating revenue		99,807
Net revenues from operations		$2,023,323
Taxes assignable to railway operation		400,837
Operating income		$1,622,485
Non-operating income		191,804
Gross income		$1,814,290
Deductions from gross income		1,082,863
Net income		$731,427
STATEMENT OF SURPLUS		
Surplus Jan. 1, 1926		$733,594
Add sundry adjustments, net		72,369
		$805,964
Net income, Jan. 1 to Dec. 31, 1926	$731,427	
Profit on sale of real estate	111,856	
	$843,283	
Dividends paid	729,740	
		$113,543
Surplus, Dec. 31, 1926		$919,507

COMPARATIVE INCOME STATEMENT OF CHICAGO, NORTH SHORE & MILWAUKEE RAILROAD

	1916	1920	1924	1925	1926
Operating revenue	$1,157,191	$4,193,669	$6,198,987	$6,850,165	$7,568,362
Operating expense	714,887	3,229,048	4,650,030	5,066,956	5,644,846
Net revenue—Railway operation	442,304	964,621	1,548,957	1,783,209	1,923,516
Net auxiliary operating revenue	.....	.....	800	86,994	99,807
Net revenue from operation	442,304	964,621	1,549,757	1,870,203	2,023,323
Taxes assignable to railway operation	66,038	151,746	298,609	408,255	400,838
Operating income	376,266	812,875	1,251,148	1,461,948	1,622,485
Non-operating income	6,208	10,332	60,155	151,673	191,805
Gross income	382,474	823,207	1,311,303	1,613,621	1,814,290
Fixed charges	237,996	390,196	610,583	832,991	1,082,863
Net income	144,478	433,011	700,720	780,630	731,427

$2,904,600 of Cleveland Railway Stock to Present Holders

Notices have gone out to the stockholders of the Cleveland Railway, Cleveland, Ohio, about the proposed increase in the stock of the company and outlining their rights to subscribe. Rights adhere to holders of record of April 1 to subscribe at par for 10 per cent of the amount of stock previously held. Subscriptions are payable one-quarter or more on or before July 1, 1927, one-quarter or more on or before Sept. 1 and the rest in one or more installments on 60 days notice from the company. The right to subscribe expires on April 25. A syndicate will take such stock as is not subscribed by present holders.

As indicated previously in the ELECTRIC RAILWAY JOURNAL, the Public Utilities Commission has approved the issue and sale of $2,904,600 of stock. The purpose of the issue is to finance these improvements:

100 street cars	$1,200,000
50 motor coaches	600,000
4 automatic substations with equipment	1,000,000
West 117th Street operating station	350,000
Track in Pearl, State and Broadview Roads	262,000
Service buildings	207,500
Miscellaneous	20,000

The total of these items is $3,639,500, but the company has stock unissued but heretofore authorized by the commission sufficient to take care of the difference between the present issue and the total of the improvements listed.

Chicago & Interurban Suspends

Abandonment of operation by the Chicago & Interurban Traction Company, known locally as the "Kankakee Line," has been formally announced by W. W. Crawford, receiver. Service over its 54-mile route between 63d Street, Chicago, and Kankakee, Ill., will cease on April 23, at 11.59 p.m.

The Illinois Commerce Commission approved the abandonment in an order entered on March 9 and the Circuit Court of Cook County confirmed the authority in an order issued by it under date of April 12.

High operating costs and falling revenue due to the competition of automobiles and motor trucks and the greatly improved suburban service furnished by the Illinois Central Railroad as a result of electrification last summer are cited by the receiver as the reasons for the failure of the company to meet operating charges. Hard roads parallel the line practically its entire length. Wages paid employees are on the same scale as those of Chicago Surface Lines employees—a basis very high considering the character of the company's operations.

About 130 employees are affected by the abandonment order. Several independent bus companies, including the Schappi Bus Company of Calumet City, Ill., have been granted permits to operate in the territory previously served by the railway.

Personal Items

Who's Who in Kansas City

Careers Reviewed of Principal Operating Officials of the Successor Company to the Kansas City Railways—Subordinates in the Management and Operating Departments Already Serving

WHEN the Kansas City Railways receivership was terminated last fall and the property turned over to the new owners, the Kansas City Public Service Company, William G. Woolfolk, president of the new organization, published a list of the operating officials who were to serve under him. At the head of this list was F. G. Buffe, general manager of the property throughout the receivership, who was elected vice-president in charge of operations. The other officials were all retained, although the titles of some were changed. A list of the official roster was published in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 23, 1926, page 786. Now that the reorganization of the company has been completed and the recently announced personnel is conducting the affairs of the successor to the Kansas City Railways under the new franchise, brief biographies of the principal operating officials are appended.

No. 1, W. G. Woolfolk
No. 2, F. G. Buffe
No. 3, P. C. Groner
No. 4, C. L. Carr
No. 5, N. S. Doran

William G. Woolfolk
President

After graduating from the Sheffield Scientific School of Yale University in 1899 Mr. Woolfolk sought employment with the General Electric Company and was placed in its Schenectady office. With two years of experience in the drafting room, testing department and power and mining engineering departments he went with the Knoxville Railway & Light Company as its general superintendent in charge of operation and reconstruction. He served in this capacity for three years, resigning in 1905 to become superintendent and chief engineer of the Philadelphia & West Chester Traction Company, operating a high-speed interurban service.

In 1906 Mr. Woolfolk entered the employ of Sanderson & Porter, engineers of New York and San Francisco, as an executive engineer. He served as assistant to President E. N. Sanderson of what is now the Republic Railway & Light Company, transacting general light, power and gas business for urban and interurban railway service in Youngstown and Niles, Ohio; Sharon and New Castle, Pa., and surrounding territory. In this capacity he had charge of the operation and reconstruction of these properties.

In 1909 he became financially interested in the Old Dominion Development Company, developing, constructing and operating coal mines in Virginia. As vice-president of this company he not only managed the property but spent a great deal of his time in the mines directing the work of the men. Later he joined again the firm of Sanderson & Porter. That was in 1913. The following year this firm opened a Chicago office and Mr. Woolfolk was placed in charge as Middle Western manager. Because of his wide experience in engineering fields the United States government in 1918 appointed Mr. Woolfolk chief of section in the chemical and explosive division of the War Industries Board at Washington, D. C., and in 1919 he was retained by the government and devoted six months in charge of salvaging surplus material for the Emergency Fleet Corporation. He returned to Chicago in the fall of 1919 and founded the firm of William G. Woolfolk & Company, Inc., transacting a general engineering business. This firm is still functioning and Mr. Woolfolk is its active head.

During the last eight years Mr. Woolfolk has served as consulting engineer to many utilities. In the ordinary course of business Mr. Woolfolk was invited to serve as adviser to the reorganization committee of the Kansas City Railways. Following the formation of a new company Mr. Woolfolk was elected president. The committee felt it needed a man of his experience and ability to refinance and reconstruct the electric railway property of Greater Kansas City.

Fred G. Buffe
Vice-President in Charge of Operation

Fred G. Buffe, who was elected to the office of vice-president in charge of operation, entered the public utility field in 1908, being first employed by H. E. Chubbuck, then vice-president executive of the Illinois Traction System. He remained with this organization until 1917, first serving as publicity manager and later as assistant to Mr. Chubbuck. He went to the Kansas City Railways in 1917 as assistant to President Philip J. Kealy. In 1919, when James Gibson, general man-


A. E. Harvey


R. W. Bailey


D. L. Fennell


E. E. Stigall


H. H. Cloyd

ager of the property, resigned, Mr. Buffe was appointed general manager. He served in this capacity until the receivership, and one of the first official acts of Senator Wilson and Colonel Fleming, as receivers, was to select Mr. Buffe as their general manager. Last October when the new company took charge of the property he was appointed to his present official position.

The present official and operating organization of this property, recognized as one of the finest in the country, was organized and built up largely through Mr. Buffe's efforts. He is the author of the Employees' Representation Plan, inaugurated there in 1919, which has been copied and placed in effect in many other cities. Mr. Buffe was also responsible for the organization of the Brotherhood and many other employee co-operative activities extant on the property.

Mr. Buffe has a wide acquaintance in utility circles, and is well known throughout the United States through his activities in railway association work. He is the author of numerous papers and articles on electric railway and bus subjects and has addressed many meetings of railway executives and employees in the last ten years.

He was born in Franklin, Morgan County, Ill. He attended Whipple Academy and Illinois College and is a graduate of Illinois Wesleyan University and the Kansas City School of Law. Although admitted to the bar of Missouri, Mr. Buffe has never practiced.

After leaving college he engaged in newspaper work as reporter for the Denver *Post* and the Denver *News and Times*. Later he became part owner and managing editor of the Peoria *Herald Transcript*. It is this experience that has enhanced his reputation as a public speaker, made him one of the best public relations men in the electric railway industry and made his formal presentation of transportation subjects not only forceful but also colorful.

Powell C. Groner
General Counsel

Powell C. Groner acted as counsel for the reorganization committee of the Kansas City Railways and at the termination of the receivership was appointed general counsel for the present company. He is one of the youngest executives in the street railway field and his outstanding work in connection with the reorganization of this property stamps him as a brilliant corporation attorney.

He was born at Norfolk, Va., Feb. 13, 1892. He received his academic and law education at the University of Virginia, specializing in corporation and public utility law, and was graduated from that famous institution with the class of 1913. From the date of his graduation until 1922 Mr. Groner engaged in general practice in both New York and Chicago, representing the Fifth Avenue Coach Company, among others, during that period. In 1922 he joined the firm of Newman, Saunders & Company, Inc., public utility operators and investment bankers, and has been a member of that organization since then.

C. L. Carr
General Solicitor

Charles L. Carr became connected with the street railway property in October, 1918, as an assistant trial attorney and later became the trial attorney, trying cases in the trial courts and briefing and looking after same on appeals to upper courts.

When Clyde Taylor resigned as general counsel, the latter part of 1919, Judge Richard J. Higgins, who had been general solicitor, was made general counsel and Judge Higgins transferred Mr. Carr from the trial department to the general counsel's office as his assistant. Mr. Carr served in this capacity until shortly after the commencement of the Kansas City Railways' receivership on Sept. 9, 1920, when Judge Higgins resigned as general counsel and became attorney for the trustees under the first mortgage of the Kansas City Railways. At the same time Judge Kimbrough Stone appointed Judge James E. Goodrich as general counsel for the receivers and Judge Goodrich in turn selected Mr. Carr as his assistant.

Mr. Carr was born in Quincy, Ill., on April 1, 1890. He was graduated from the Quincy High School in 1909 and that same year entered the Northwestern University at Evanston and Chicago, Ill. He was graduated from the liberal arts department of the University at Evanston in 1913 and from the law department in Chicago in 1915. From October, 1915, until October, 1918, he was deputy circuit clerk of Kansas City, Mo., assigned to Division No. 3.

Rufus W. Bailey
General Superintendent of Maintenance

Rufus W. Bailey on Oct. 15 last assumed charge of the power generation and distribution departments, the way and structures, equipment and bus maintenance departments. In addition to these duties Mr. Bailey will supervise all methods and standards, the laboratory, power conservation, electrolysis investigations, surveys and studies. He went to the Kansas City Railways under F. G. Buffe as assistant to general manager in charge of the Kansas properties in 1919. Early in 1920 he took over the distribution work and in December of the same year assumed charge of the power plant. When H. S. Day resigned in 1922 Mr. Bailey took over the shops and mechanical departments and a little more than a year later, when R. L. Weber left the organization, the research and engineering departments were placed under his supervision.

Under Mr. Bailey's direction the power and equipment departments have reached a high state of efficiency, hundreds of improvements have been made both in working conditions and types of


J. D. Cornell


C. A. Kincade


L. R. Carson


H. M. Smith


H. W. Smith

machines used, and plant accidents have been reduced to a minimum. Many of the safety features incorporated on the buses purchased a year ago by the receivers were invented and patented by Mr. Bailey. He also has applied for patents on the new periscopes and loud speakers now in use on the Kansas City buses.

Mr. Bailey was born in St. Louis, Mo., on Aug. 22, 1877. He was graduated from the high school there and attended the University at Providence, R. I. During vacation periods he was employed by the old Sixth Street car line and the Olive Street line in St. Louis. For two years after leaving school he did erecting work for both the General Electric and Westinghouse companies out of St. Louis, building numerous electric light plants for them.

He served in Cuba throughout the Spanish-American War.

In 1900 Mr. Bailey joined the East St. Louis & Suburban Railway as superintendent of construction. He served in various capacities with this organization, finally being appointed general superintendent of the Alton Division. In this position he also acted as supervisor of a number of properties owned by the E. W. Clark interests. In 1907 he went with the McKinley interests in Peoria and was general superintendent there until he went to Kansas City in 1919.

Neal S. Doran
Comptroller and Assistant Treasurer

Neal S. Doran, comptroller and assistant treasurer of the Kansas City Public Service Company, first went to Kansas City in 1893 as auditor of the Texarkana & Fort Smith Railroad. He later was connected with various construction companies in building the Kansas City Southern Railway, the Suburban Belt Railroad and the Kansas City & Independence Air Line. He was appointed secretary and auditor of the Kansas City, Mexico and Orient Railroad at its organization in 1901 and continued in that same capacity until June 1, 1920. On that date he was appointed auditor of the Kansas City Railways and remained in that position throughout the receivership.

Mr. Doran was born on July 4, 1870, in Iowa. He received his education in the Pittsburgh, Pa., schools.

Ernest E. Stigall
Purchasing Agent

Ernest E. Stigall entered the employ of the Kansas City Railways & Light Company in May, 1904, in the accounting department of the light and power division. In 1909 he was appointed cashier and chief clerk of the light and power company and in May, 1911, was promoted to the position of purchasing agent for the Kansas City Railways & Light Company.

Following the granting of a new franchise in 1914, which provided for the separation of the Kansas City Railways from the light and power company Mr. Stigall was appointed purchasing agent for the Kansas City Railways and he has remained with the organization in the same capacity since that time.

Mr. Stigall was born in Stewartsville, Mo., on Dec. 24, 1883. He was graduated from William Jewell College at Liberty, Mo., in 1903 and in the same year went to Kansas City and took a course in Spalding's Commercial College.

A. E. Harvey
Chief Engineer

A. E. Harvey is a graduate of the University of Illinois, having received his degree in 1891. In 1894 he received the degree of C. E. from the University of Illinois. During his college vacation periods and for two years after graduating Mr. Harvey sought employment with firms where he could gain construction and engineering experience and in April, 1894, was employed by the Illinois Central Railroad in numerous capacities, from that of instrument man to division engineer and road master. In April, 1902, he entered the employ of the Chicago Great Western Railway as division engineer in charge of maintenance and construction. From April, 1905, until February, 1906, Mr. Harvey held similar positions with the Illinois Central Railroad and the St. Louis & Iron Mountain Railroad. In February of 1906 Mr. Harvey became associated with R. A. Elzy in the general railroad contracting business. From 1908 until 1910 Mr. Harvey was superintendent of the Western Division of the Chicago Great Western Railroad in charge of operation and maintenance and from 1910 until early in 1911 was division engineer for the Kansas City Southern Railway. In April, 1911, Mr. Harvey entered the service of the Metropolitan Street Railway as chief engineer and he has been on the property since that date in the same capacity but under different titles. At present he has charge of the construction work of the Kansas City Public Service Company.

Daniel L. Fennell
General Superintendent of Transportation

Daniel L. Fennell is the only operating official of the company who has never been employed by any other than the railway organizations of Kansas City. During his summer vacation periods of 1902 and 1903, Mr. Fennell was employed as a material clerk on track construction. In June, 1904, he entered the service permanently, being employed as a rodman in the engineering and construction department. While still in this department he served for several months as assistant foreman on track construction. In 1905 he was appointed time keeper and material clerk on track and power plant construction, remaining in this capacity until 1907, when he was transferred to the shops as chief clerk under the master mechanic.

It was on May 1, 1909, that Mr. Fennell joined the transportation department and his first position was assistant division superintendent at 48th and Harrison, the largest division on the property. On June 1, 1910, he was promoted and made division superintendent at 31st and Holmes, remaining there until Oct. 1, 1912, when he was transferred back to 48th and Harrison as division superintendent. The next promotion came on Dec. 13, 1913, when he was made secretary and assistant to the general superintendent. He was appointed superintendent of traffic on Dec. 1, 1916, and organized the present traffic and schedule department.

Mr. Fennell became assistant superintendent of transportation on May 16, 1918, and from Dec. 1, 1918, until March 1, 1919, served as acting superintendent of transportation. On the latter date he received a permanent appointment as superintendent of transportation, and since then has served continuously in the same capacity. For a number of years he has been an officer of the Kansas City Safety Council and the present success of that organization is in a great measure due to his efforts. He was also one of the organizers of the Mid-West Electric Railway Association and served as its first president. Mr. Fennell is 40 years of age.

Hardy H. Cloyd
Assistant to Mr. Buffe

Hardy H. Cloyd was first regularly employed as construction foreman for an Omaha contractor and in this capacity he had charge of the construction of a number of electric light plants in Nebraska and Oklahoma. Later he moved to Trenton, Mo., where, after rebuilding the gas and electric plants, he was appointed local manager for the holding company. He occupied this and other similar positions with the same company until moving to Kansas City in 1911. His first position there was with the electric light company, but later he was transferred to the railway company in charge of the metering equipment. He has since been connected with various departments and in different capacities, going into the general manager's office in May, 1924, as statistician.

Mr. Cloyd, was born in Hastings, Neb., on Aug. 26, 1883, and lived there until after finishing his education, which included a two-year university course in electrical engineering. He spent his vacations and other spare time while attending school working in a small foundry and machine shop, which, in addition to a general repair shop, manufactured a line of small electric motors.

J. D. Cornell
Freight Traffic Manager

J. D. Cornell began his railroad work in 1890 in the car accountant's office of the Chicago, Burlington & Quincy Railroad at St. Joseph, Mo. From 1892 until 1900 he was employed in the accounting department of the St. Joseph & Grand Island Railway at St. Joseph. He went to Kansas City in 1900 and for seven years served in the general freight department of the Kansas City Southern. In 1907 he was selected to take charge of the compilation of tariffs for the Southwestern Tariff Committee at St. Louis, and he served in this capacity until 1910, when he became traffic manager of the Rock Island Southern Railway (Electric) at Davenport, Iowa.

During 1905 and for several years following Mr. Cornell served as traffic manager of the Joplin & Pittsburgh Railway and the Southwest Missouri Railway, electric interurban roads op-

erated in the metal mining district of Missouri. He has held the position of freight traffic manager at Kansas City for the last seven years.

C. A. Kincade
Superintendent of Distribution

C. A. Kincade entered the service of the Metropolitan Street Railway, Kansas City, on May 22, 1900. His first work with this company was as a gripman on the old Twelfth Street cable line. In September, 1903, he was promoted to the position of assistant superintendent of the Twelfth Street division and as such his duties included the handling of trainmen and carhouse men as well as the work now taken care of by the timekeeper and cashier. Mr. Kincade was transferred to the electrical department in September, 1904. In 1905 he was appointed assistant to the electrical engineer. At that time his work included timekeeping and power despatching as well as clerical and general office work. Still in the capacity of assistant electrical engineer, in 1907 Mr. Kincade was placed in charge of all overhead and underground construction and maintenance work. At that time the power houses and substations were handled by his department.

In March, 1918, he was appointed superintendent of the electrical distribution department and he has handled those duties since then. On May 22 next Mr. Kincade will celebrate his twenty-eighth anniversary as an employee of this property.

Mr. Kincade was born and reared in Mason County, West Virginia. He removed to Kansas City in 1900.

Howard W. Smith
Superintendent of Way and Structures

Howard W. Smith was employed in various capacities with road surveying parties in both the states of Michigan and Missouri from 1902 to 1906. In the latter year and until 1909 he was resident engineer in the construction of the Pacific Coast extension of the Chicago, Milwaukee & St. Paul in Dakota and Montana.

Mr. Smith was first employed by the street railways in Kansas City in 1911 as assistant engineer of the way and structures department and he has been in that department continuously since that date with the exception of four months in 1918 in war service. In 1916 he was appointed assistant superintendent of way and structures and served in that capacity until last October, when he was appointed superintendent of the department, reporting to R. W. Bailey.

Mr. Smith was born in Grand Rapids, Mich., in 1883 and lived there until 1903, when he moved to Kansas City.

R. S. Neal
Superintendent of Equipment

R. S. Neal, superintendent of equipment, went to the Kansas City Railways on March 16, 1918, from the Kansas City Power & Light Company and was first employed in the way and structures department. Following several assignments in the engineering field, he returned to the Kansas City Railways on Nov. 12, 1920, to take charge of the engineering work for the mechanical department. He organized the engineering department, which includes all the designing work, making up of specifications, shop work plan and general drafting work. This position he held until April 1, 1922, when he was appointed assistant superintendent in charge of the mechanical department, reporting to R. W. Bailey.

J. A. Harder

L. M. Boschert

D. E. Druen

Harry M. Smith
Assistant Superintendent of Transportation

Harry M. Smith entered the electric railway field as a despatcher with the Lorain & Cleveland Railway, Toledo, Ohio. This was not a big property and Mr. Smith, after several years of experience, was appointed auditor of the road, holding that position until it was merged with the Lake Shore Electric Railway, which operated between Cleveland and Toledo. Following the merger Mr. Smith was appointed chief train despatcher and later division superintendent. After six years with this property Mr. Smith was employed by J. M. Bramlette of the Michigan United Railways as interurban superintendent. This property operated in the city of Battle Creek, and from Jackson to Kalamazoo, a distance of about 70 miles. He held this position for seven years, when he resigned to accept an offer as superintendent of the Mexico Tramway in Mexico City, Mexico. He remained with this road for five years and then returned to the states and went direct to Chicago, serving for a year and a half as director of service for the Willys-Overland Company.

One day in Chicago Mr. Smith met his old friend J. M. Bramlette, who was then with the Lincoln Traction Company of Lincoln, Neb., and Mr. Bramlette prevailed upon him to return to the electric railway field as his superintendent of transportation. After three years at Lincoln, Mr. Smith went to Kansas City and in November, 1919, joined the organization as assistant superintendent of transportation, the same position he now holds.

Mr. Smith was born in Swanton, Ohio. He received his high school education in Toledo.

I. R. Carson
Assistant Superintendent of Transportation

I. R. Carson went direct from a farm in Ellsworth County, Kansas, to Kansas City and a year or so later he entered the service of the Metropolitan Street Railway on May 30, 1906, as a motorman serving in that capacity until 1911, when he was made day office clerk. The next year he became the assistant division superintendent at Ninth and Washington and in 1913 was transfrred back to 48th and Harrison as assistant division superintendent under D. L. Fennell, who is now at the head of the entire transportation department.

In 1914 Mr. Carson was appointed superintendent of the Kansas City & Westport Belt Railway, a subsidiary of the old Metropolitan Street Railway. In 1915 he was transferred back to Ninth and Washington as division superintendent, where he remained until July 1, 1918, at which time he was placed in charge of work trains and freight service. Exactly a year later, on July 1, 1919, he was appointed assistant superintendent of transportation. He has held that position continuously since then. Mr. Carson was born in Brooklyn, N. Y.

E. W. Holmes Promoted at Buffalo

Edward W. Holmes has been appointed assistant treasurer and assistant secretary of the International Railway and International Bus Corporation, the railway subsidiary, Buffalo, N. Y. Mr. Holmes brings to the post a wealth of transportation experience, having been engaged in the business for practically his entire career. In 1906 he became connected with the company as a clerk in the auditing department. Through successive promotions he became secretary to the president, at that time Thomas Penney. When Mr. Penney resigned in 1912, Mr. Holmes continued as secretary, as well as office manager of the legal department. From 1921 to 1924 he occupied the position of secretary to the International Railway voting trust, and continued there until his apointment to his new position.

E. G. Grimes is serving as division superintendent of the Union Traction Company at Marion, Ind. He joined the forces of this company in 1907, working on the Broad Ripple line for three years. He was then promoted to interurban conductor. When in the fall of 1917 C. S. Keever was appointed superintendent of transportation he appointed Mr. Grimes division superintendent at Fort Harrison. After this position was abolished Mr. Grimes was made instructor on all divisions and afterward was made freight claim investigator.

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

Action on Fifteen Cars for San Francisco Expected

The public utilities committee of the Council of San Francisco, Cal., on April 15 postponed until its next meeting action on a recommendation by the Board of Public Works that $290,000 be set aside for the purchase of fifteen new cars for the projected Judah Street line of the Municipal Railway.

Completion of the line, in connection with the new Duboce tunnel, is partially contingent upon approval of proposed municipal line extensions at the coming bond issue election. It was said at the meeting, however, that the line might be completed out of the railway funds if the issue should not be approved by the voters. Investigation of this possibility was ordered before the next meeting.

It was explained that the cars should be ordered eight months in advance of the expected date of their need in order to insure delivery on time. Action on the matter is not expected to be longer delayed.

Economic Trend to Be Discussed at Chamber of Commerce Meeting

President Coolidge and Secretary of Commerce Hoover will be among the speakers who will address the fifteenth annual meeting of the Chamber of Commerce of the United States to be held in Washington May 2 to 5. This national gathering of business leaders from all parts of the United States has been called to discuss the important economic changes that have taken place in the business life of the nation during the past few years. The discussions will center around the major topic "The New Business Era."

President Coolidge's talk will be delivered before a joint meeting of the national Chamber of Commerce and the Pan-American Commercial Conference. The latter conference will be attended by representatives from the Latin-American countries and will be held in Washington during the week of the meeting of the national chamber.

In many respects the meeting will be one of the most important ever held by the chamber. A statement says:

American business, sweeping forward under the play of new economic forces, finds it more necessary than ever to look into the future. What do changes that are taking place foretoken? How sharp is the break from the conditions before the war? In what direction are we headed? Are we approaching ever more important readjustments than we have seen in the recent past?

The new business era demands the careful weighing of many problems. It calls for study of complicated relationships. Trades and industries are entering new fields. Business units and conditions are changing. New points of contact with government and within commerce and industry are being developed.

Business is achieving so many new things even the best observers cannot keep abreast of them all. Industries are changing with new inventions and the application of new methods. Selling goods at home and abroad is bringing out new features of distribution.

The annual meeting of the national chamber will survey economic trends with the purpose of determining their meaning, with the hope of throwing light into the future. Leading business men will bring forward new problems within their industries. Newly arising questions that are bothering large sections of the country will be discussed.

Simplified Invoice Drafted by U. S. Commerce Committee

Accompanied by an acceptance blank, the simplified invoice recently adopted by the joint committee of invoice simplification is being distributed by the Department of Commerce. The new invoice was unanimously chosen by the committee at a meeting held Feb. 16 and is the result of a series of meetings held during the past few months. The committee has given considerable study to the problems of the vendor and the customer, and it is of the opinion that all contingencies and the best features of both the uniform and the national standard have been taken care of in the form now circulated in the mails. In addition to the invoice set up as shown elsewhere on this page, the committee has circulated the following instructions:

To conform to standards:

"Customers' Use" block must be exactly as shown.

Designations must all be shown.

Sequence and position of designations must be as shown.

Sizes—8½ in. from side to side; 7, 11, and 14 in. from top to bottom.

Optional for user's convenience:

Size and arrangement of space for vendor's name, address, trademark, etc., may be changed as desired.

Spacing both horizontal and vertical to left of both Customers' Use block may be changed if desired.

"Ship To and Destination" may be arranged for window envelopes.

"Quantity," "Description," "Price," and "Amount" columns may be subdivided as desired.

Invoices for retailers should provide a column ⅞ in. wide to the right of the "Amount" columns and headed "For Retailer's Use."

Another note reads: "In case of multiple billing, provide columns here for order number. If not so used, this space may be added to the width of the other columns." The space indicated is at the left of that portion of the form used for detailing items. The committee also requests that the users of either standard or uniform forms adopt the simplified invoice form when the supply of their present forms is exhausted.

D. H. Moore Promoted by Ohio Brass

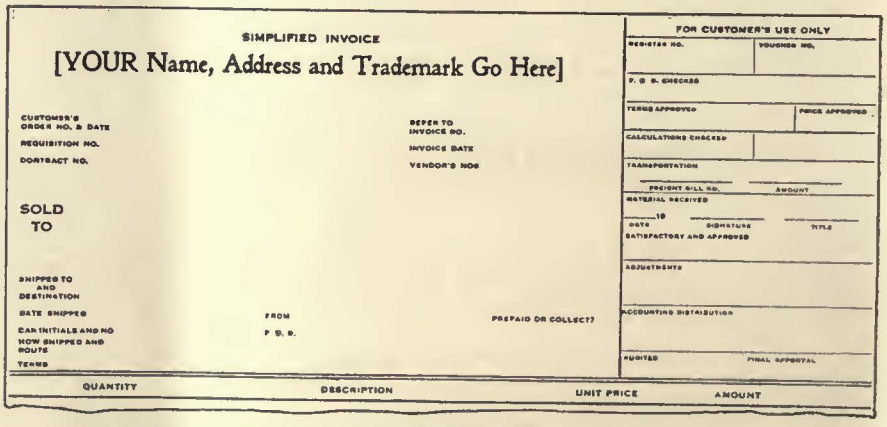
David H. Moore, since 1925 electrical engineer and assistant to the secretary of the Ohio Brass Company, Mansfield, Ohio, has been appointed district sales manager of the company with headquarters at 50 Church Street, New York City. Mr. Moore's appointment took effect March 21. He will handle steam railroad accounts in parts of New York, New Jersey, Pennsylvania and the New England states.

Before going to the Ohio Brass Company Mr. Moore spent seven years with Day & Zimmermann, Inc., Philadelphia, in consulting and general engineering work. For eight years prior to that he was connected with the Schenectady and Pittsfield Works of the General Electric Company.

Seattle's Mayor Wants Car Bonds Sold Locally

Mayor Bertha K. Landes of Seattle, Wash., has suggested that since the city has been unable to reach any agreement with the St. Louis Car Company in regard to its taking city bonds in payment for 80 new cars contracted for by the Municipal Railway the bonds be sold locally. She says this plan would speed up the purchase and enable the city to buy the cars at a lower figure.

The Mayor said that after conferring with representatives of the car company and St. Louis bankers she was convinced that a deadlock had been reached. The company is unwilling to take the bonds without a priority agreement in view of the litigation pending against the railway in the federal courts. The issue totals $1,420,000.



SIMPLIFIED INVOICE

[YOUR Name, Address and Trademark Go Here]

CUSTOMER'S ORDER NO. & DATE
REQUISITION NO.
CONTRACT NO.
REFER TO INVOICE NO.
INVOICE DATE
VENDOR'S NOS
SOLD TO
SHIPPED TO AND DESTINATION
DATE SHIPPED
CAR INITIALS AND NO
HOW SHIPPED AND ROUTE
TERMS
FROM
F. O. B.
PREPAID OR COLLECT?

FOR CUSTOMER'S USE ONLY
REQUISITION NO.
VOUCHER NO.
P. O. CHECKED
TERMS APPROVED
PRICE APPROVED
CALCULATIONS CHECKED
TRANSPORTATION
FREIGHT BILL NO.
AMOUNT
MATERIAL RECEIVED
DATE
SIGNATURE
TITLE
SATISFACTORY AND APPROVED
ADJUSTMENTS
ACCOUNTING DISTRIBUTION
AUDITED
FINAL APPROVAL

QUANTITY	DESCRIPTION	UNIT PRICE	AMOUNT

New simplified invoice unanimously adopted by joint committee on invoice simplification

Manhattan & Queens Railway Relocating Tracks

Work of relocating the track of the Manhattan & Queens Traction Corporation on Queens Boulevard, Borough of Queens, N. Y., has begun. The Eastern Construction Company, New York, is doing the work. It calls for relocating the tracks from Van Dam Street, Long Island City, through the communities of Winfield and Woodside to Fifty-sixth Avenue, Elmhurst, L. I.

At present, following the path of the old Queens Boulevard, the tracks of the railway alternate between the southbound and northbound side of the vehicular roadway. When the present work is completed and the old tracks removed those sections will be repaved and then two wide highways with one-way traffic on each will be available for motorists.

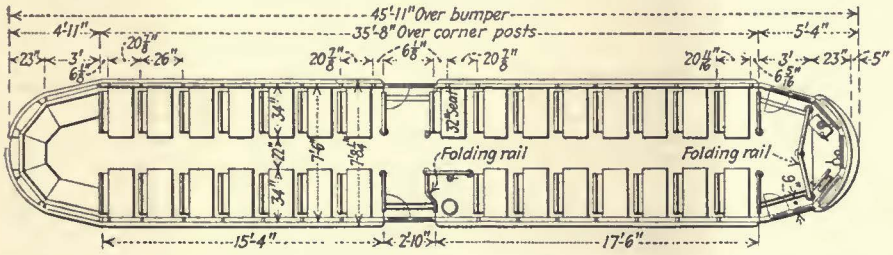
Porto Rico Railway Gets Six New Two-Man Cars

Following are specifications of the six new two-man, single-end cars delivered on March 3 to the Porto Rico Railway, Light & Power Company, San Juan, Porto Rico, by the Perley A. Thomas Car Works of High Point, N. C.:

Date order was placed	Oct. 14, 1926
Date of delivery	March 3, 1927
Type of car	Single-end, front-entrance, center exit, two-man
Weight:	
Car body	14,500 lb.
Trucks	8,278 lb.
Equipment	6,222 lb.
Total	29,000 lb.
Bolster centers, length	26 ft. 0 in.
Length over all	45 ft. 11 in.
Truck wheelbase	5 ft. 2 in.
Width over all	7 ft. 8½ in.
Height, rail to trolley base	10 ft. 7⅜ in.
Body	All steel
Interior trim	Mahogany
Headlining	Agasote
Roof	Arch
Air brakes	General Electric Co.

Interior view near center door of new 65-passenger cars for the Porto Rico Railway, Light & Power Company

Axles	Taylor Electric Truck Co.
Bumpers	Channel
Car trimmings	Thomas
Center and side bearings	Taylor Electric Truck Co.
Conduits and junction boxes	Duraduct
Control	General Electric K-75-A
Couplers	Car builder
Curtain fixtures	Curtain Supply Co.
Curtain material	Pantasote, double-faced
Destination signs	Hunter
Door operating mechanism	Car builder
Fare boxes	Johnson
Fenders	Consolidated
Finish	Duco
Gears and pinions	General Electric Co.
Hand brakes	National Brake Co.
Headlights	Electric Service Supplies Co.
Journal bearings	Taylor Elec. Truck Co.
Journal boxes	Taylor Elec. Truck Co.
Lightning arresters	General Electric Co.
Motors	G.E.264-A, inside hung
Sanders	Ohio Brass Co.
Seats	Heywood-Wakefield Co.
Seating material	Leather
Springs	Taylor Electric Truck Co.
Step treads	Kass
Trolley catchers	Ohio Brass Co.
Trolley base	General Electric Co.
Trucks	Taylor Electric Truck Co.
Wheels	Cast iron, 24 in.



Commodious seating plan for cars

Track Improvement Begun by East Chicago, Ind., Railway

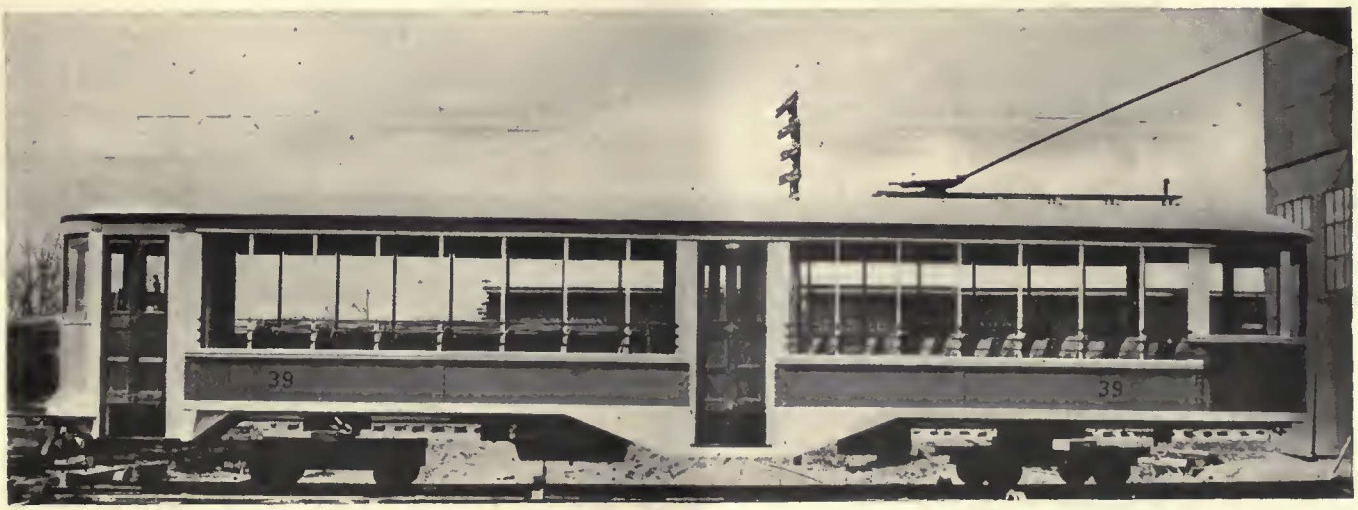
Improvement of its right-of-way on Forsyth Avenue in East Chicago, Ind., from 150th Street to the northern city limits, a distance of about 3½ miles, is being made by the Hammond, Whiting & East Chicago Railway. The project includes realignment and paving of tracks over the entire route, according to Charles E. Lawrence, general manager.

At the request of property owners along Main Street, East Chicago, and the Board of Public Works, officials of the railway and of the Gary Railways are also considering plans to pave their right-of-way along that street. Due to the narrowness of the thoroughfare and the parking of automobiles along the curb, motorists are compelled to use the tracks. Property owners have asked the companies to pave the right-of-way in order to furnish a well-paved thoroughfare from curb to curb.

Heavy Buying in the Copper Market

A large volume of copper buying after seven weeks of unusual dullness was the outstanding feature of the non-ferrous metals market for the week ended April 20. On this date the price seems to be fairly well established at 13¾ cents delivered in Connecticut. Business in the other metals was only moderate and prices for lead and zinc are lower than a week ago. Antimony is quiet but firm, tin is quiet and steady and quicksilver is dull and easier. A further reduction in the price of platinum was made during the week, the market for all of the platinum group of metals being stagnant.

The issuance of March copper statistics showing a decided improved position in respect to stocks and current production started a buying wave April 13 that continued for five business days, reports *Engineering and Mining Journal*. The total volume of sales has been greater than the aggregate of the four preceding weekly periods and was exceeded by only one week since the first of the year. Deliveries have been specified principally for May and June, with a lesser quantity for prompt and



Typical exterior of steel car bodies built by the Perley A. Thomas Car Company for service in San Juan, P. R.

some as far ahead as July. In spite of the activity, it seems improbable, however, that the "Slack" created in the last seven weeks has been taken up, and sellers look for further buying in reasonable volume. Most of the Eastern business was placed at 13 cents until Monday, when all but two or three sellers increased their price to 13⅛ cents. A little 13-cent metal hung over until April 19, but on the day following 13⅛ cents appeared to be the bottom and some were talking of even higher prices. Foreign business has likewise been good and effective; April 20 the price of the export association increased to 13.50 cents c.i.f., the former figure being 13.35 cents. The f.a.s. market is quiet at about 13.20 cents. Domestic buying April 20 was quiet, but a breathing spell is to be expected. One large consumer took the attitude that he could afford to wait now until he sees whether the curtailment in output shown by the March figures will persist in April.

With no apparent curtailment in mine output in Joplin, a reduction in the ore price to $42 a ton, prime Western zinc, had eased during the week in a quiet market. Galvanizers are still backward buyers and on April 20 metal was available at from 6.30 cents to 6.325 cents. High grade is quoted at 8.25 cents delivered in New York and continues dull.

Lead Down to 7 Cents, New York

Lead is indubitably weaker and no one seems to be optimistic as to the price trend in the immediate future. Sales in the last week have been of fair volume but current consumption is disappointing compared with last year and is almost certainly below the rate of production. Production, incidentally, shows no signs of declining in the March statistics, and without such curtailment there can be little hope of better prices. Mexican production, which it was supposed had been cut, actually showed a substantial gain.

METAL, COAL AND MATERIAL PRICES
F. O. B. REFINING

Metals—New York	April 19, 1927
Copper, electrolytic, cents per lb	12.87
Copper wire, cents per lb	15.25
Lead, cents per lb	7.15
Zinc, cents per lb	6.71
Tin, Straits, cents per lb	68 625
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.325
Somerset mine run, Boston, net tons	1.925
Pittsburgh mine run, Pittsburgh, net tons	2.25
Franklin, Ill., screenings, Chicago, net tons	2.50
Central, Ill., screenings, Chicago, net tons	2.00
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$5.50
Weatherproof wire base, N. Y., cents per lb.	16.75
Cement, Chicago net prices, without bags	2.05
Linseed oil (5-bbl. lots), N. Y., cents per lb.	11.2
White lead in oil (100-lb. keg), N. Y., cents per lb	14.50
Turpentine (bbl. lots), N. Y., per gal	$0.66

On Monday, April 18, the American Smelting & Refining Co. reduced its contract price for New York lead from 7.25 cents to 7.15 cents. Reductions were also made by sellers in the Middle West from 6.90 cents, St. Louis basis, to 6.80 cents. Even at the reduced levels few buyers could be found, battery makers continuing out of the market. A little interest was shown by paint manufacturers, who report a good though seasonal improvement in their business; two or three days ago, for example, a fair sized order for corroding lead was placed at 7.05 cents, Chicago basis. Late this afternoon, a further reduction was made by the Smelting Co. to 7 cents, New York, practically no business having been done at the higher level.

Tin Drops After Quiet Week

The Easter holidays in London have interfered with the tin market, with the result that until April 20 prices showed little change, though sellers were firm. The marked drop in London on that date was unexpected in view of the rather strong tone here; it brought New York prices for prompt Straits to the neighborhood of 68 cents, with forward tin about 1½ cents less.

Steel Castings 62 Per Cent of Shop Capacity

March bookings of steel castings, as reported to the Department of Commerce by the principal manufacturers, were 62 per cent of shop capacity, as against 69 per cent in February and 81 per cent a year ago. The production of steel castings was 73 per cent of capacity in March, as against 64 per cent in February and 83 per cent a year ago. The 123 reporting concerns have a present monthly capacity of 133,000 tons and represent over four-fifths of the commercial castings capacity of the United States, of which 60,100 tons are usually devoted to railroad specialties and 72,900 tons to miscellaneous castings.

Rolling Stock

Johnson City Traction Company, Johnson City, Tenn., is reported to have bought two new cars.

Charleston Consolidated Railway & Lighting Company, now a subsidiary of of the South Carolina Power Company, Charleston, S. C., will add nine new Birney safety cars to its equipment, according to a newspaper statement by Stuart M. Cooper, vice-president and general manager. Some of the cars have already been shipped and will probably be delivered shortly, it was stated.

Evanston Railway, Evanston, Ill., according to press reports, will add six new street cars to the thirteen now in service in the city. The new cars, estimated to cost $12,000 each, will probably be put into service in the next two months.

Track and Line

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has started special track reconstruction work on East Wisconsin Avenue. Temporary rails have been laid along the curb so that service will not be interrupted.

Municipal Railway, Seattle, Wash., will make two track extensions in the city if a recent recommendation of the city utilities committee is adopted. One extension is designed to reduce traffic congestion on University Way and the other to provide additional means of travel between Montlake and the University business district. The new work will cost $17,000 and will be paid for by sale of railway warrants.

South Carolina Power Company, Charleston, S. C., is reported as spending $100,000 for new rails on several of its lines. Work is now being done on Meeting Street. Later operations will extend to King Street in Charleston.

Kansas City Public Service Company, Kansas City, Mo., is reported to have begun work on laying temporary tracks from Nineteenth to 24th Streets on Southwest Boulevard, Kansas City. The new tracks and paving of the right-of-way are in advance of the paving of the boulevard. Bids on paving the boulevard received some time ago by Matthew S. Murray, director of public works, call for one of four constructions, a 3½-in. brick top, 3½-in. top of asphalting, 2-in. top of asphaltic concrete or Warrenite bitulithic on the present concrete base.

Shops and Buildings

Wisconsin Valley Electric Company, Wausau, Wis., recently broke ground for a new 96 x 185-ft. concrete and steel carhouse to be erected at First and De Kalb Streets, Wausau. The new structure, estimated to cost $42,000, will replace one twenty years old.

Knoxville Power & Light Company, Knoxville, Tenn., according to a recent press report, will shortly occupy two additions which have been built to its carhouse located at the intersection of Magnolia Avenue and Jessamine Street in Park City. Brick, steel and concrete are being used in the construction of the carhouse and brick and concrete will be used in the garage addition. The additions will cost $12,000.

Trade Notes

Rome Wire Company, Rome, N. Y., has opened a new warehouse at 622 West Adams Street, Chicago, Ill. F. R. Weaver, district manager, is in charge.

Billings & Spencer Company, Hartford, Conn., has transferred J. H. Coyle, formerly supervisor of engineering, to be directly in charge of sales engineering in New York, Pennsylvania and New England. His headquarters will be at Hartford.

American Hammered Piston Ring Company, Baltimore, Md., has added H. W. Marshall to its sales force. Mr. Marshall's territory will include Kansas, Oklahoma, Arkansas and part of Missouri.

United States Rubber Company, New York, is responsible for a new publication, the *U. S. Tire Retailer*, of which Vol. 1, No. 1 appeared on March 1, 1927. E. F. Underhill is editor and Donald Fairbanks associate editor. The magazine is primarily designed to serve the tire dealers in the United States. Its size is 8½x12 in. Excellent illustrations and heavy glazed stock add to the attractiveness of the interesting text matter.

Type EAS

Fit the Bond to the Job

Type EAS

DIFFERENT operating conditions require specified types of rail bonds. High speed multiple unit trains, for instance, induce in the rails a peculiar vibration of high frequency. This taxes the endurance of any metal, eventually causing its destruction.

To meet this trying condition, we developed our Erico EAS Champion Rail Bond, pictured above.

Rope lay stranding, wires tightly interwoven, eliminates entirely transmission of rail vibration to any one strand. Yet the bond is extremely flexible.

The heavy copper sheath of Erico Champion terminals tightly binds the rope strands just beyond the zone of the weld. Thus vibration is almost completely dampened at this point.

Type ET

AGAIN it is frequently necessary to bond rails where the joint is very loose. This condition necessitates a rail bond with a deep loop and one that is flexible. At the same time a permanent contact must be assured.

For this purpose we designed our type ET rail bond, illustrated below.

Terminals and conductors are made from a continuous copper strip which forms an unbroken copper path from rail to rail. The deep loop and flexible laminations especially fit this bond for use on loose joints.

In addition, it is particularly adaptable for application on the head of light tee, or girder rails. Also on the narrow ball, top or bottom, of a standard third or conductor rail.

There is an Erico Rail Bond for every bonding need. Information about our complete line will be gladly furnished upon request.

Type ET

The Electric
Railway Improvement Co.
2070 East 61st Place, Cleveland, Ohio

TWIN COACH" Powered with Two "Ricardo" Head Engines

a-718-L

Setting a New Standard

As one of the foremost Bus designers in the World, it was fitting that the "TWIN COACH" should have been designed by Frank R. Fageol, father of the "SAFETY COACH." In selecting the engines, the following objectives were sought—simplicity of design, found only in an "Ell" head type engine —adequate power, for rapid acceleration in city work — yet economical enough to make profitable bus operation. That is why the "Ricardo" Head type of engine was chosen.

We are very proud to announce that after deciding on "Ricardo" Head Engines for his buses, Mr. Fageol, after carefully inspecting our extensive shop facilities, commissioned us to build the specially designed engines used in the "TWIN COACH." Waukesha Engines are also built in sizes varying from 20 to 130 H.P. and in four and six-cylinder types for Bus and Heavy Duty Truck work. All are equipped with "Ricardo" Heads which give more power per gallon of gasoline than any other type of engine and do it without "pinging." Let us send you an interesting booklet on "A Study in Heads."

(A-726-L)

AUTOMOTIVE EQUIPMENT DIVISION

WAUKESHA MOTOR COMPANY

Waukesha **Wisconsin**

Eastern Sales Offices *Aeolian Building, 33W. 42nd Street* *New York City*

Exclusive Builders of Heavy Duty Automotive Type Engines for Over Twenty Years

PIN TERMINAL RAIL BONDS

View of 20th Century rounding bend at Marblehead. The New York Central is always among the leaders in modern equipment. Insert shows our type CPO1 Bond used on all main line tracks

BECAUSE of the ease of installation, Pin Terminal Rail Bonds are used on many of the larger railway systems. They are accessible for inspection, show low maintenance cost, insure strong contact and low resistance.

The American Steel and Wire Company has a rail bond for every requirement. Our engineers will be glad to assist you in selecting the best bond for your needs.

American Steel & Wire Company

Sales Offices:

CHICAGO, NEW YORK, BOSTON, CLEVELAND, WORCESTER, PHILADELPHIA, PITTSBUROH, BUFFALO, DETROIT, CINCINNATI, BALTIMORE, WILKES-BARRE, ST. LOUIS, KANSAS CITY, ST. PAUL, OKLAHOMA CITY, BIRMINGHAM, MEMPHIS, DALLAS, ATLANTA, DENVER, SALT LAKE CITY

EXPORT REPRESENTATIVE: U. S. STEEL PRODUCTS CO., NEW YORK

PACIFIC COAST REPRESENTATIVE: U. S. STEEL PRODUCTS COMPANY, SAN FRANCISCO, LOS ANGELES, PORTLAND, SEATTLE.

Concrete bridge erected by the Southern Pacific Railway Company in Oregon. George W. Boschke Chief Engineer.

Economical to Build—Safe to Use

ALONG the new 278-mile extension of the Southern Pacific Railway in Oregon are many portland cement concrete bridges similar to the one pictured above. The trestles are of concrete—the decks are made of *precast* concrete slabs.

Precast concrete units, manufactured according to factory principles of production and quality control, are most economical and practical for bridges and other railway structures which are duplicated at several locations. They are firesafe, durable, and flexible as to size and arrangement.

Portland cement concrete is coming into increasingly general use by railroads throughout the country.

PORTLAND CEMENT *Association*

Concrete for Permanence

CHICAGO

Look at that tread! In the matter of traction as in other details of design, India Tires are far in the lead.

ADD TO SERVICE— FINE APPEARANCE

In the matter of appearance—on private or company cars—tires may add or detract.

India has always been a De Luxe tire—proud of its superiority and telling the world of its difference by means of the red stripe on the side-walls.

The jet black rubber, brilliant after rain, and the red stripe, have been identifying the cars of the rich and those who like rich things for years. India Tires add so much to the beauty of even the finest cars that plenty have willingly paid a premium to get them.

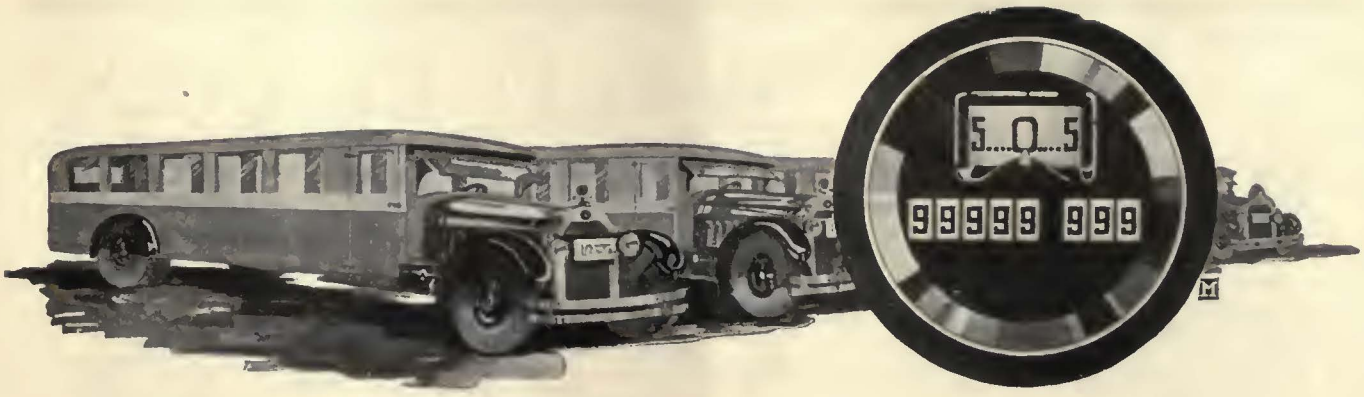
India users and dealers know that the difference in Indias is not all on the outside. They know about the 6-4 ply balloon construction—the ideal combination for comfort and long wear. They know about the True-Blue (HEAT-PROOF) Inner Tube which makes any tire give greater mileage. They know that for years nearly all the tires India could make were taken by bus and truck operators who demand the utmost of uninterrupted mileage.

"Fleet owners" must have best possible service first. Fine appearance is also a valuable asset.

Have one job equipped with Indias all 'round and you will quickly see how Indias give the best combination you can get.

INDIA TIRES

INDIA TIRE & RUBBER CO. AKRON, OHIO



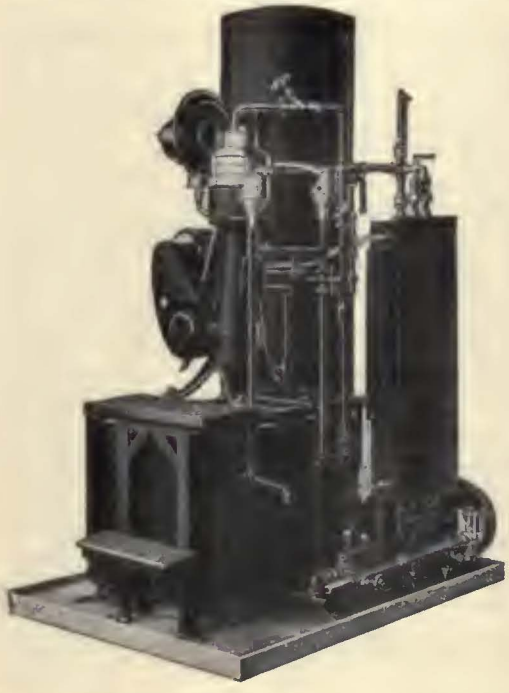
Will your Speedometers Register the limit 5 times?

They can if your Motors are properly lubricated!

Friction, the mortal enemy of motors, puts more automotive vehicles on the scrap heap than any other single cause. And friction, as any operator knows, is caused by poor lubrication.

Street railway systems operating fleets of buses or service trucks can easily insure for their units the kind of lubrication that will enable them to deliver thousands of miles of excess service.

Lubrication engineers and oil refiners state that *oil does not wear out!* It simply loses its ability to lubricate by becoming contaminated with road dust, carbon, water and gasoline. *Removal of these impurities provides a lubricant equal in every respect to new oil.* In fact, lubricating authorities state that properly purified oil is superior to new oil because the carbon forming elements are largely eliminated and carbon will not thereafter form so quickly.



The De Laval Crankcase Oil Reclaiming Outfit renews old oil—restores its viscosity—its ability to lubricate—enables you to change oil more frequently—at a cost of but *10 to 18 cents per gallon!*

Fleet owners who are using the De Laval have found that any handy man can operate it and that in a short time it pays for itself—the more so in the case of street railways as at little additional cost equipment can be added which will also enable the recovery of car axle oil.

Write today for information showing how you can keep your buses and trucks on the road longer, asking particularly for Bulletin 108-R.

THE DE LAVAL SEPARATOR COMPANY

165 Broadway, New York 600 Jackson Blvd., Chicago

DE LAVAL PACIFIC COMPANY, San Francisco

ALFA-LAVAL CO. Ltd., 34 Grosvenor Road, London, S. W. 1

DE LAVAL

Crankcase Oil Reclaiming Outfit

Car Axle Oil Reclaiming Equipment-Transformer Oil Purifiers

Bankers and Engineers

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $3.00.

Proposals, 40 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
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch
Rates for larger spaces, or yearly rates, on request.
An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

POSITION VACANT

FIRST-CLASS draftsman, familiar with steam and electric car truck design and manufacture. Answer stating age, experience and salary expected. P-988, Electric Railway Journal, Tenth Ave. at 36th Street, New York.

POSITIONS WANTED

ASSISTANT to some busy general manager by technically and commercially trained man. Can assist in modernizing program, or operation. PW-995, Electric Railway Journal, Tenth Ave. at 36th St., New York City.

AUDITOR, office manager, accountant, high class man of executive type, qualified by successful experience with large organizations; particularly trained in street railway work; available on short notice; correspondence invited. PW-985, Electric Railway Journal, 1600 Arch St., Philadelphia, Pa.

MASTER mechanic of character and ability, 20 years' experience on city and interurban property, desires to make a change for personal reasons. Best of references, correspondence solicited. PW-993, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

MAINTENANCE of equipment on buses, city and interurban electric cars. I have been very successful in showing low cost per mile with minimum number of car failures, desire for personal reasons to make a change, correspondence solicited, confidential. PW-990, Electric Railway Journal, 7 So. Dearborn St., Chicago, Ill.

POSITIONS WANTED

Mr. MANAGER: If not satisfied with earnings, operating costs, efficiency and co-operation of employes, a reply to this advertisement will put you in touch with a superintendent of transportation with a proven record and broad experience, fully capable of getting results you desire. Fine references. Correspondence and interviews invited. PW-996, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

PRESENT manager of street railway property in Middle West operating 70 cars and 65 buses, desires change for personal reasons. Forty-five years of age. Twenty years' practical experience. Correspondence solicited. PW-987, Electric Railway Journal, Bell Telephone Building, St. Louis, Mo.

SUPERINTENDENT of railways with 20 years' experience, desires for personal reasons to make change. Nationwide reputation as railway operator, can take full charge. Has ability to handle men and show results. Correspondence invited and treated in confidence. PW-979, Electric Railway Journal, 7 South Dearborn Street, Chicago, Ill.

UTILITIES executive available. Engineering graduate, broad operating and executive experience, railway, also light and power. Young and progressive with tried and proven ability. Railway activities known to the industry. At present employed; seek opportunity with larger interests. The opportunity for past successful methods to produce relatively greater results. PW-972, Electric Railway Journal, Tenth Ave. at 36th St., New York.

SALES ENGINEER

Graduate Electrical Engineer, at present employed with nationally known corporation, desires, for personal reasons, to make new connection.
Nine years' practical railway experience, and seven years' sales experience in electrical equipment. Particularly adapted to railway supply line. Age 30, married. Prefer New York or vicinity. Excellent references.

AS-994, Electric Railway Journal, Tenth Ave. at 36th St., New York City.

FIND that better position you are looking for. Advertise your qualifications in the Searchlight Section.

FOR SALE

15 BIRNEY SAFETY CARS

Brill Built
West. 508 or G. E. 264 Motors
Cars Complete—Low Price—Fine Condition

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

Wanted to Purchase for Cash

36—Westinghouse 306—CV-4 Motors.
100—G. E. 247 Motors.
100—Westinghouse 328 Motors.
40—K-35-G2 Controllers.

IRVING S. VAN LOAN CORPORATION
1750 Broadway, New York City
Specialists in street cars or any part of a street car. Illustrated bulletin supplied on request.

Saving is a good habit, BUT—

Why Save Things You'll Never Use?

WHY let Mother Nature grow grass between the wheels of replaced cars? Why pile up rails, shop equipment, power plant equipment, line equipment, car appliances, road building material, etc., etc., you will never use again?

TODAY you can turn them over at a fair price. Tomorrow they will be—JUNK. Is it not the better part of good horse-sense to dispose of them NOW?

6000 other electric railway men will see your advertisements of used or surplus equipment and materials here—in the Searchlight Section of their business paper.

Some of these men—officials or executives of other lines in other parts of the country and operating under different conditions—can use what you no longer need. For an insignificant investment you can tell these others what you have. And they will buy.

One "Searchlight" advertiser wrote, "We can cheerfully recommend the Searchlight Section as a wonderful medium for reaching buyers of rails and equipment." Another—"The strongest proof that your 'Searchlight' finds its way to many readers is shown by the numerous letters we have received in answer to our recent ad."

Let us tell you the cost of advertising your used or surplus equipment and materials in the Searchlight Section. Just address a list of what you have to dispose of to the

Searchlight Department
ELECTRIC RAILWAY JOURNAL
Tenth Ave. at 36th St., New York, N. Y.

WHAT AND WHERE TO BUY

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

Advertising, Street Car
Collier, Inc., Barron G.

Air Brakes
Westinghouse Air Brake Co.
Air Receivers & Aftercoolers
Ingersoll-Rand Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Appraisals
American Appraisal Co.
Armature Shop Tools
Columbia Machine Works
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.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works
Westinghouse E. & M. Co.
Axles, Front
Shuler Axle Co.
Axles, Steel
Carnegie Steel Co.
Babbitt Metal
More-Jones Brass & Metal Co.
Babbitting Devices
Columbia Machine Works & M. I. Co.
Badges and Buttons
Elec. Service Supplies Co.
International Register Co.
Batteries, Dry
Nichols-Lintern Co.
Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse E. & M. Co.
Bearings, Center and Roller Side
Cincinnati Car Co.
Columbia Machine Works
Stucki Co., A.
Bearings, Roller
Timken Roller Bearing Co.
Bells and Buzzers
Consolidated Car Heating Co.
Bells and Gongs
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Railway Trackwork Co.
Bodies, Bus
Brill Co., The J. G
Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.

Boilers
Babcock & Wilcox Co.
Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.
Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co
Bonds, Rail
American Steel & Wire Co.
Elec. Service Supplies Co.
Electric Railway Improvement Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.
Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
Bates Expanded Steel Truss Co.
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
Brake Adjusters
Brill Co., The J. G
Cincinnati Car Co.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.
Brake Shoes
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
Brake Testers
National Ry. Appliance Co.
Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.
Brakes, Magnetic Rail
Cincinnati Car Co.
Brushes, Carbon
General Electric Co.
Jeandron, W. J.
LeCarbone Co.
Westinghouse E. & M. Co.
Brushes, Wire Pneumatic
Ingersoll-Rand Co.

Brushholders
Columbia Machine Works

Bulkheads
Haskelite Mfg. Corp.

Bus Lighting
National Ry. Appliance Co.
Bus Wheels, Steel
Heywood-Wakefield Co.
Buses
Brill Co., The J. G.
International Motor Co.
Mack Truck Co., Inc.
St. Louis Car Co.
Studebaker Corp. of America
Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
St. Louis Car Co.
Cables (See Wires and Cables)
Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.
Carbon Brushes (See Brushes, Carbon)
Car Lighting Fixtures
Elec. Service Supplies Co.
Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.
Car Steps, Safety
Cincinnati Car Co.
Car Wheels, Rolled Steel
Bethlehem Steel Co.
Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co.
St. Louis Car Co.
Cars, Gas-Electric
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.
Cars, Gas, Rail
Brill Co., The J. G.
St. Louis Car Co.
Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Kuhlman Car Co., G. C.
Wason Mfg. Co.
St. Louis Car Co.
Cars, Second Hand
Electric Equipment Co.
Cars, Self-Propelled
Brill Co., The J. G.
General Electric Co.
Castings, Brass Composition or Copper
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
More-Jones Brass & Metal Co.
Castings, Gray Iron and Steel
American Steel Foundries
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.
Standard Steel Works
Castings, Malleable & Brass
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.
Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas N.
Catenary Construction
Archbold-Brady Co.
Ceiling Car
Haskelite Mfg. Corp.
Ceilings, Plywood, Panels
Haskelite Mfg. Corp.
Cement Products
Portland Cement Ass'n
Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.
Change Trays
Cincinnati Car Co.
Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.
Clamps and Connectors for Wires and Cables
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Railway 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.
Cincinnati Car Co.
Ohio Brass Co.
St. Louis Car Co.
Clusters and Sockets
General Electric Co
Coil Banding and Winding Machines
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
Coils, Armature and Field
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.
Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.
Coin Sorting Machines
Cleveland Fare Box Co.
Coin Wrappers
Cleveland Fare Box Co.
Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.
Commutatoe Truing Devices
General Electric Co.
Commutators or Parts
Cameron Electrical Mfg. Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.
Compressors, Air
General Electric Co.
Ingersoll-Rand Co.
Westinghouse Tr. Br. Co.
Compressors, Air, Portable
Ingersoll-Rand Co.

Condensers
General Electric Co.
Ingersoll-Rand Co.
Westinghouse E. & M. Co.
Condensor Papers
Irvington Varnish & Ins. Co.

Connectors, Solderless
Westinghouse E. & M. Co.
Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Controllers or Parts
Columbia Machine Works & M. I. 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
General Electric Co.
Westinghouse E. & M. Co.
Copper Wire
American Brass Co
American Steel & Wire Co.
Anaconda Copper Mining Co.
Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
Anaconda Copper Mining Co.
Cord, Bell, Trolley, Register
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
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
American Steel Foundries
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.
Cowl Ventilators
Nichols-Lintern Co.
Cranes, Hoists & Lifts
Electric Service Supplies Co.
Cross Arms (See Brackets)
Crossing Foundations
International Steel Tie Co.

Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Crossings, Track (See Track Special Work)
Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.
Curtains & Curtain Fixtures
Brill Co., The J. G.
St. Louis Car Co.
Dealer's Machinery & Second Hand Equipment
Electric Equipment Co.
Hyman-Michaels Co.
Van Loan Corp., Irving S.
Derailing Devices (See also Track Work)
Derailing Switches
Ramapo Ajax Corp.
Destination Signs
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Detective Service
Wish-Service, P. Edward
Door Operating Devices
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
National Pneumatic Co.
Safety Car Devices Co.
Doors & Door Fixtures
Brill Co., The J. G.
Cincinnati Car Co.
General Electric Co.
Hale-Kilburn Co.
St. Louis Car Co.
Doors, Folding Vestibule
National Pneumatic Co.
Safety Car Devices Co.
Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Ingersoll-Rand Co.
Ohio Brass Co.
Dryers, Sand
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Ears
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Electric Grinders
Railway Trackwork Co.
Electrical Wires and Cables
Amer. Electrical Works.
American Steel & Wire Co.
John A. Roebling's Sons Co.
Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co.
Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co.
Engineers, Consulting, Contracting and Operating
Archbold-Brady Co.
Beeler, John A.
Bibbins, J. Rowland
Buchanan & Layng Corp.
Day & Zimmermann, Inc.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Kelly-Cooke Co.
Linn & Marshall Co.
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster Co.
White Eng. Corp., The J. G.

Engines, Gas, Oil or Steam
Ingersoll-Rand Co.
Waukesha Motor Co.
Westinghouse E. & M. Co.
Exterior Side Panels
Haskelite Mfg. Corp.

Fare Boxes
Cleveland Fare Box Co.
Perey Mfg. Co.
Fare Registers
Electric Service Supplies Co.
Ohmer Fare Register Co.
Fences, Woven Wire & Fence Posts
Acme Wire Co.
American Steel & Wire Co.
Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co.
St. Louis Car Co.
Star Brass Works
Wood Co., Chas. N.
Fibre and Fibre Tubing
Westinghouse E. & M. Co.
Field Coils (See Coils)
Floodlights
Electric Service Supplies Co.
Floor, Sub
Haskelite Mfg. Corp.
Floors
Haskelite Mfg. Corp.
Forgings
Brill Co., The J. G.
Cincinnati Car Co.
Duff Mfg. Co.
Standard Steel Works
Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Frogs, Track (See Track Work)
Frogs, Trolley
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Fuses and Fuse Boxes
Columbia Machine Works & M. I. Co.
Consolidated Car Heating Co.
General Electric Co.
Westinghouse E. & M. Co.
Fuses, Refillable
General Electric Co.
Gaskets
Westinghouse Tr. Br. Co.
Gas Producers
Westinghouse E. & M. Co.
Gates, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Gauges, Oil and Water
Ohio Brass Co.
Gear Blanks
Brill Co., The J. G.
Standard Steel Works
Gear Cases
Chillingworth Mfg. Co.
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co
Westinghouse E. & M. Co.
Gears and Pinions
Bemis Car Truck Co
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
R. D. Nuttall Co.
Generating Sets, Gas-Electric
General Electric Co.

Generators
General Electric Co.
Westinghouse E. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gongs (See Bells and Gongs)
Greases (See Lubricants)
Grinders, Portable
Ingersoll-Rand Co.
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks and Wheels
Railway Trackwork Co.

(Continued on page 48)

Guard Rail Clamps
Ramapo Ajax Corp.
Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Hammers, Pneumatic
Ingersoll-Rand Co.
Harps, Trolley
Columbia Machine Works
Elec. Service Supplies Co.
More-Jonea Brass & Metal Co.
R. D. Nuttall Co.
Star Brass Works
Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.
Headlining
Columbia Machine Works & M. I. Co.
Haskelite Mfg. Corp.
Heaters, Bus
Nichols-Lintern Co.
Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heat. & Ltg. Co.
Smith Heater Co., Peter
Heaters, Car, Hot Air and Water
Smith Heater Co., Peter
Heaters, Car Stove
Smith Heater Co., Peter
Helmets, Welding
Railway Trackwork Co.
Una Welding & Bonding Co.
Hoists & Lifts
Columbia Machine Works & M. I. Co.
Hoists, Portable
Ingersoll-Rand Co.
Hose, Bridges
Ohio Brass Co.
Hose, Pneumatic
Westinghouse Traction Brake Co.
Instruments, Measuring, Testing and Recording
American Steel & Wire Co.
General Electric Co.
National Ry. Appliance Co.
Westinghouse E. & M. Co.
Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
U. S. Rubber Co.
Westinghouse E. & M. Co.
Insulating Silk
Irvington Varnish & Ins. Co.
Insulating Varnishes
Irvington Varnish & Ins. Co.
Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
U. S. Rubber Co.
Westinghouse E. & M. Co.
Insulation Slots
Irvington Varnish & Ins. Co.
Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.
Insulators (See also Line Materials)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Interior Side Linings
Haskelite Mfg. Corp.
Interurban Cars (See Cars)
Jacks (See also Cranes, Hoists and Lifts)
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Joints, Rail (See Rail Joints)
Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Lamp 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
Elec. Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.
Lanterns, Classification
Nichols-Lintern Co.
Letter Boards
Cincinnati Car Co.
Haskelite Mfg. Corp.
Lighting Fixtures, Interior
Electric Service Supplies Co.
Lightning Protection
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Line Material (See also Brackets, Insulators, Wires, etc.)
Archbold-Brady Co.
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
More-Jones Brass & Metal Corp.
Westinghouse E. & M. Co.
Locking Spring Boxes
Wm. Wharton, Jr. & Co.
Locomotives, Electric
Cincinnati Car Co.
General Electric Co.
St. Louis Car Co.
Westinghouse E. & M. Co.
Locomotives, Oil Engine, Electric Driven
Ingersoll-Rand Co.
Lubricating Engineers
Universal Lubricating Co.
Lubricants, Oil and Grease
Universal Lubricating Co.
Manganese Parts
Bemis Car Truck Co.
Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co.
Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.
Manganese Steel Switches, Frogs and Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Meters (See Instruments)
Mirrors, Inside & Outside
Cincinnati Car Co.
Motor and Generator Sets
General Electric Co.
Motor Buses (See Buses)
Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.
Motorman's Seats
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
St. Louis Car Co.
Wood Co., Chas. N.
Nuts and Bolts
Bemis Car Truck Co.
Cincinnati Car Co.
Hubbard & Co.
Oil Purifiers
De Laval Separator Co.
Oils (See Lubricants)
Omnibuses (See Buses)
Oxygen
International Oxygen Co.
Packing
U. S. Rubber Co.
Westinghouse Traction Brake Co.
Paints and Varnishes (Insulating)
Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.
Paints & Varnishes, Railway
National Ry. Appliance Co.
Panels, Outside, Inside
Haskelite Mfg. Corp.
Pavement Breakers
Ingersoll-Rand Co.
Pickup, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.
Pinion Pullers
Elec. Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.
Pinions (See Gears)
Pins, Case Hardened, Wood and Iron
Ohio Brass Co.
Westinghouse Traction Brake Co.
Pipe Fittings
Standard Steel Works
Westinghouse Tr. Brake Co.
Planers (See Machine Tools)
Plates for Tee Rail Switches
Ramapo Ajax Corp.
Pliers, Rubber Insulated
Elec. Service Supplies Co.
Plywood, Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks
Haskelite Mfg. Corp.
Pneumatic Tools
Ingersoll-Rand Co.
Pole Line Hardware
Bethlehem Steel Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Pole Reinforcing
Hubbard & Co.
Poles, Metal Street
Bates Expanded Steel Truss Co.
Elec. Ry. Equipment Co.
Hubbard & Co.
Poles and Ties Treated
Bell Lumber Co.
International Creosoting & Const. Co.
Poles, Ties, Posts, Piling & Lumber
International Creosoting & Const. Co.
Naugle Pole & Tie Co.
Poles, Trolley
Elec. Service Supplies Co.
R. D. Nuttall Co.
Poles, Tubular Steel
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Potheads
Okonite Co.
Okonite-Callender Cable Co., Inc.
Power Saving Devices
National Ry. Appliance Co.
Pressings, Special Steel
Cincinnati Car Co.
Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.
Pumps
A. S. Cameron Steam Pump Wks. (Ingersoll-Rand Co.)
Ingersoll-Rand Co. (A. S. Cameron Steam Pump Wks.)
Pumps, Vacuum
Ingersoll-Rand Co.
Punches, Ticket
International Register Co.
Wood Co., Chas. N.
Rail Braces and Fastenings
Ramapo Ajax Corp.
Rail Grinders (See Grinders)
Rail Joints
Carnegie Steel Co.
Rail Joint Co.
Rail Joints, Welded
Lorain Steel Co.
Metal & Thermit Corp.
Rail Welding
Metal & Thermit Corp.
Railway Trackwork Co.
Una Welding & Bonding Co.
Rails, Steel
Carnegie Steel Co.
Railway Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.
Rattan
Brill Co., The J. G.
Elec. Service Supplies Co.
Hale-Kilburn Co.
St. Louis Car Co.
Registers and Fittings
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
International Register Co.
St. Louis Car Co.
Reinforcement, Concrete
American Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.
Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.
Repair Work (See also Coils)
General Electric Co.
Westinghouse E. & M. Co.
Replacers, Car
Cincinnati Car Co.
Elec. Service Supplies Co.
Resistances
Consolidated Car Heating 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
Haskelite Mfg. Corp.
Roofs, Car and Bus
Haskelite Mfg. Corp.
Rubber Specialties of All Kinds
U. S. Rubber Co.
Safety Control Devices
Safety Car Devices Co.
Sanders, Track
Brill Co., The J. G.
Elec. Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.
Sash Fixtures, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Sash, Metal Car Window
Hale-Kilburn Co.
Scrapers, Track (See Cleaners and Scrapers, Track)
Screw Drivers, Rubber Insulated
Elec. Service Supplies Co.
Seating Materials
Brill Co., The J. G.
Haskelite Mfg. Corp.
St. Louis Car Co.
Seats, Bus
Brill Co., The J. G.
Hale-Kilburn Co.
St. Louis Car Co.
Seats, Car (See also Rattan)
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
St. Louis Car Co.
Second Hand Equipment
Hyman-Michaels Co.
Van Loan Corp., Irving S.
Shades, Vestibule
Brill Co., The J. G.
Cincinnati Car Co.
Shovels
Brill Co., The J. G.
Hubbard & Co.
Shovels, Power
Brill Co., The J. G.
Side Bearings (See Bearings Center and Side)
Signals, Car Starting
Consolidated Car Heating Co.
Elec. Service Supplies Co.
National Pneumatic Co.
Signals, Indicating
Nichols-Lintern Co.
Signal Systems, Block
Elec. Service Supplies Co.
Nachod and United States Electric Signal Co.
Wood Co., Chas. N.
Signal Systems, Highway Crossing
Nachod and United States. Electric Signal Co.
Wood Co., Chas. N.
Slack Adjusters (See Brake Adjusters)
Sleet Wheels and Cutters
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
More-Jones Brass & Metal Co.
R. D. Nuttall Co.
Smokestacks, Car
Nichols-Lintern Co.
Snow Plows
National Ry. Appliance Co.
Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia Machine Works & M. I. Co.
Consolidated Car Fender Co.
St. Louis Car Co.
Snow Sweeper, Rattan
J. G. Brill Co.
Soldering and Brazing Apparatus (See Welding Processes and Apparatus)
Spacer, Tie
Duff Mfg. Co.
Special Adhesive Papers
Irvington Varnish & Ins. Co.
Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co.
Wm. Wharton, Jr. & Co.
Spikes
American Steel & Wire Co.
Splicing Compounds
U. S. Rubber Co.
Westinghouse E. & M. Co.
Splicing Sleeves (See Clamps and Connectors)
Springs
National Ry. Appliance Co.
Springs, Car and Truck
American Steel Foundries
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works
Sprinklers, Track and Road
Brill Co., The J. G.
St. Louis Car Co.
Steel and Steel Products
American Steel & Wire Co.
Carnegie Steel Co.
Steps, Car
Brill Co., The J. G.
Cincinnati Car Co.
Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.
Stop Signals
Nichols-Lintern Co.
Storage Batteries (See Batteries, Storage)
Storage Tanks
S. F. Bowser Co.
Strain Insulators
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Strand
American Steel & Wire Co.
Roebling's Sons Co., J. A.
Street Cars (See Cars, Passenger, Freight, Express)
Superheaters
Babcock & Wilcox Co.
Sweepers, Snow (See Snow Plows, Sweepers and Brooms)
Switch Stands and Fixtures
Ramapo-Ajax Corp.
Switches, Selector
Nichols-Lintern Co.
Switches and Switchboards
Consolidated Car Heating Co.
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Switches, Tee Rail
Ramapo-Ajax Corp.
Switches, Track (See Track Special Work
Tampers, Tie
Ingersoll-Rand Co.
Railway Trackwork Co.
Tapes and Cloths (See Insulating Cloth, Paper and Tape)
Tee Rail Special Track Work
Ramapo-Ajax Corp.
Telephones and Parts
Elec. Service Supplies Co.
Telephone & Telegraph Wire
American Steel & Wire Co.
American Telephone &
Testing Instruments (See Measuring, Testing, etc.)
Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter
Ticket Choppers and Destroyers
Elec. Service Supplies Co.
Ties and Tie Rods, Steel
Carnegie Steel Co.
International Steel Tie Co.
Ties, Wood Cross (See Poles, Ties, Posts, etc.)
Telegraph Co.
Tires
India Tire & Rubber Co.
U. S. Rubber Co.
Tongue Switches
Wm. Wharton, Jr. & Co.
Tools, Track & Miscellaneous
American Steel & Wire Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Hubbard & Co.
Railway Trackwork Co.
Ramapo-Ajax Corp.
Towers and Transmission Structure
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Westinghouse E. & M. Co.
Track Grinders
Metal & Thermit Corp.
Railway Trackwork Co.
Ramapo-Ajax Corp.
Track, Special Work
Columbia Machine Works & M. I. Co.
Ramapo Ajax Corp.
Trackless Trolley Cars
Brill Co., The J. G.
St. Louis Car Co.
Transformers
General Electric Co.
Westinghouse E. & M. Co.
Treads, Safety Stair, Car Step
Cincinnati Car Co.
Tree Wire
Okonite Co.
Okonite-Callender Cable Co.
Trolley Bases
General Electric Co.
More-Jones Brass & Metal Co.
R. D. Nuttall Co.
Ohio Brass Co.
Trolley Bases, Retrieving
General Electric Co.
R. D. Nuttall Co.
Ohio Brass Co.
Trolley Bases
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.
Trolley Material, Overhead
Elec. Service Supplies Co.
More-Jones Brass & Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Trolley Wheel Bushings
More-Jones Brass & Metal Co.
Star Brass Works
Trolley Wheels (See Wheels Trolley)
Trolley Wire
Amer. Electrical Works
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Min. Co
Roebling's Sons Co., J. A.

(Continued on page 51)

Seats Which Please

Brill seats are particularly designed to please, and thus to prove attractive to the riding public. In merchandising public transportation today the importance of seats of this type cannot be overestimated.

Numerous types of Brill seats have been developed to meet the requirements of every class of public transportation service, with various styles of backs and cushions and embodying a wide range of upholstery, thus affording an unusual selection from which to choose the seat best adapted to the service.

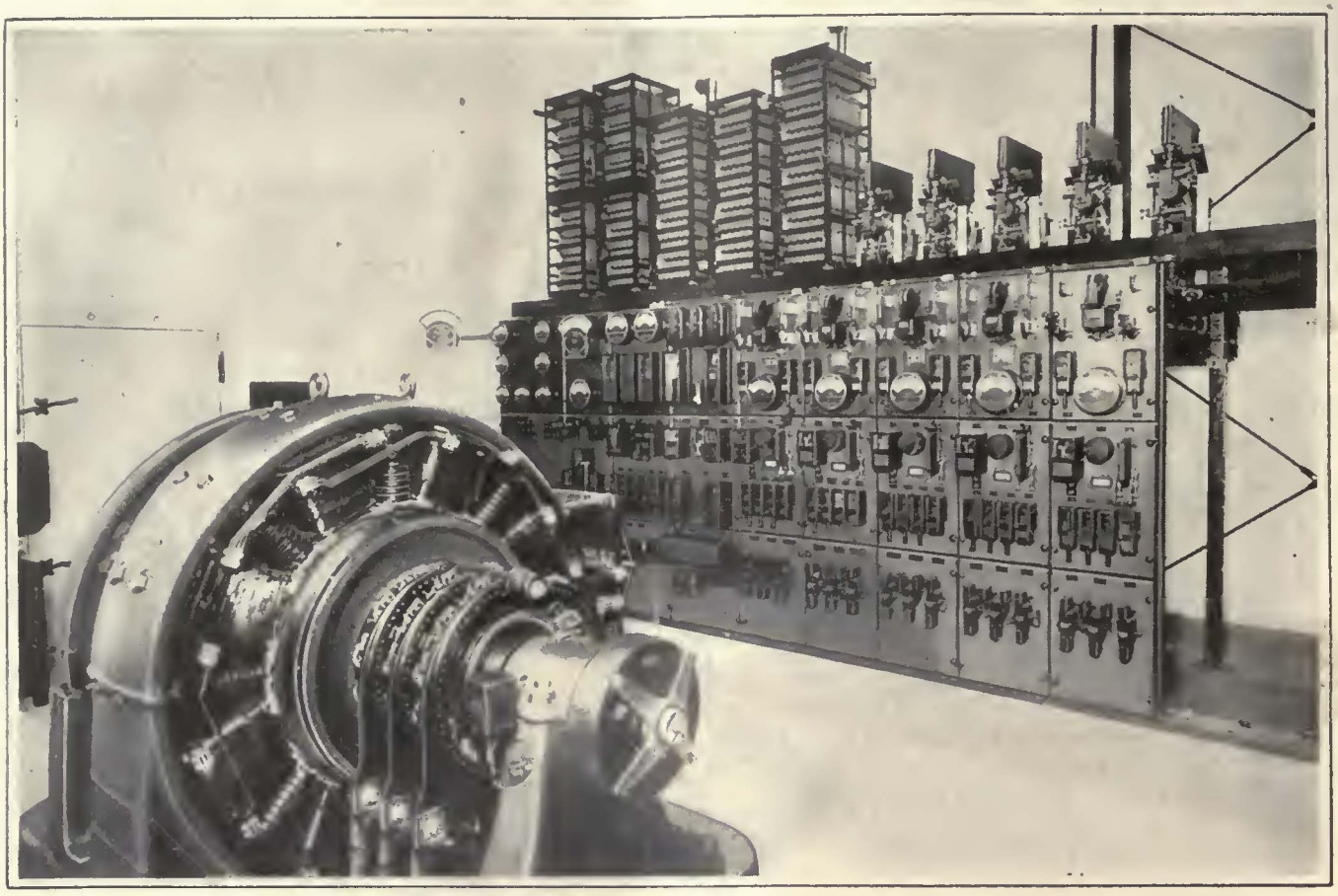
Brill No. 201-D Seat

(Reversible)

Other attractive seats illustrated in our Catalog No. 284

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.

AMERICAN CAR CO. ST LOUIS MO. — G.C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.



Where Operating Charges were greatly reduced

The Los Angeles Railway is operating six G-E Automatic Substations for at least 60 per cent less than for similar manual stations. Over a period of four years the savings per substation have averaged better than $500 a month.

These six automatic stations have a total capacity of 7,500 kw. The detailed operating figures, given below, tell you why plans are now being made for four more.

The Los Angeles Railway has incorporated in its automatic substations the latest methods and equipment. These stations are made virtually soundproof, have air cleansers to minimize troubles caused by dust accumulation, and utilize forced air for both ventilation and cooling.

Operating Charges of Automatic Substations, Los Angeles Railway

Monthly Average per 1,000 kw. Capacity

Year	Repairs to Equipment		Labor of Operators		Supplies	
	Automatic	Manual	Automatic	Manual	Automatic	Manual
1922	$ 9.94	$52.77	$83.16	$277.14	$16.07	$ 8.35
1923	1.73	36.22	78.17	226.75	4.91	9 37
1924	5.75	60.24	79.80	247.76	11.13	15.02
1925	17.83	106.67	80 55	221.74	11.33	8.24
1926	20.72	61.99	83.89	220.80	12.68	8.86

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GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES