ELECTRIC RAILWAY JOURNAL

H Publishing Company, Inc. October 22, 1927 Twenty Cents per

White Six Busses Cut 3 Hours Off Chicago-Detroit Run

IN inaugurating a de luxe high-speed bus service between Chicago and Detroit in co-ordination with electric railway transportation the Shore Line Motor Coach Company selected White six-cylinder bus equipment.

Three White six-cylinder 100-horsepower busses run between Detroit and South Bend, where connections are made with high-speed electric trains operated by the Chicago, South Shore & South Bend Railroad. There is one trip a day in each direction by "The Golden Arrow."

The Chicago-Detroit run is 284 miles, 194 miles by bus and 90 miles by electric train. The 8½-hour service cuts three hours from the present bus running time between the two cities. The busses are equipped with toilet and washroom facilities, observation compartment and inside baggage compartment.

The selection of White Busses by the Shore Line Motor Coach Company for this important run is typical of the preference that has been given White Bus equipment by scores of electric railways and hundreds of independent operators.

THE WHITE COMPANY, *Cleveland*

WHITE BUSSES

and WHITE TRUCKS

Trains operating on the runway track and main line of the Chilean State Railways at Los Chilcas.

In Chile

Thirty-Nine Electric Replace 110 Steam Locomotives

WHEN thirty-nine electric locomotives replaced 110 steam locomotives on a section of the main line of the Chilean State Railways, a new epoch in transportation in South America was written. And with electrification came new records of achievements—new records in economies, in maintenance, and locomotive performance.

The electrification extends over a distance of 116 miles between Valparaiso and Santiago and a branch line to Los Andes, a distance of 28 miles. The curvature of the entire line may be considered as of medium severity, while the grades at some points, especially the Tabon grade, is 2¼ per cent.

Under steam operation it required two locomotives 40 minutes to haul a 300-ton passenger train up the Tabon grade, a distance of 12 miles. Now one 115-ton electric locomotive takes the same train up the grade in 21 minutes. The six daily express trains have shortened their running time 50 minutes between Santiago and Valparaiso, while freight trains have increased their tonnage from 350 to 700 tons per train. Running time along the entire line has been materially shortened.

Under steam operation, the annual cost of coal consumed amounted to $1,447,200. The annual cost of electrical energy is $604,800, which shows an annual saving of $842,400 since electrification was introduced.

But the economies of electrification and lower operating costs go further. Additional reductions are shown in repairs and maintenance of locomotives; reduction of forces; eliminating coal yards and water tanks; reduction in the expense of shop power and station lighting, and the indirect economy arising from improved facilities and rapid train movements.

The Baldwin Locomotive Works
Philadelphia, Pennsylvania

Westinghouse Electric & Mfg. Company
East Pittsburgh Pennsylvania

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OCTOBER 22, 1927

Progress

PROGRESS was the dominant note which resounded at the Cleveland convention. Reports, exhibits, conferences and discussions intensified it. As the year's accomplishments were reviewed, the flame of inspiration was kindled for greater achievements.

Only through the knowledge of each baffling obstacle overcome can a true picture be gained of the progress in the electric railway industry. Each step taken in the forward movement gives inspiration to continue the advancement and to avoid retrogression. Every milestone reached along the path toward better transportation marks the passing of the old into the realm of obsolescence.

A broad survey and careful analysis of what is transpiring in the industry are of incalculable value to those engaged in it. The Cleveland convention was such a survey. In reporting it, and in continuing to report the progress of the industry, not only once each year, but every week, the JOURNAL is doing its part to speed the advance of the industry.

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Savings the Years Show

Because their firs
cost is their fina
cost, the economie
of Davis "One
Wear" Steel Wheel
roll up as the year
roll by.

Where other wheel
need contour cond
tioning, Davis "On
Wear" Steel Whee
remain in servic
They save men, m
terial and time.

And the secret of
all is a special whe
steel, of speci
composition, hea
treated to develc
the unusual prope
ties that make th
Davis Steel Whe
truly "One-Wea

AMERICAN STEEL FOUNDRIE

NEW YORK CHICAGO ST. LOU

The O-B Marathon Trolley Ear

Bottom View. Marathon Installed. Note Smooth Underrun

Make your statistics reflect the same savings!

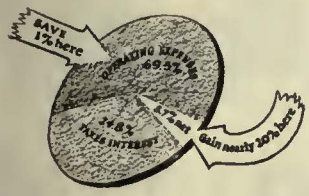
VERIFYING the fact that Marathon Ears *do* last longer and make the ultimate cost for ears much less, we present the above statistics of a large city property. Do you wonder that the Line Superintendent *standardized* on Marathon Ears.

It has taken years of experience, gained in manufacturing many thousands of trolley ears of various types, carefully checked with line superintendents, to build into O-B Marathons the endurance that has made them world famous.

In addition to direct savings which help swell *the net*, every Marathon Ear on the wire is an aid in the constant effort to give street car riders prompt, speedy and delay-free service.

It is easy to figure what *you* would save in maintenance expense through their use—not so easy, what you'd gain in improved service. Either saving, however, makes it worthwhile to use Marathons.

Statistics of the industry as a whole reveal a split-up of the average fare as illustrated below. The net income is only 5.7%. Just one percent saved from the 69.5% now devoted to operating expenses would make the net 6.7%—an increase of nearly 20%.



Ohio Brass Company, Mansfield, Ohio
Dominion Insulator & Mfg. Co., Limited
Niagara Falls, Canada
704B

Ohio Brass Co.

PORCELAIN INSULATORS
LINE MATERIALS
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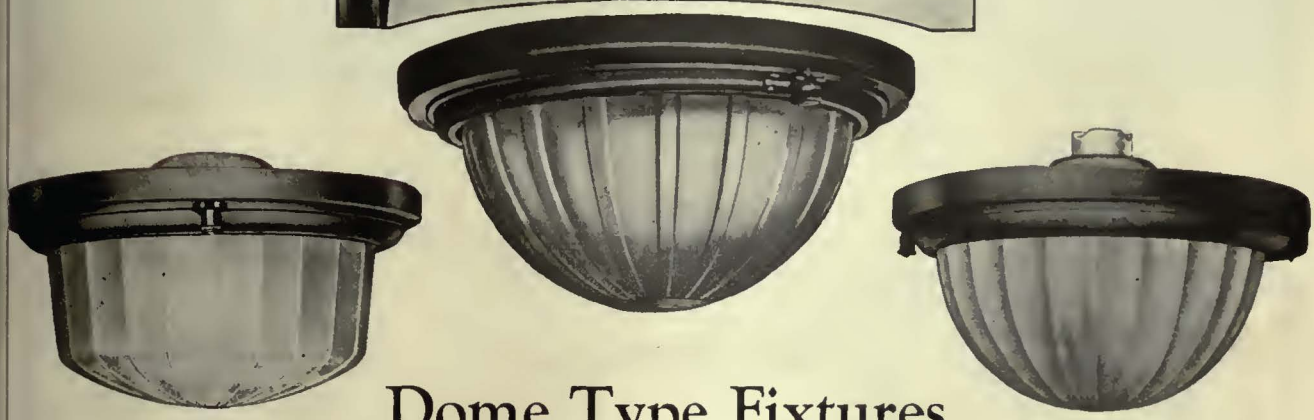


Dome Type Fixtures

Enhance the Appearance of Your Car Interiors

Interior lighting of modern cars by means of dome type fixtures has become exceedingly popular. It reflects the present trend toward improving the comfort and appearance of electric cars so that they may equal the de luxe service offered in many cases by competing vehicles.

These Dome Type Lighting Fixtures are designed to provide well diffused light and to prevent any glare and consequent eye strain to passengers. They are also substantially made to withstand extreme vibration.

Let us explain to you how our new and interesting wiring plans can be adapted to your requirements.

Home office and plant at 17th & Cambria Sts., PHILADELPHIA; District offices at 230 So. Clark St., CHICAGO; 50 Church St., NEW YORK; Bessemer Bldg., Pittsburgh; 88 Broad St., Boston; General Motors Bldg., Detroit; 316 N. Washington Ave., Scranton; Canadian Agents, Lyman Tube & Supply Company, Ltd., Montreal, Toronto, Vancouver.

ELECTRIC SERVICE SUPPLIES CO.

MANUFACTURER OF RAILWAY, POWER AND INDUSTRIAL ELECTRICAL MATERIAL

SPEEDY transportation is vital to present-day conditions. Car riders want it; car owners need it.

What factors contribute toward the attainment of this objective?

Short headway between cars to reduce waiting time of patrons.

Quick application of brakes to reduce time consumed in making a stop.

Rapid interchange of passengers to cut down the standing time.

Prompt release of brakes to permit a quick get-away.

How may these factors be efficiently combined while retaining the basic element of safety?

The answer is—Safety Car Control Equipment. It brings economic advantages that warrant additional cars. It assures the quickest possible brake action. It provides the maximum convenience and flexibility in controlling entrance and exit. It safeguards operation by interlocking power, brakes, and doors, and by centralizing responsibility.

Safety Cars are giving a noteworthy impetus to transportation service.

It paid this operator to *"make the setting count"*

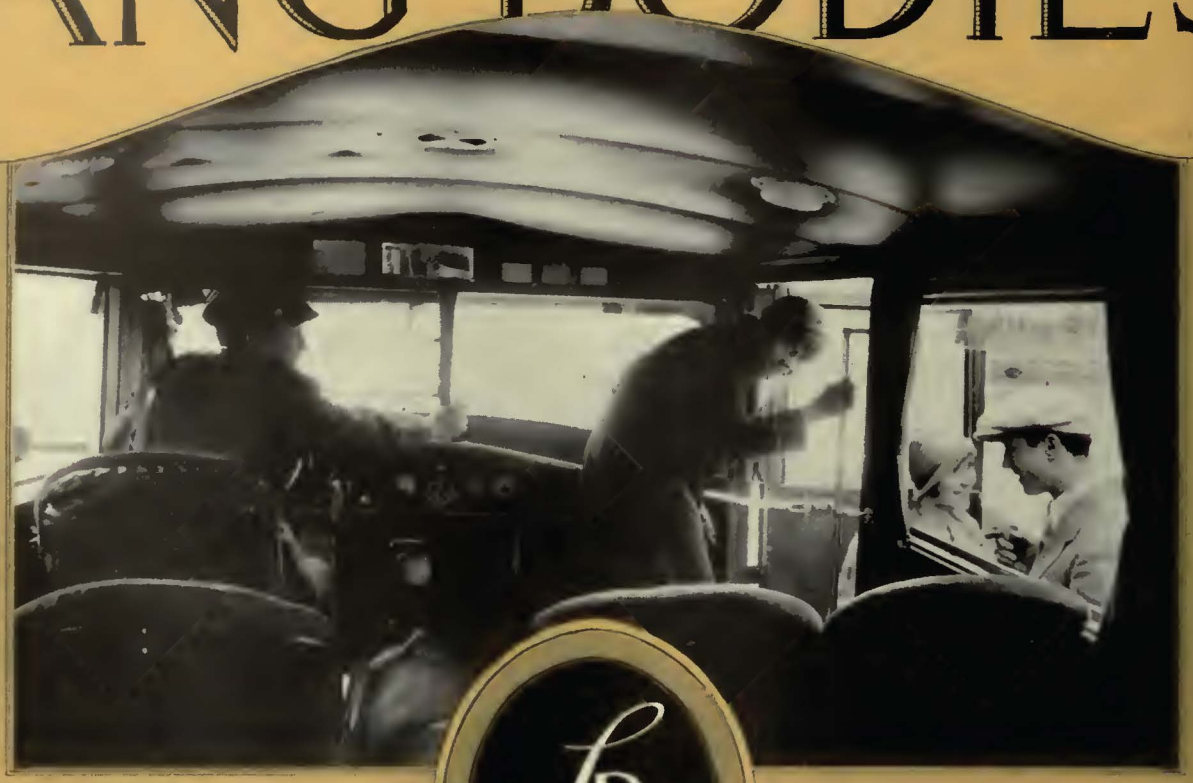
Here was a perfectly good chassis. But it needed a new setting,—a new and up-to-date body,—to restore its revenue-building power.

Lang Craftsmen have made a thorough study of such problems. Thus they have built a body exactly in tune with today's demands on this operator,—fine in line, luxurious in appointments, sturdy and practical in every detail. No one would know that the chassis was of any but the latest type.

After all it *is* the setting that counts.

. . . Lang has a . . . special department for body maintenance

LANG BODIES



LANG BODIES create passengers—friendly passengers who ride often and tell others of the comfort enjoyed.

Every detail of luxury, that contributes to the enjoyment of riding, is carefully planned with an eye to building revenue. Every mechanical feature of construction is designed to assure economy and long life. Lang Bodies, "Pullmans of the Road," are built by master craftsmen.

THE LANG BODY COMPANY, CLEVELAND, OHIO

"After all—it's the Setting that counts!"

Wet, dry or greasy

On July 20, 1926, a double-truck car of the Buffalo & Erie Railway, equipped with the *Duplex Air and Magnetic Brakes,* was tested for emergency stops from a speed of 44 m.p.h. on a 700-ft. section of greased track.

With both air and magnetic equipment operating it stopped on the greased section in 470 ft.

With air alone it ran through the greased section and 85 feet onto dry track before stopping.

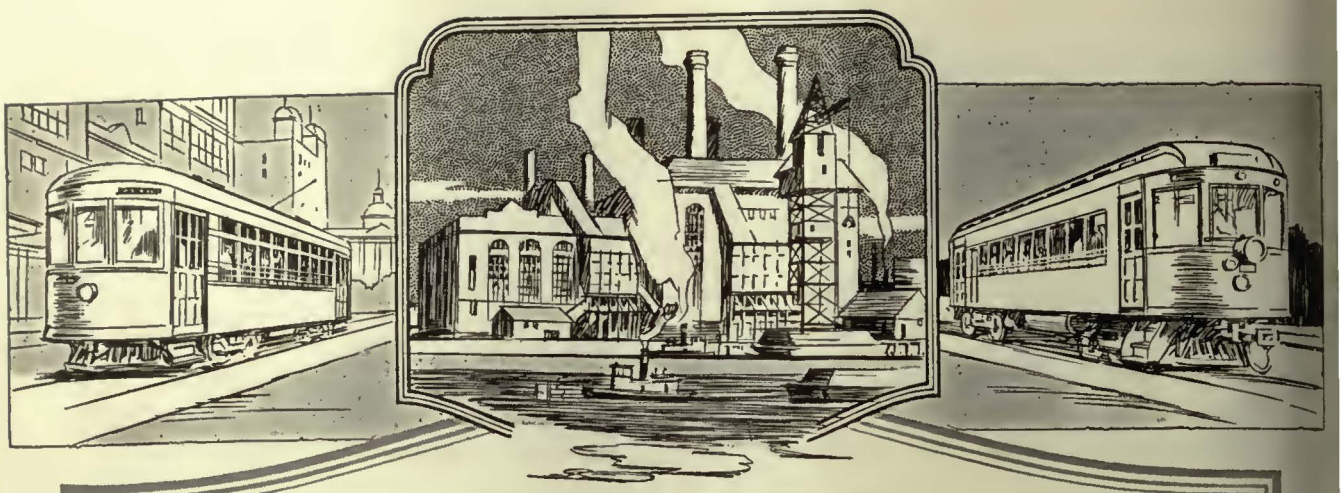
Pretty strong evidence of magnetic braking efficiency under adverse track conditions!

Technical data on request.

Cincinnati Car Company
Cincinnati, Ohio

CINCINNATI
BALANCED LIGHTWEIGHT CARS


If it's
MOTOR
COACHES
stop
HERE
you
are
sure
of
these
things



OCTOBER—
an *Important* month
to Lubricating Engineers

—*and this is why:*—

Each year, at this time, Electric Street Railways have to meet certain operating conditions which have a seasonable phase.

Being in the Oil business, *we'll* stick to *that* end of it.

That is why we impress upon you that now is the time to begin changing your lubricants to meet weather conditions.

There is a good reason for this:

All oils tend to become a little thicker, a little sluggish, in colder weather.

The viscosity (fluidity or body) of all oils varies with temperature. In the application of lubricants to street cars it is the operating temperature that counts. As the weather gets colder, the oils you used all summer will thicken. They will not feed as freely. You can't change the temperature, but you can *change the oils* to compensate.

But weather doesn't change at a given date, so here's what we recommend:

Compensate gradually. Begin now (about the middle of October) adding steadily small quantities of lighter oils to the lubricants now on the cars. This will gradually lower the viscosity, keeping it normal all the time as winter comes.

Begin now, changing over to

TEXACO *WINTER* ELECTRIC CAR OIL
TEXACO *WINTER* AIR COMPRESSOR OIL
TEXACO *WINTER* GEAR LUBRICANT

Then all the time, even in the middle of winter, you will be fully protected by these carefully refined lubricants.*

We have worked out an interesting and economical technique on roads all over the country and shall consider it a privilege to have our TEXACO Lubrication Engineers discuss it with you in person.

As our stations are already stocked with the Winter Lubricants, we are amply prepared to handle your order for them now.

And remember, there is a TEXACO Lubricant for every purpose; for rolling stock or power plant—everywhere along the line.

*In spring, reverse the Process, gradually raising the initial viscosity of the lubricants so that, under the heat of summer, the oils will "fall back" to their original fluidity.

THE TEXAS COMPANY
Texaco Petroleum Products
17 BATTERY PLACE, NEW YORK CITY
DEPT. EX
OFFICES IN PRINCIPAL CITIES

Last Week

An announcement of the Coffin award to the Grand Rapids Railway Company—in which St. Louis Cars played a conspicuous part.

This Week

In recognition of the accomplishments of Grand Rapids

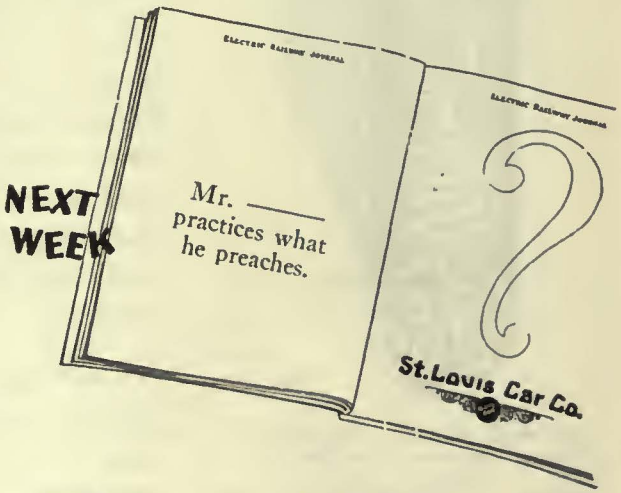
Not spectacular in the usual sense of the word—but an outstanding achievement in increasing the advantages of electric railway transportation for the well-being of the public and the benefit of the industry.

These facts based on the following operating figures won the Coffin Award for Grand Rapids.

For the year ending May 31st, 1927, operating costs were reduced 9.88% and net revenue increased 20.83% over the year of 1926.

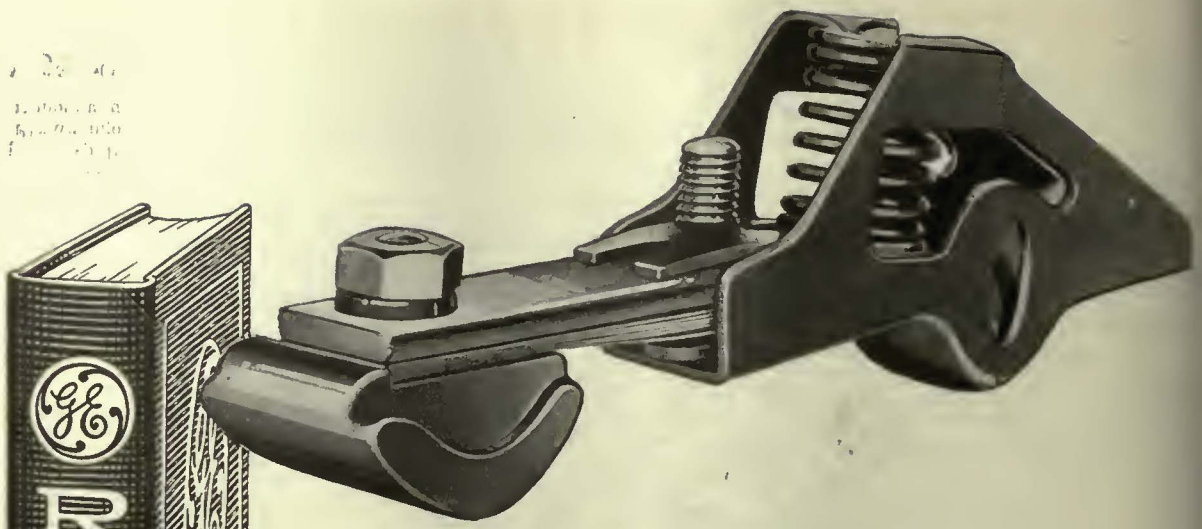
After charging off depreciation amounting to approximately 10% of its gross, there was available a balance equal to 6.40% of its rate base of $6,000,000—an increase of 41.68% over the corresponding period of 1926. And this figure for 1926 was 15.63% better than for 1925.

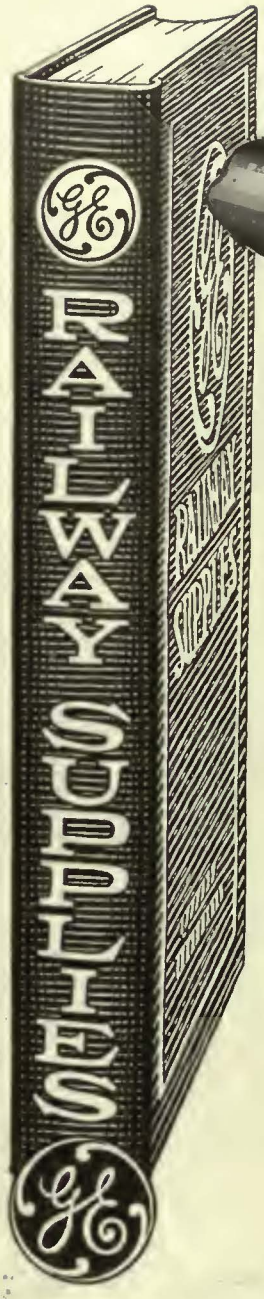
Small wonder that the industry honors its debt to Grand Rapids. Small wonder, too, that the Quality Shops is entirely satisfied to stand in the reflected glory for the part St. Louis Cars played in electric railway operating history for Grand Rapids!



St. Louis Car Co.

Quality Cars





The G-E Railway Supplies Catalog lists many items necessary for railway equipment maintenance. Use your catalog to simplify your buying.

Self-aligning fingers *for* better control

The new G-E hinged-type controller finger practically eliminates trouble due to broken and bent fingers. Contact pressure is maintained by means of a rigid hinged arm and a spiral steel spring.

The arm which carries the tip is made of steel and will not break or bend under the most severe operating conditions. The hinge end seats and rocks on a steel tongue narrow enough to allow full-width contact through the alignment of tip and segment. This feature reduces heating and burning of both segments and tips and greatly prolongs their life.

This finger is equipped with a removable tip. By replacing only the worn tips, practical economies are effected in controller maintenance.

Specify G-E hinged-type fingers for all finger replacements.

330-65

GENERAL ELECTRIC

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

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

olume 70 New York, Saturday, October 22, 1927 *Number 17*

Occasion for Justifiable Pride

SOME of the practices and the results accomplished by the track and electrical departments of the Chicago urface Lines, as presented by that company in its brief or the 1927 Coffin Award, are outlined in an article in is issue. Other phases of the property's accomplishents will be published in subsequent issues. These cords speak for themselves. But in interpreting the erformance of this largest street railway in the world veral pertinent factors should be borne in mind.

First of all, labor rates in Chicago are as high as in ny city in the country. That condition is not peculiar transportation labor, but is attributable, at least in large rt, to the generally high level of rates paid by various dustries in the city. Consequently, the management as faced not with a theory but with a condition over hich it had little control; that is, it had little opporunity for initiative in determining the prevailing level of bor rates. It did, however, have control over the facilies which directly affect the productivity of labor. The st per man-hour was fixed by conditions in the comunity, but the number of man-hours per job was partly the hands of the management.

So it is to the record of unit costs that we must look or a measure of efficiency. There will be found figures at show up very favorably with comparable properties other cities. Not only is this important fact made clear the company's presentation, but the reason is quickly vident. In Chicago machines are cheaper than men, nd so on every hand is found the substitution of machine or hand labor.

There is a deeper significance in all this. Even nominal oresight on the part of the management would dictate doption of machinery by an enterprise whose future was early mapped. Such, however, was not the situation f the Chicago Surface Lines. The franchises expired February, 1927. Since that date the property has been perated under temporary grants, and one of the conituent companies is in technical receivership.

Not only in the figures themselves, but in the conditions nder which they were recorded, lies the true measure f Chicago's accomplishments. Machinery calls for capal and to get capital requires credit. It is one thing put money into an enterprise which is promising, but requires an entirely different quality of foresight and ourage when no bridge is visible over troubled waters.

Chicago turned hard cash into more cars, new and ebuilt track, more efficient substations and maintenance achinery to keep these facilities at the highest possible tandard of efficiency, despite costly labor and an uncerain future. In no city of the country has there ever been like demonstration, on such a scale, of faith in the undamental need for street railway transportation, in the ultimate judgment of the American people toward a transportation management or in the power of demonstrated efficiency to win a square deal for invested capital. In most cities the approach of such a franchise condition as now exists in Chicago has been accompanied by physical deterioration and operating lassitude.

There is strong evidence that the full significance of the Surface Lines management's performance during the past several years is gradually penetrating the public consciousness in that city. When an equitable franchise settlement is reached—such a result seems inevitable if the present policy is continued—there will have been written what is perhaps the most glorious chapter in all recent local transportation history.

What the Maintenance Contest Teaches

GOING over the many items submitted in ELECTRIC RAILWAY JOURNAL'S Maintenance Contest one is impressed particularly by the large variety of problems with which electric railway maintenance departments are confronted. The articles show an earnest desire on the part of the men who submitted them to lower maintenance costs, to provide more efficient and better methods, to eliminate fatiguing operations and manual labor, to overcome troubles experienced in the various operations and to provide improved equipment to do the work.

Sometimes shop-constructed equipment is employed which might be considered crude, but time and labor are saved by using it and the need for improved equipment of this character is demonstrated. There are two reasons why this equipment is built in electric railway shops. First, few devices such as are needed for these special operations are available ready built by the manufacturers. Secondly, the railway has the material and labor necessary for making these, and managers frown on authorizing necessary appropriations for new and untried equipment while the shop forces can build such devices as will satisfy them and charge the cost to maintenance.

Frequently, after apparatus designed and built in the shop to serve a specific purpose has been given a tryout and changes that experience shows are necessary have been made, the improved device may be put on the market in commercial form by a manufacturer.

Another lesson learned from a study of the material submitted in this contest is that there is particular need for the interchange of ideas among maintenance men and the adoption on each property of the more progressive methods and equipment that are found of value on other railways. There seems to be a hesitancy on the part of some to use a method because it originated elsewhere, or, on the other hand, to broadcast their own methods that have been found of particular value. Much good will result from a free interchange of ideas.

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

Good Cars Deserve Good Track

WITH the trend toward better accomplishment in railroad operation one item is receiving too little consideration—the track. Strenuous effort is being made to improve public relations through the use of better appearing and riding cars and other means of sales appeal. But, alas, the track is down in the dirt and in a fair way to be overlooked or given scant attention. It requires no detailed analysis or proof to show that this is short-sighted, and particularly so for the interurban railway. A rough track shakes a good car to pieces and even a good car makes the bad track still worse.

Aside from the mechanics of the problem, which determines cost, rough track drives away the passenger. Instances can be cited without number to prove this, but the following is typical. An executive of a large city system has occasion to use an interurban road to another large city and the necessary pass to permit his free use of the electric line. This system is well equipped with the most modern of cars, which would furnish a most enjoyable ride were it not for a rough track. This executive, rather than submit to the rough-riding track, takes the steam train and pays his fare. If the electric railways cannot sell their wares to members of their own fraternity, how can they hope to stimulate public patronage? There is nothing more terrifying than a high-speed interurban car lurching from side to side.

An Engineering Accomplishment in Tongue Switch Design

EMPHATIC approval of the recommended design for a standard solid manganese steel tongue switch registered by way engineers at the round-table luncheon held in Cleveland during the convention serves particularly well to illustrate the successful working of the new method of conducting Engineering Association studies through special committees, which was commented on in an editorial last week.

To those versed in Engineering Association affairs a near-miracle has come to pass. Five years ago no way engineer would have ventured to hope that such a standard could be adopted, but the special committee, in securing agreement among both manufacturers and users on the details of such an important piece of track mechanism, has accomplished just that object after only three years.

It is doubtful if a large committee constituted as the way committee was formerly, with nearly 30 members, could have done this in so short a time, and the immediate approval of the new design gives good evidence of the value of the special committee method for the study of highly specialized subjects and emphasizes the merit of the important change in conduct of Engineering Association committee work begun during the year 1925-26.

What a standard tongue switch design means to the industry is readily apparent to executives as well as engineers, and the display at the convention of an actual switch made to the new design was a stroke of good business. Every one could see what was being talked about. The luncheon discussion of the switch was another piece of good management. It seemed to interest the engineers who should use the switch in the need for actual purchase and use under traffic tests which are necessary to develop the value of the several novel features found in the new design.

The special committee responsible for the design deserves great credit for its work. It remains for executives and way engineers generally to do their part in making test installations, thus assisting the committee and showing appreciation of its efforts to aid in securing further economy in operation which should result from this important piece of standardization work.

Time Saving Important Factor in Reducing Maintenance Costs

LONG hours of labor were the rule in repair shops of yesterday, the wages paid workmen were small and raw material was low in price. These economic factors permitted the use of cut-and-try methods of repair, which did not serve to awaken the human consciousness to the great importance and value of time.

Much old equipment is still in use today. Work done by it may be quite well finished, but when checked with the economical production resulting from use of up-to-date equipment, the time taken is astonishing. In these prehistoric shops it is quite usual to find an obsolete motor running the entire system of shafting. If it is necessary to drill only a ¼-in. hole, the whole plant must be set in motion so that the drill press may run. Compare this arrangement with some of the modern shops, where each tool is driven individually and where no energy is wasted to drive machines not in actual use.

Time saving of today does not include alone machine tool design or methods of installation and drive. In modern shops much is being done to promote the required efficiency through the use of special appliances, jigs and fixtures. The parts when completed or repaired with the assistance of these devices have longer life because of greater accuracy and precision in manufacture. Such fixtures also make possible interchangeability of machined parts, with resultant saving in installation.

Jigs and special fixtures frequently reduce the time and energy required for repairing car parts by more than 75 per cent of that used but a short period ago. The use of this improved equipment has made possible the carrying out of many repairs to parts where previously they were replaced by new ones. The worn parts were scrapped indiscriminately, and the new ones were put in without particular thought of the cost of the material or the wastefulness of such a procedure. Now many railways have reclamation departments, so that the parts removed are sent to these and they are so reconditioned as to again be able to serve as well as the new parts.

The effect of the maintenance department's performance on reliability of service and upon the condition in which the passenger finds equipment is most marked. The very life of electric railway service depends on its reliability. Interruptions of service due to failures of equipment, track or line are a serious detriment to the reputation of any company and to any railway organization. It takes but few such interruptions to put the company in a bad light in the eyes of the public and its patrons. In addition, maintenance forces play an important part in fixing the expenses of operation. In proportion as the performance of maintenance forces increases or decreases, operating expenses increase and decrease, and these have a marked effect on the margin of resources that the management has available for the improvement of service to the public. Officials must give increased attention to maintenance methods. One of the least expensive improvements that can be made is to provide special tools and fixtures for doing the work so that it can be carried out more efficiently and so that the parts, when repaired, will be of the highest type.

Absentees from Formal Discussion Detract from Value of Meetings

EFFORTS made by the program committees of the various associations to arrange well-balanced meetings are defeated if men who promise to participate in the discussion fail to appear. This year a special endeavor was made to liven up the proceedings by reducing to a minimum the time spent reading formal reports. It was thought that this time could be spent more profitably in numerous short discussions in which transportation men from all over the country could give their views. That this plan is a good one was clearly shown by the lively interest evinced by the delegates in the discussion. But there was not enough of it. The chairmen called on man after man listed on the program without response. Of 40 men scheduled to discuss various topics at the sessions of one of the affiliated associations only fifteen appeared. Eight were represented by substitutes and seventeen failed to participate in any way. From this sorry showing it is evident that those who have promised to discuss committee reports need to be aroused to a keener appreciation of their responsibilities. It might be well for next year's program committees to make note of this while the recollection of it is fresh, in order that it shall not be repeated at the 1928 convention.

Putting Line Maintenance on a Business Basis

DISCUSSION of trolley wire failures has been avoided in some quarters, like a plague or a hidden sin, although the resulting delay is very evident and can only give the public a more unfavorable impression of street car service. Each break is spectacular to a degree, and stands out to patrons of the road like an advertisement of non-reliability. From an economic standpoint, each break is extremely costly in car delay, loss of revenue and accident contingency.

However, despite the lack of publicity, overhead maintenance on many properties has advanced to such a point that the familiar cry of "trolley down" and the thrilling flash of the emergency crew to the scene is now a rare occurrence. On these roads preventable wire breaks do not exist, because the wire is repaired before the breaking point is reached.

To the mind of the operator of each road, the overhead plant resolves itself into the contact wire alone. Some managements judge efficiency of the line department only by the rapidity with which breaks can be repaired. Little or no cognizance is taken by them of the number of failures, their causes and the car mileage operated. A better way of judging efficiency in respect to trolley wire breaks should be by the number of preventable breaks in direct ratio to the number of car-miles traveled. Certain data make it seem that this figure should be in the neighborhood of one failure for every 1,000,000 car-miles traveled. With this figure or the A.E.R.E.A. suggested average of 0.5 break per single-track mile as a basis of comparison operators can readily compare the efficiency of their overhead plant.

Many properties are now establishing records for uninterrupted service which were thought impossible a few years ago. These roads have lowered their trolley breaks to such a point that practically all that occur are due to agencies beyond the control of the overhead department. It is suprising to note that these results are being obtained at less total cost than with the "rush out and pick up" method.

What is possible on these properties is possible on all. The speed of the emergency crew must surrender to the accuracy of frequent inspection and adequate renewals, and thus lay the bogey of the trolley down to rest with the other "it can't be done's."

Raising Safety to a Major Factor in Industry

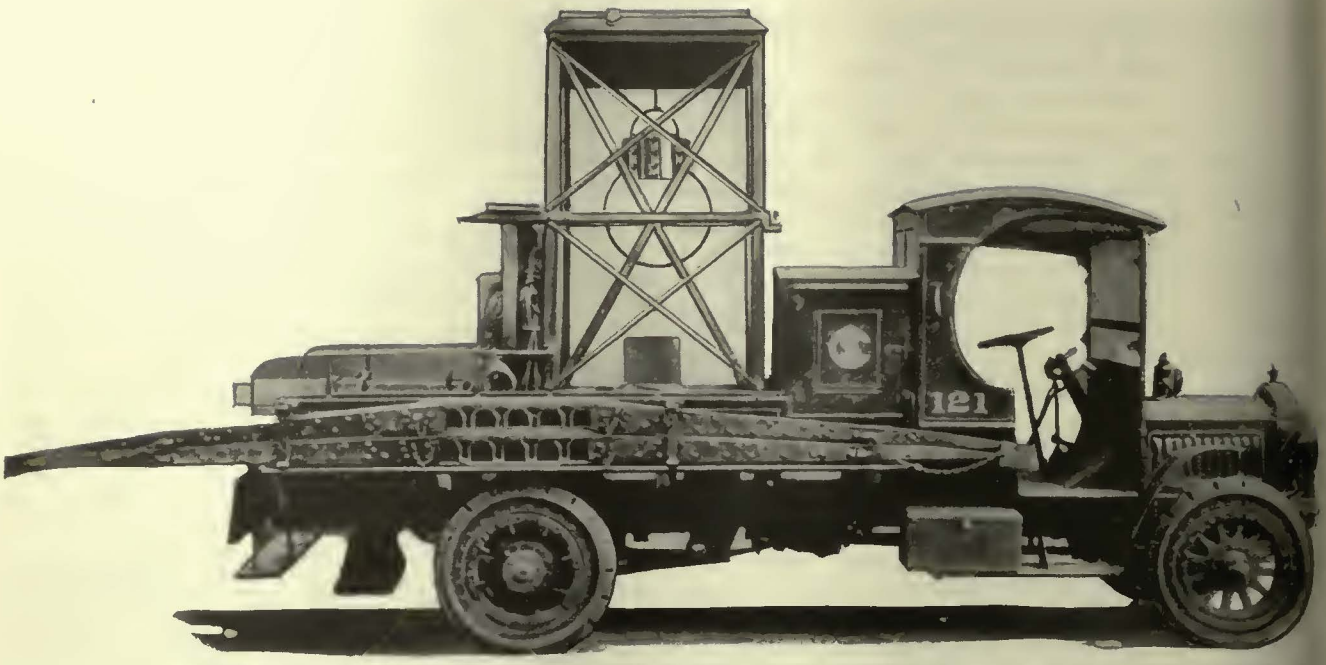
HIGH production and most efficient operation can be secured only through the elimination of accidents and their resulting costs, says a committee of the American Engineering Council, which for more than a year has been making an exhaustive study of nation-wide safety and production. As the result of representation by the National Bureau of Casualty and Surety Underwriters, by which it was financed, a study was made of twenty industries and 60 productive groups, based upon an experience of over 50,000,000,000 man-hours. Thirty-six local committees comprising 230 engineers in all parts of the country participated. Out of their investigation came the undeniable slogan, "The safe factory is the efficient factory, and the efficient factory is the safe factory."

The report contains thirteen detailed findings built up from data covering 13,898 companies, 122,028 company-years, 2,454,413 employees, 13,143,569 man-years, and 54,430,707,000 man-hours.

From these data there have been deduced several axioms, among them: (1) Maximum productivity is dependent on the reduction of accidents to an irreducible minimum; (2) there is such a close relationship between safety and production that it is impossible for a plant to have continued increase in productivity unless at the same time it reduces its accident rate; (3) individual companies report that material reduction in accident rates can be obtained simultaneously with increase in production rates; (4) the rate of production per man-hour for the industrial groups studied was 13.4 per cent higher in 1925 than in 1922; (5) prior to this the rate of accident frequency per man-hour was 10.4 per cent lower in 1925 than in 1922; (6) accident prevention and performance in the past in each industry shows tremendous improvement, and similar results can be achieved by the remaining plants in each industry. Also, a great many do not analyze or even keep proper records.

Perhaps the most significant statement in the entire report is as follows: "The dynamic force which can obtain this highly desired objective has but one source: it resides in the management. Therefore, a responsibility that cannot be evaded rests on the managers and executives of industry to make safety a major interest and a controlling care. Here is the crux of the entire safety movement and one that has been lost sight of due to faulty methods of applying the safety program. The JOURNAL has stressed this point and would stress it again: No employee is going to respect the safety program when he is conscious that his employer does not. Safety cannot be assimilated in piecemeal. It must be a steady and consistent diet strictly adhered to by everyone, from the president to the office boy.

In fixing the responsibility for higher production and more efficient operation the American Engineering Council committee has called a spade a spade, something which should have been done in the safety field of engineering industries long ago. By its recommendations and its findings this committee has raised safety to a major factor in American industry.



Wrecking truck used by Chicago Surface Lines, showing method of carrying fire hose bridges. These trucks are of 3 to 3½ tons capacity

Track and Power Efficiency

Increased in Chicago

Chicago Surface Lines reveals in its brief filed in the Charles A. Coffin contest some of the methods and practices that have enabled the track and electrical departments of the company to hold down costs in the face of high labor and material prices

BOTH the track and electrical departments of the Chicago Surface Lines have been called upon to show a constantly increasing efficiency in order to meet that company's program of improved service and reduced costs while at the same time paying the highest wages, both for skilled and unskilled labor, of any property in the industry. The record of how this result has been accomplished, as revealed in the company's brief filed in the 1927 Coffin Award contest, is one of systematically reducing expensive hand labor to a minimum. At the same time, the company's policy of increasing and improving service in the face of expiring franchises that prevented the acquirement of new capital has taxed the ingenuity of both track and electrical forces to keep up with the constant demand for greater utilization of existing facilities.

The substitution of machine for hand labor has played an important part in increasing the efficiency of the track forces of the Chicago Surface Lines. Equipment of this department includes two sizes of air compressors, the larger unit with a capacity of 360 cu.ft. operating four concrete breakers or eight tie tampers, and the smaller machine capable of operating four tie tampers or two concrete breakers. Drake continuous mixers and those of the Chicago type, both mounted on trucks, are used for large concrete jobs. For smaller projects mixer-mobiles propelled by the engine of a 1-ton truck are used. Concrete materials are handled by bucket loaders. Rotary grinders of the Atlas type, rated at 7 hp., take care of electric seam-welded joints and electric welds on special trackwork, both manganese and high carbon. Vulcan type reciprocating grinders are used for thermit welds, and electric hand grinders for the throat ways of manganese mates and frogs where one run is used more than another. The hand grinders are particularly valuable for use on emergency curves in the downtown district. Rail corrugations are removed with six Kerwin grinder cars. For straight trackwork, electric boring and spike-driving machines are employed. Duntley track drills are used for tie-rod and fish-plate holes.

For maintenance work, an asphalt road repair outfit has been found to be of great assistance, not only for the specific duty for which it is designed but for heating concrete materials during winter work. The company also has a number of Differential dump cars and flat cars, the latter equipped for unloading ballast with air-operated sliding trapdoors.

Special attention has been given by the track department to switch protection. There are on the system 2,074 trailing switches, of which 179 are protected. Protection is divided into four styles: Electric, lever (a Chicago Surface Lines product), spring and tongue-holding devices for paved streets, and the standard ground throw and high stand type for open track. In 1924 only 7.08 per cent

derailments were due to track imperfections. In 1925 and 1926 there was a further reduction of 6.05 and 5.83 per cent respectively.

In the matter of welding thermit joints, the Chicago Surface Lines has some interesting figures to show. It has been possible to weld approximately 2,200 joints without a single runout, more than 400 per cent more joints than experts declare can be expected. Competent supervision before the process starts has resulted in obtaining 190 joints to each crucible lining. Electric seam welds with the carbon arc process, used to salvage broken electric or cast welds, have been employed with great success and without interfering with operation.

Due to the use of power machinery in maintenance of way, the labor cost and productivity show relative reductions and increases. On the basis of wages in 1921 being nearly 346 per cent over the 1913 scale and labor cost 330 per cent increased over 1913, the company found in 1926 by the introduction of power machinery that while labor rates had only decreased to 325 per cent over the 1913 scale unit labor costs had dropped to 238 per cent of the 1913 figures.

Eighty-six per cent of the track paving in Chicago is of 5-in. granite blocks from 7½ to 15 in., depending upon rail heights. In addition, 18 miles of 19-in. concrete paving has been laid, the rails being flanked by granite blocks.

Power for the 1,080 miles of track in Chicago is supplied through seventeen modern substations. Some idea of the power problem may be gained from the fact that the maximum hourly system loads show an increase from 124,400 kw. in 1920 to 151,800 kw. in 1926. Although this is an increase of 22 per cent it has only necessitated increasing the substation capacity by $3\frac{1}{10}$ per cent. Recent figures compiled during the Christmas peak of last year revealed that the maximum hourly load on the system was 3.5 per cent above its rated capacity. During this period one substation carried an hourly overload of 40.3 per cent.

Many factors enter into this record of the electrical department. To begin with, the thermal capacity of the machines has been increased by replacing with mica tape the old-style fabric armature insulation on the synchronous converters. Perfect commutation has been secured by undercutting the commutators, and the air-blast transformers have been rebuilt to increase the amount of air circulation.

Modern type of concrete paving on Michigan Avenue at 126th Street in Chicago. The rail was installed in 1912 and 1913. Paving was placed in 1924

In line with its determination to insure a reliable power supply at minimum cost the management installed an automatic railway substation in October, 1926. This station, located in the northwest part of Chicago, is equipped with two 2,000-kw., 600-volt, 60-cycle, six-phase, compound-wound commutating pole synchronous converters that are supplied by outdoor power transformers. There is supervisory control equipment in the station that enables the operator in the nearest manually operated station to control both units and all direct-current feeders.

Experience has shown a 20 per cent reduction in the cost of maintenance and operation per kilowatt-hour converted in this type of station as compared with a manual substation of like capacity. Among other things the station includes a natural ventilating system developed by the company's men. While on this subject it is interest-

Precautions taken by Chicago Surface Lines to protect track workmen in the streets. The simple safety gate blocks the work area effectively

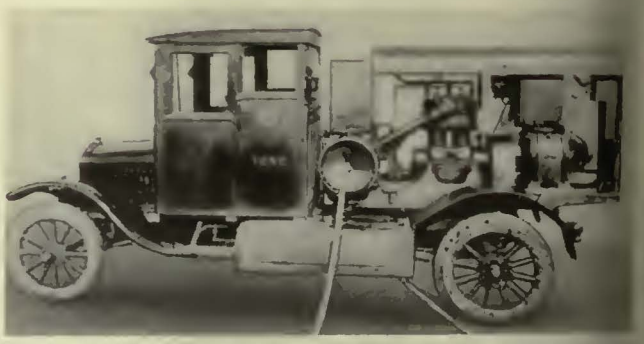
Barber-Greene bucket loader, in combination with a Drake continuous mixer, speeds concrete work in the Chicago track department

ing to note that there has been a decrease of 11.4 per cent in the cost per kilowatt-hour for substation employees during the past five years, this in face of an increase in the wage scale. Cost data on materials and supplies indicate a decrease of 23.1 per cent between 1920 and 1926.

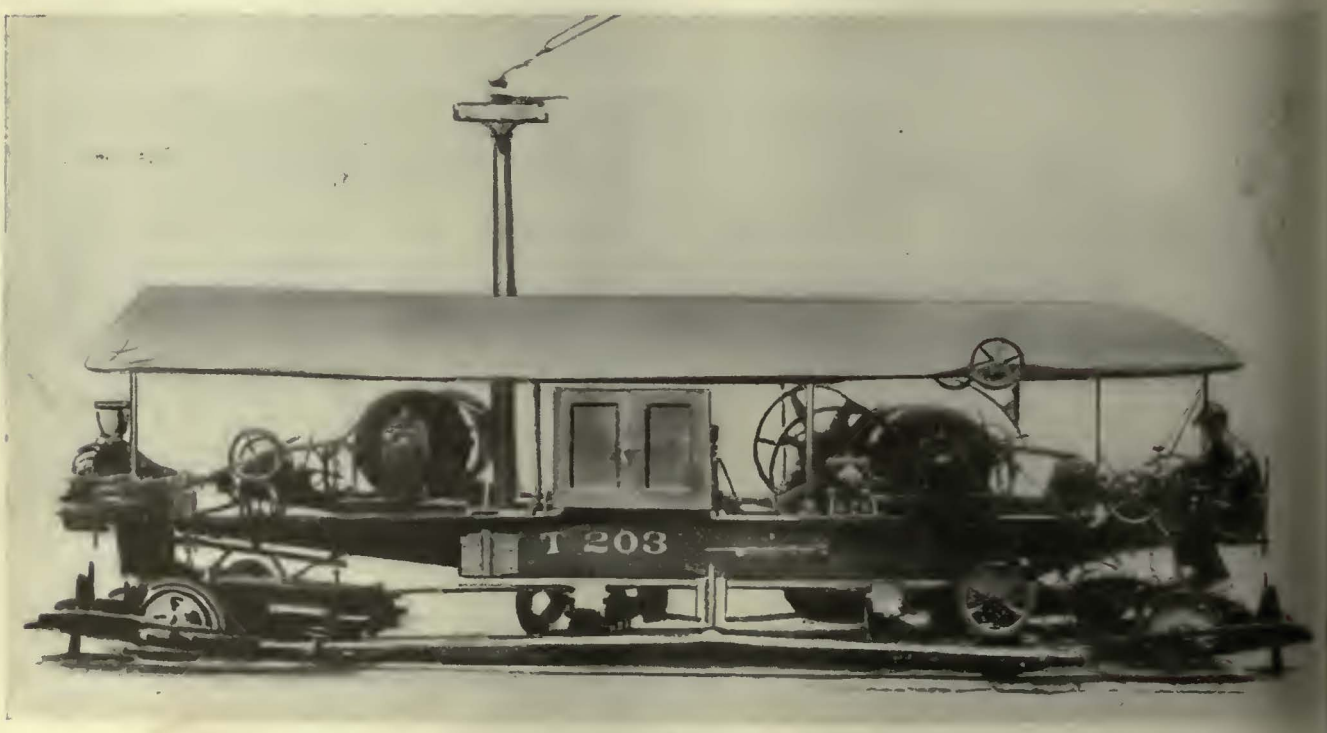
The installation of Economy meters on passenger equipment and the creation of a car meter division, which were decided upon in 1924, have brought about a marked saving in energy, represented by a 7.6 per cent gross decrease in energy consumption per car-mile measured at the car. The company points out that there is an additional saving which is not shown by this figure, due to the operation of more cars at a greater speed and that they carry more passengers than in 1924. Included in the organization of the car meter division are twelve supervising motormen who act as energy-saving instructors for the system's twelve transportation districts. These men, through the medium of accurate records of the meter readings for all motormen, are able to segregate the inefficient operators for the purpose of giving them special instruction. As an incentive toward power conservation, contests are conducted among the twelve divisions, the one making the best record receiving a flag trophy.

In order to maintain the 3,500 meters in use by 7,000 motormen there has been developed and turned out from the company's shops a meter test car—which is an electrical testing laboratory on wheels. This unit is equipped with standard trucks, four motors, control apparatus and air brakes. One-half of the car contains power generating and distributing apparatus, small tools, storage batteries, etc. The other end contains facilities for cleaning, repairing and calibrating.

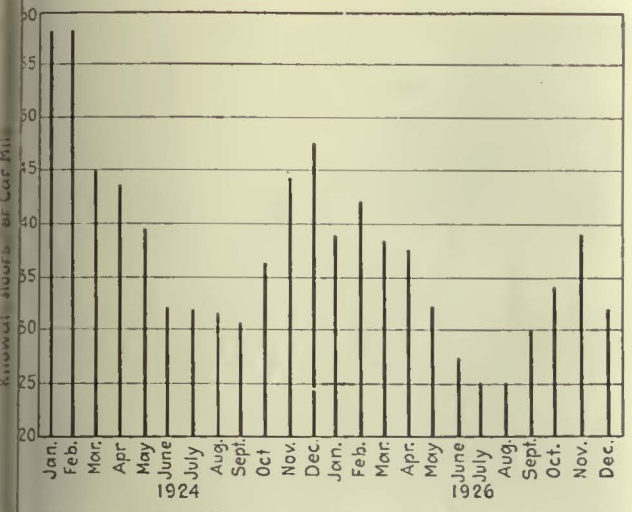
To prevent mercurial poisoning special equipment was designed by the company's engineers to take care of cleaning the meter mercury. For the past three years the maintenance cost per meter per year (exclusive of overhead) was: 1924, $1.81; 1925, $1.64, and 1926,



An Ingersoll-Rand Model 20 air compressor of 20 cu.ft. displacement, mounted on a Ford chassis, provides a flexible and efficient compressed-air unit for trackwork



Rail corrugations in Chicago are removed with a Kerwin double ended grinder that speeds the work and reduces cost in comparison with a single machine



Chicago Surface Lines energy economy story at a glance. The saving during the winter months is particularly important, since that is the period of peak demand

1929. The energy saving resulting from the use of meters has permitted car-miles operated since January, 1923, to be increased 8.4 per cent with little attention given to increasing distribution copper.

By the use of outdoor-type automatic reclosing circuit breakers for equalizing positive feeders, there has been a marked increase in trolley voltage that has obviated the necessity for adding positive feeders. This device is used to adjust the load between heavily and lightly loaded districts. A large investment for additional copper also has been avoided because the primary distribution system was originally designed on such a liberal basis as to admit of increasing loads.

From the standpoint of maintaining a constant flow of power in any eventuality, the Chicago Surface Lines employ most of advanced ideas and equipment known to the industry. Through the medium of a well-organized welding force, both on the line and in the shops, poles are kept in constant repair. In the street, where poles have failed at the joint and ground line, it is the practice to weld sleeves around these breaks. Experience in this class of reclamation work shows that the cost of welding is about 30 per cent that of a new pole. In the case of roadways that are being widened, where a 32-ft. pole is needed instead of one 30 ft. in length, the 2-ft. welded extension is made at about 10 per cent of what a new installation would cost. Welding is also being effectively used to reclaim broken poles, truck frames, gear cases, broken air compressor frames, broken brake-beam and truck castings, and a thousand and one auxiliary parts used on the property.

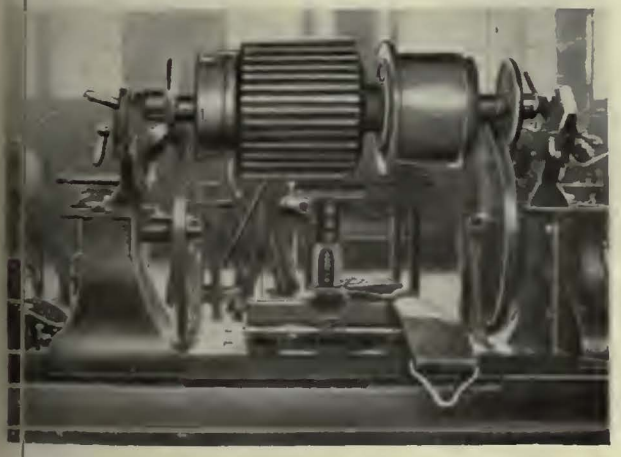
As the line of defense to insure an uninterrupted power supply, there is maintained a motorized department for maintenance and construction. Of the ten tower trucks owned, three are assigned to emergency patrol and are fully equipped to meet any trolley situation. There is one truck for each emergency district. Five of the tower trucks are of 3½ tons capacity, these having been bought in 1926 to replace obsolete equipment. Some idea of the economy effected by motorization is gained by the following comparison of former and present unit equipment. In place of four tower wagons, two reel wagons, fourteen horses, six teamsters and 22 men formerly required, there are now two tower trucks, one express truck with a reel rack, three chauffeurs and nine men. Recently a combination cable puller winch and pump for pulling lead-covered cable was acquired. This is mounted on a truck that is of sufficient dimensions to carry the equipment necessary for complete cable installations, including two large reels.

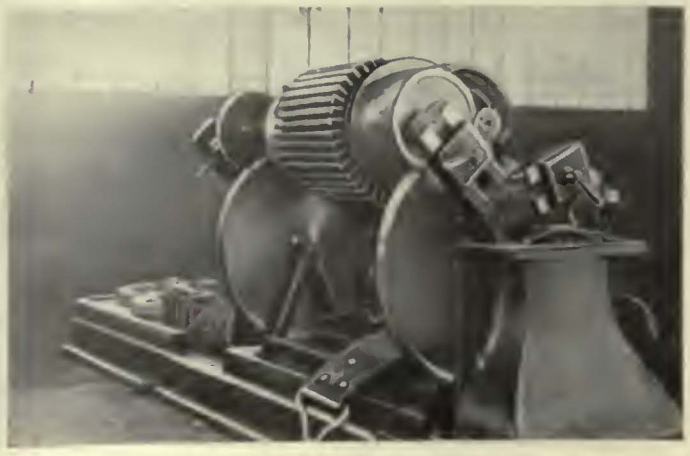
Balancing Armature Cores in Paris

SO MANY opportunities exist for an armature spider, core and commutator assembly to get out of true it is not surprising that many of them are out of balance when they are received in the electrical shop for rewinding. The effect of any considerable unbalanced weight in a rapidly moving armature necessarily is added wear on the bearings and strain on the housings. Recognizing this, the Metropolitain Railway of Paris, France, tests all armatures on a balancing machine before they are rewound. Two views of this machine, which is known as an "equilibreuse" and is manufactured by Jost & Company of Paris, are shown herewith.

The machine has two large disk wheels, one at each end, on which the armature is placed. These wheels are mounted with ball bearings so that they will allow the armature to turn freely. There is a pair of smaller ball bearing disks at each end, placed so that they will restrain the armature shaft and keep it from riding over the large wheels, thus preventing the armature from rolling off the machine.

The armature is delivered to the balancing machine





Two views of the armature balancing machine used in the shops of the Metropolitain Railway of Paris. The cores are equalized on this machine before being wound

by a travelinig crane. It is carried in a leather sling, of a type used to some extent in American shops. In order to prevent the possibility of damage to the delicate portion of the mechanism the armature is lowered onto a screw jack. shown in the center between the main bearings. The weight is then transferred to the balancing wheels without shock. After being set in place the armature is leveled up with a spirit level, then turned slowly two or three revolutions and allowed to come to rest. If it is heavier on one side, it will oscillate back and forth, finally coming to rest with the heavy side downward. It is then possible for a workman to add sufficient weight to the lighter side so that the core is completely balanced, which is indicated by lack of oscillation, the armature slowly coming to rest. The weight is usually placed on the pinion end. Sometimes as much as 10 lb. is required, while for other armatures ¾ lb. or less will suffice.

Incidentally, all of the armatures used on the Metropolitan are wound with copper strap instead of wire. Each slot holds five of these straps formed to shape, taped individually, then placed together and taped again. The conductors are placed in the slots in mica troughs covered first with insulating paper, then with two sheets of oiled linen, then with another sheet of insulating paper. The upper coil is held down with a wooden wedge extending the entire length of the slot, being dovetailed into its sides. The wood used for the purpose is hornbeam, which is quite similar to the American water beach, from which the elastic tips for fishing rods are usually made.

Rehabilitated Cars Secure Patrons for Railway

"TUSCARORA" is the name for one of two rehabilitated cars recently put in service between Detroit and Toledo by the Detroit, Monroe & Toledo Short Line Railway, Detroit, Mich. Plans for their rehabilitation included the placing of individual, fully cushioned seats of the bucket type commonly used by de luxe motor coaches. The cars are also equipped with a baggage rack

What the Detroit, Monroe & Toledo Short Line Railway has don in the way of rehabilitating some of its rolling stock. A baggage rack is located at the end of each car, where free checking obtains

on the rear platform for the free checking of passenge hand baggage by the conductor. The seats are individua chair type, leather upholstered.

"We have had," writes Mr. Roger, "a great man favorable comments from our patrons on this type o seat and they are attracting some business to the rai line from the coach line. The equipping of the two car now in operation was accomplished by removing the ol type seats from two of our all steel cars, repaintin the exterior and interior and giving each car an indi vidual name. Our intention is to equip other cars in like manner as conditions will warrant and operate then in limited service on our principal lines, including th line between Detroit and Cleveland."

Commenting further on the construction of the cars Mr. Roger continues: "The idea of the baggage com partment on the rear platform has been received favor ably by our patrons. This was installed to avoid th unsightly overhead baggage rack and to avoid the neces sity of having to bring baggage into the main section o the car, where it is more or less in the way of the pas senger.

The "Tuscarora," an old car in new dress which is attracting patronage for the Toledo Short Line Railway

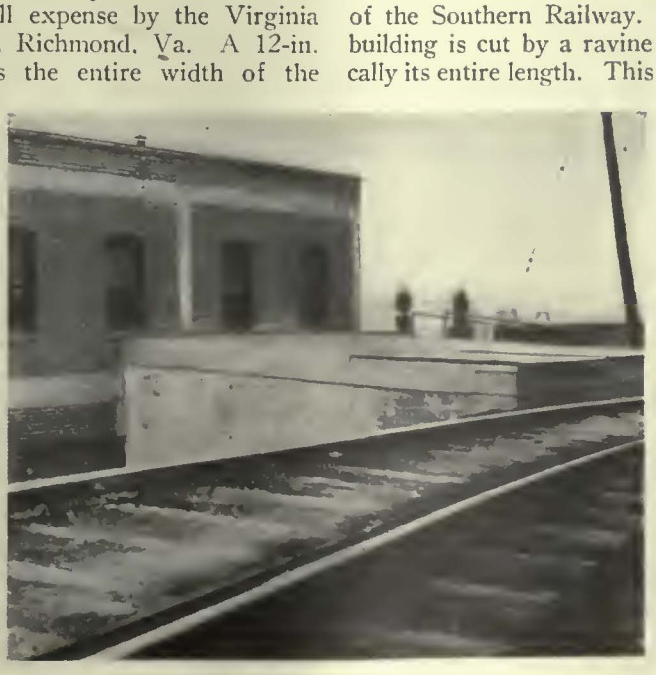
Home for Way Department Made from Carhouse

Shop, storage and sand-drying plant made from abandoned building in Richmond, Va. All maintenance of way and construction forces concentrated at this point

Plenty of room is provided for the storage of maintenance of way materials in this converted carhouse

SEEKING a suitable headquarters for the maintenance of way forces, a substantial brick and concrete building approximately 280 ft. x 75 ft. has been remodeled at small expense by the Virginia Electric & Power Company, Richmond, Va. A 12-in. brick wall extending across the entire width of the building divides it into sections 212 ft. long and 68 ft. long respectively. The 67-ft. section contains three rooms separated by brick walls, as shown in one of the drawings. The machine shop, blacksmith shop and dry shed loading room is approximately 59 ft. x 67 ft., the sand room 35 ft. x 15 ft. and the storage room 33 ft. x 15 ft. Wide doors permit easy entrance of motor trucks and cars. The larger section of the building is used entirely for storage of maintenance of way material.

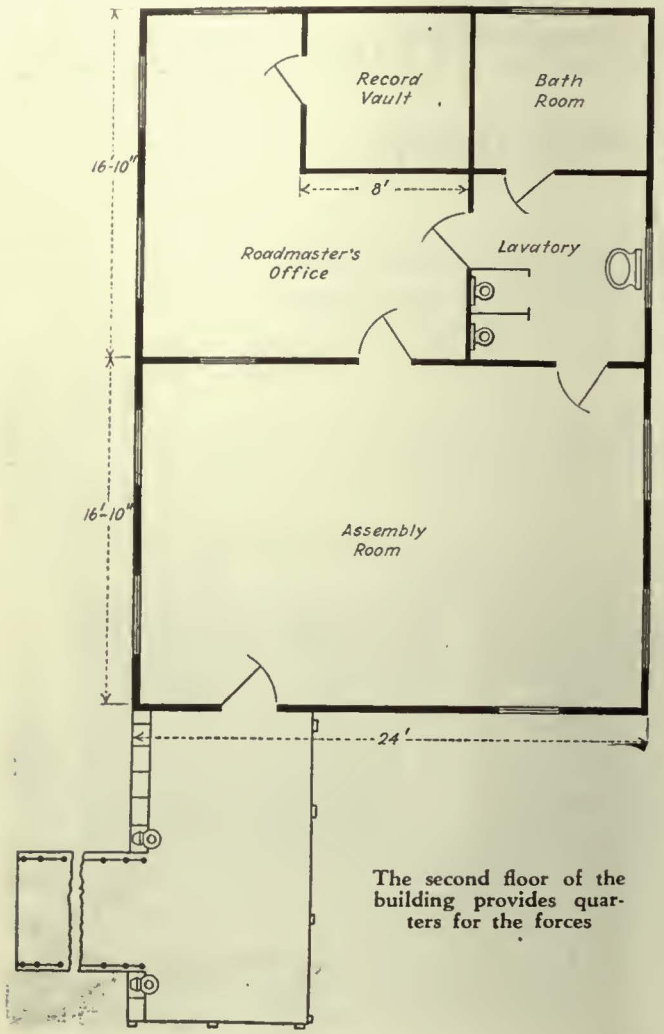
The building was constructed for a carhouse by one of the predecessor companies, but after the consolidation it was abandoned. It is, however, in an excellent location on a main line and within 500 ft. of the Southern Railway. The ground adjacent to the building is cut by a ravine some 20 ft. deep for practically its entire length. This provides a good place for disposal of excavated material and other waste. In the course of time the filled property will become valuable.



The roadmaster's office is accessible from the main line track above the sand-drying installation

Three tracks run into the building and one along the ravine, all being connected to the main line. The center track runs entirely through the building, connecting with the ravine track front and rear, while the others end at the dividing wall inside the building.

Special work and rails are stored along one wall inside the building, while on the opposite side are miscellaneous supplies. Between the ravine track



The second floor of the building provides quarters for the forces

and center track are bolts, spikes, tie rods, plates, etc. To facilitate the handling of the material by a motor truck a 6½-ft. paved driveway runs from the main road to the dividing wall within the building.

Sand-Drying Equipment

A feature of the installation is a complete sand-drying plant. A wet sand storage bin of 156 cu.yd. capacity has been installed adjacent to the main line track, which is high enough that sand can be dumped into it direct from flat cars. This bin is 18 ft. x 26 ft. with 12-in reinforced concrete walls. The floor is inclined, with a maximum depth of 18 ft. A chute from the lower end of the bin permits delivery of wet sand by gravity to the sand-drying room. One-third of the bin has a hinged cover, while the balance is covered with reinforced concrete.

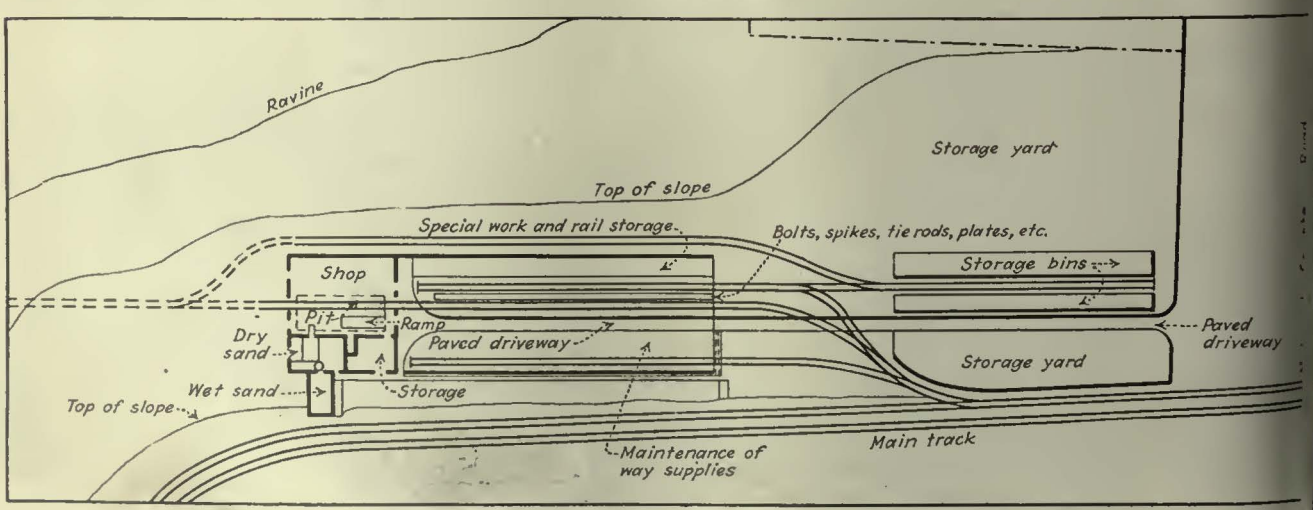
The drying room is equipped with a sand-drying stove and a reinforced-concrete dry sand bin, built in two sections, one for reserve with a capacity of 25 cu.yd. and the supply section 12½ cu.yd. The inside dimensions are 9 ft. x 15 ft. The reserve bin is 5 ft. deep, while the supply bin has an inclined floor, with a depth of 5 ft. at the lower end. A chute from the supply bin passes through the brick wall, entering a pit in the machine shop, which is 15x60 ft. A 6-ft. ramp 30 ft. long is built in this pit directly in line with the driveway, so that motor trucks can be loaded with dry sand by gravity. The only manual labor required is that of shoveling the wet sand into the stove and the dry sand into the storage bin. Members of the regular organization do the work, since emergency men are on duty day and night. An average of 8 cu.yd. of sand is used daily.

It is planned to install suitable equipment in the machine and blacksmith shops for the way department's maintenance work. The expectation is that this arrangement will prove economical and decrease delays while waiting for other departments to do work.

A floor over the sand-drying section of the building is used for the roadmaster's office, record vault, bathroom, lavatory and assembly room. This has an area of 25 ft. x 34 ft. During inclement weather the assembly room is used for foremen's conferences for discussion of maintenance of way problems and the advancement of a program for closer relations.

Boston Elevated Announces Educational Program

ANNOUNCEMENT has been made of the Boston Elevated Railway's educational program for 1927-1928 in a pamphlet recently issued to the company employees. The program for the year is simple but varied, including some popular courses offered in previous years and two or three new ones. The schedule which has been arranged so that employees can get



Layout of the maintenance of way building of the Virginia Electric & Power Company at Richmond

variety of opportunities, includes the following subjects: Supervised reading, history-making events of the day, public speaking, correct English, investing savings, increasing personal powers, every-day law, fabric painting, maintenance of automotive equipment, and psychology of personality. In addition there will be foremen conferences and group conferences in various departments.

In the announcement, Edward Dana, general manager, stated in part: "On Nov. 1 we open the fifth season of the Boston Elevated educational program. The enthusiasm which marked the closing exercises last May showed that the courses had met a real demand on the part of a large number of employees. The aim of the educational program is to meet the needs of Boston Elevated men and women who realize that their personal satisfaction and their progress in the industrial world depend upon their mental capacity and alertness."

New Bus Repair Shop in Los Angeles

Particular attention has been given to provide a well-lighted and ventilated building. Fourteen pits provide repair space for 30 buses at one time. Two 5-ton electric cranes handle material

RECENTLY a new bus inspection and repair shop was completed by the Los Angeles Railway, Los Angeles, Cal. The building is 100 ft. wide and 310 ft. long. It is of brick, steel and concrete and is equipped with a wet pipe automatic sprinkler system.

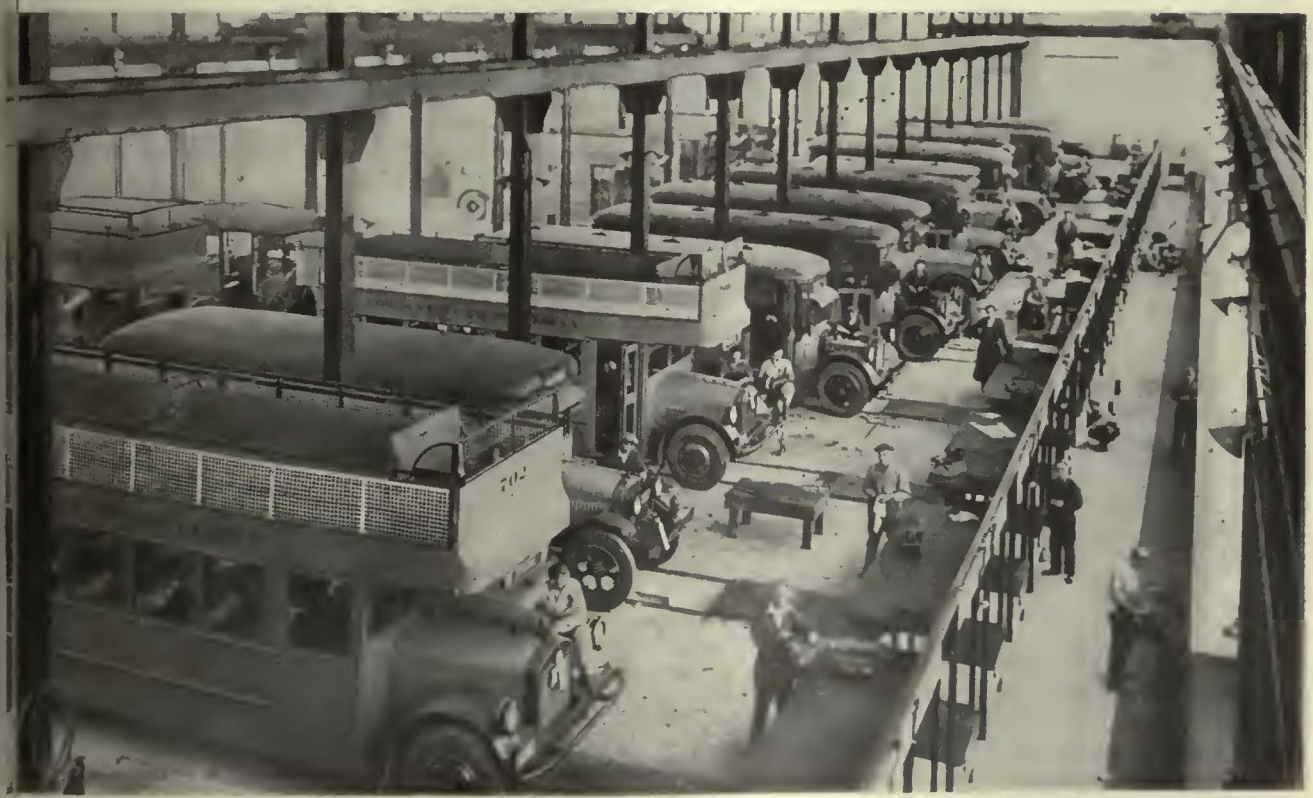
To provide the most modern mechanical equipment for the inspection and repair of the fast-growing fleet, engineers of the Los Angeles Railway made a comprehensive study of desirable features. Particular attention was given to the lighting and ventilating of the building, with a view to facilitating the work and improving conditions for the mechanic. There are three bays to the building and the three roofs are arranged in sawtooth fashion, each section being equipped with skylights running its entire length.

Windows along the north side of the building run the entire length, each window being 12 ft. wide and 24 ft. high. They are arranged so that each workman's bench has an individual window. Buses enter the building through the south side, the floor of the garage being on the same level as the yard. Fifteen pits running crosswise of the building accommodate 30 buses at one time for inspection and repair. Each pit is 3 ft. wide and 4 ft. 6 in. deep and is equipped with recesses for tool boxes and electric lights for the mechanics.

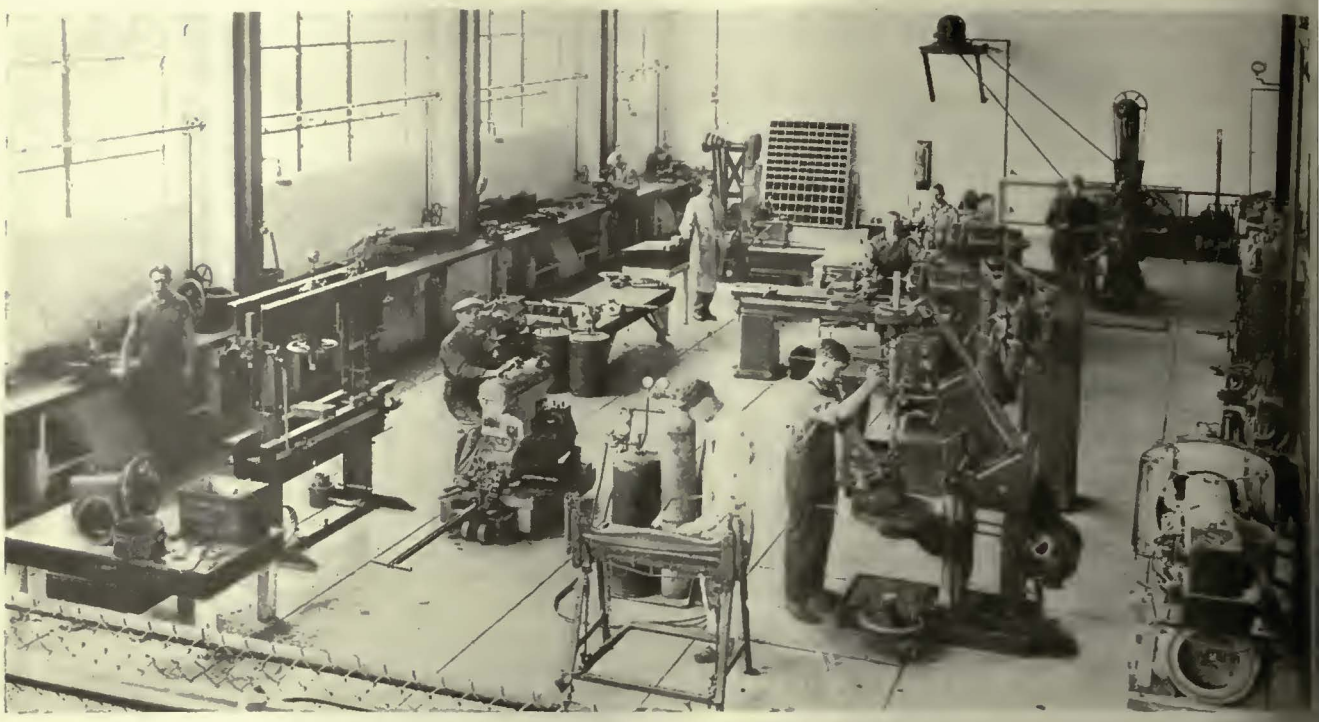
In addition to these, a main pit runs lengthwise of the building on the north side and the fifteen cross pits open into this main pit. In the main pit there are workbenches on both sides and on the south side tool cupboards or lockers are provided, so that each individual mechanic has one assigned to him. Between these tool lockers are steps to the floor level. The mechanics on the floor level also have their individual benches and there is no necessity for a mechanic in the pit to come to the floor level for his tools, or the mechanic on the floor level to go to the pit. All workbenches are covered with sheet iron to give increased service.

Two 5-ton electric cranes with three-motion operation do all the lifting and handling of material. They are controlled by pull handles which can be operated by the mechanics from the floor or pit level.

An accompanying illustration shows the machine shop and the tool room, which is situated at one end of the building. This is equipped with lathes, drills, etc., to take care of the numerous repair operations necessary.



General view of interior of repair section. A long pit at the ends of cross pits is used for bench-work

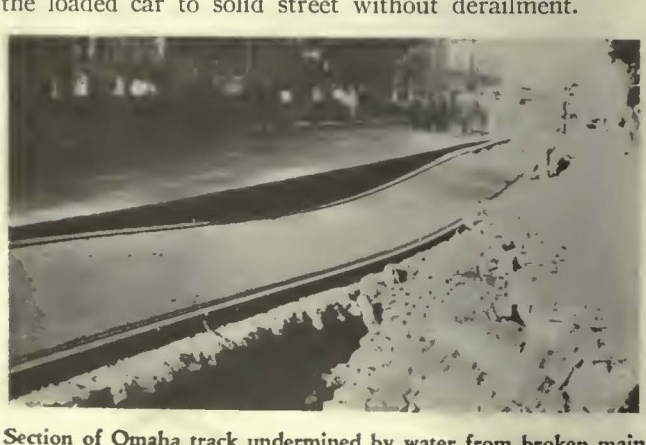


The machine shop and toolroom occupies the east end of the building. It is well equipped with the latest tools

Showers, washrooms, toilets and lockers for the mechanics are located in the basement, directly underneath the toolroom. The foreman's office, battery room and a portion of the storeroom adjoin the toolroom on the ground floor. A mezzanine floor immediately above these departments contains offices of the superintendent of automotive equipment and also the general office of the garage, together with a storeroom. This storeroom is equipped with a hydro-electric elevator for handling material between the two levels.

Car Breaks Through Undermined Omaha Track

ON THE evening of Sept. 8 a double-truck street car of the Omaha & Council Bluffs Street Railway, weighing about 23 tons and loaded with passengers, broke through an undermined section of track at 38th and Cuming Streets, Omaha, Neb. Luckily, no one was injured and the car merely received injured brakes due to the twisting of the car. The veteran motorman, who felt the car sinking and heard the noise incidental to the breaking of the pavement, applied all the power and rode the loaded car to solid street without derailment.



Section of Omaha track undermined by water from broken main

The undermining, which was caused by the breaking of a 24-in. water main, developed under a 220-ft. section and made a cavity from 7 to 10 ft. deep and from 10 to 15 ft. wide. Due to recent repaving, the escaped water could not break through the street. Following the tracks for 220 ft. it finally broke through a street fill and flowed to a low tract at the side.

It is interesting to note the track construction which supported the considerable weight before sinking. The track is constructed of Lorain rail, section 97-424, laid on 6-in. x 8-in. x 7-ft. sawn, creosoted, red oak ties, under which is 6 in. of crushed stone ballast, rolled and pneumatically tamped. Between the ties and 2 in. above is a concrete base of 1:3:5 mixture and the surface pavement is brick block grouted.

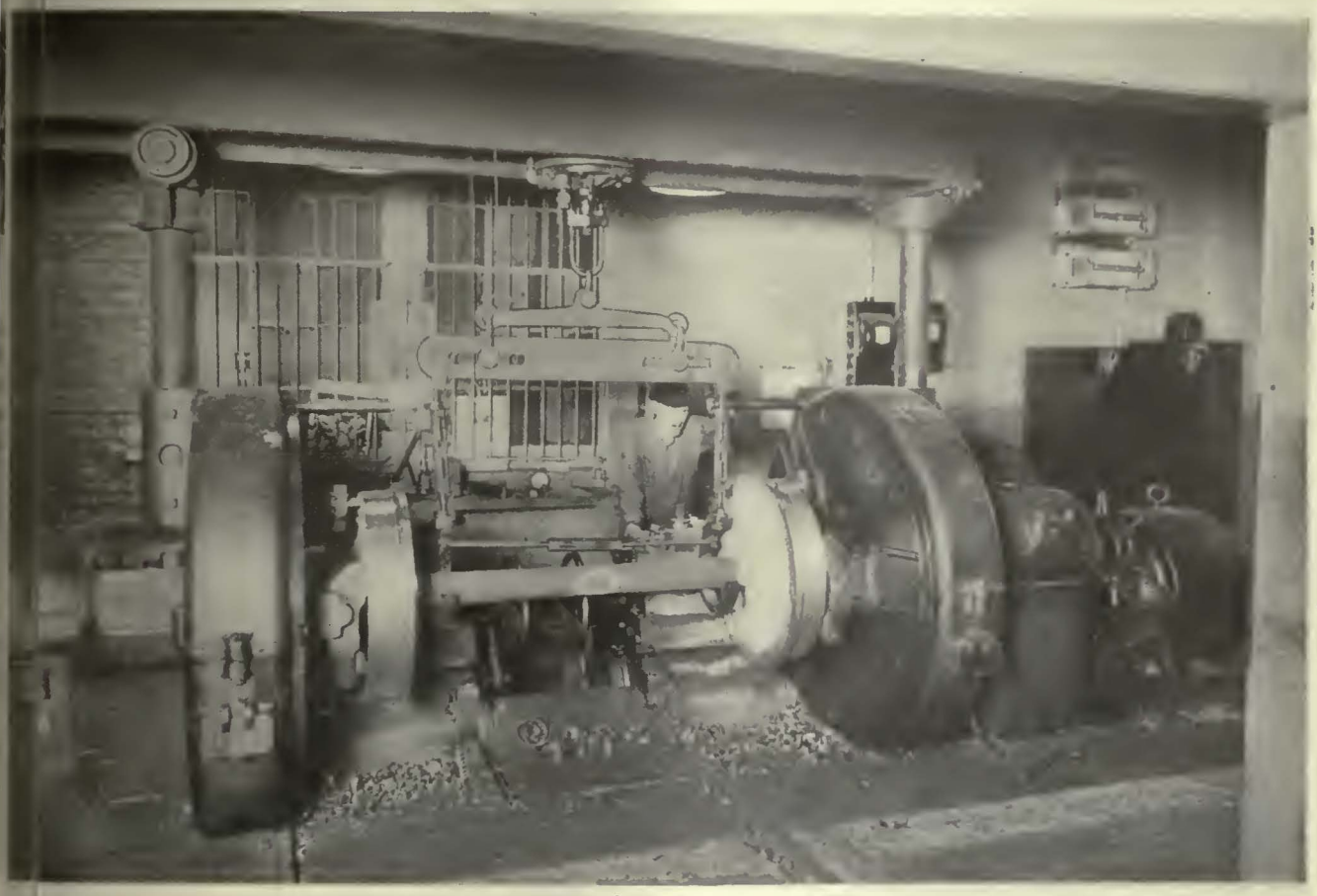
About 1,000 cu.yd. of dirt was hauled in to fill up the street. Operation of cars was taken care of through use of the other track and temporary cross-overs.

California Lumber Company Electrifies Logging Railroad

ELECTRIFICATION of the logging railroad lines of the Red River Lumber Company, whose main plant is at Westwood, Cal., is, in the opinion of officials of the company, a pronounced success. More than 25,000 cars of logs are transported per season to the mill at Westwood over 17 miles of standard gage road from Chester. In addition to the main line there are also four passing tracks totaling approximately 6,000 ft. in length. The electrification program includes the passing tracks in addition to the main line. Power is derived from the company's steam and hydro-electric plant, supplemented by the three-phase, 60-cycle, 33,000-volt power line from Hat Creek which passes the railroad at Almanor Junction. Electric locomotives are of the steeple cab type of 60 tons each on four driving axles. Each locomotive is equipped with four railway motors, rated at 200 hp. each, with forced ventilation.

Improved Wheel Equipment
for Chicago

Turning of about 3,600 pairs of wheels annually is handled by new lathe—Efficient equipment for wheel handling and transporting between shops, together with effective wheel storage, speeds up work



This wheel lathe replaces three old ones

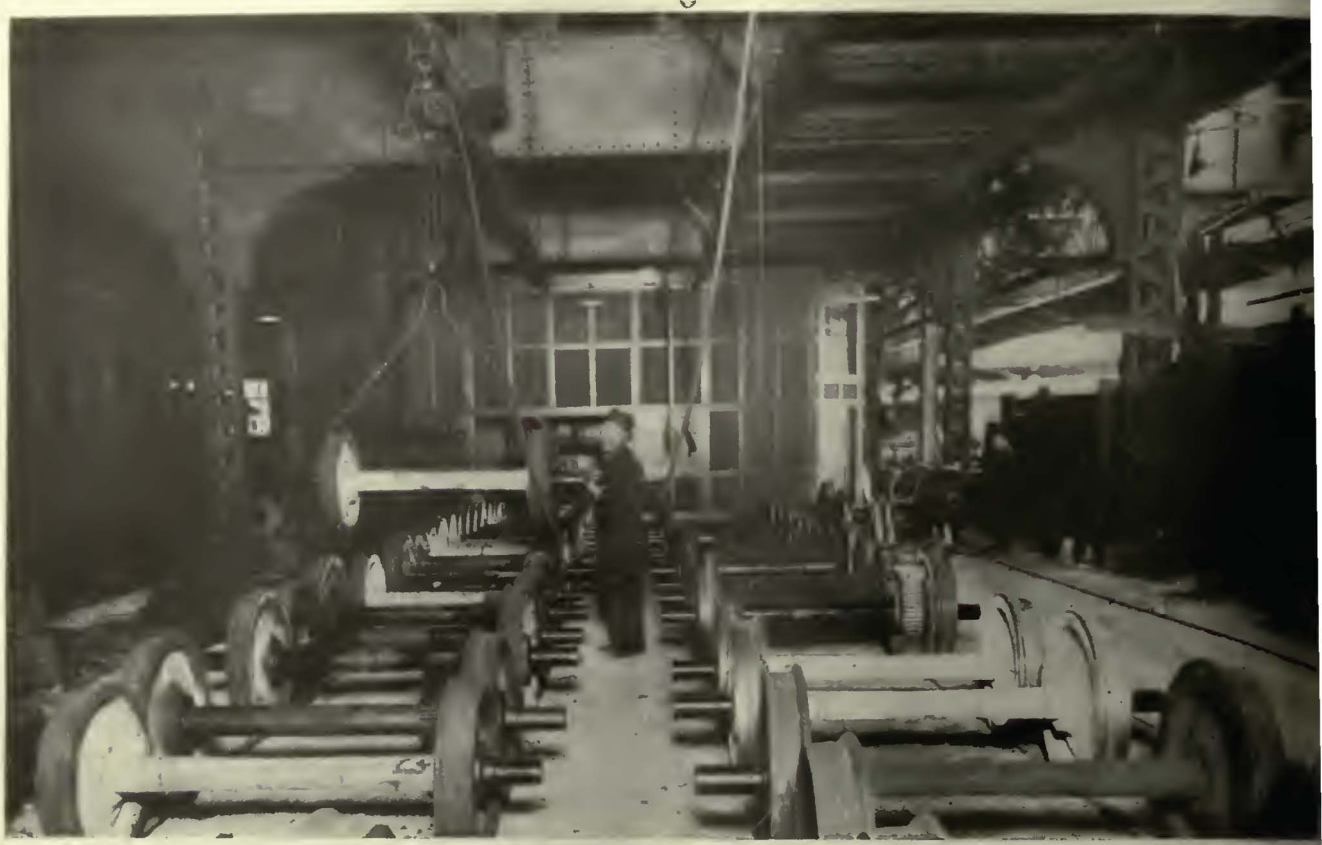
EFFICIENCY and speed dictated the purchase of a new high-capacity motor-driven wheel lathe for turning worn car wheels to correct contour which wa recently placed in service by the Chicago Rapid Transit ompany. The new machine is a Sellers lathe, weighin about 39 tons. It is set on heavy reinforced concrete fo ndations and inclosed in a special building at the W son Avenue shops.

he total installation cost approximately $35,000. It als included motor-driven tool-grinding mechanism, ex a wheel storage tracks, turntables, a 4,000-lb. capacity verhead monorail system for handling wheels above sto ge tracks and extra tools.

his new machine now handles the entire wheel-turnin requirements of the company—about 3,600 pairs of wheels annually. It replaces three old wheel lathes which ha been in service from 20 to 30 years. One operator, wi a helper, is able to turn more wheels on the new machine than were four operators with helpers on the old machines.

Maximum operation, however, could be obtained only by the development of efficient wheel storage and handling facilities. Therefore, three wheel-storage tracks 150 ft. long were laid out directly in front of the lathe. Each wheel storage track is served by an overhead monorail system. The three tracks terminate in a feeder track, connecting all four by means of turntables. From the feeder track the wheels run directly into the lathe. This makes it possible to pick up any wheel from any of the three tracks and by means of the monorail system deposit it on the feeder track and thence roll it directly into the lathe.

The same simplicity and rapidity of operation characterize the turning of the wheels. The lathe itself is driven by a 50-hp., 600-volt Westinghouse motor. The tailstock is moved by an auxiliary 8-hp. motor.



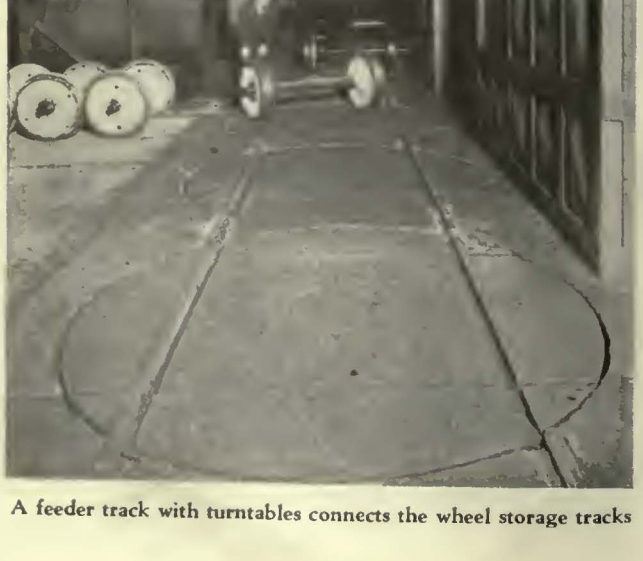
These wheel-storage tracks, each 150 ft. long, serve the new lathe

Operation throughout is largely automatic. The 50-hp. driving motor is controlled with three push buttons which actuate switches in automatically correct sequence on a control switchboard. One push button starts the motor and brings it up to maximum speed. Another stops it by disconnecting the current and applying at the same time a powerful electric brake. If an especially hard spot on the wheels is encountered, a third push button at the operator's touch automatically slows down the machine.

Wheels are rolled into the machine and then centered by means of an air hoist attachment. The tailstock of the lathe is then moved forward by means of an 8-hp. auxiliary motor to clamp the wheels in position and at the same time to adjust the driving dogs against the work and lock them in place. This auxiliary motor is controlled by a reversing controller which automatically locks the tailstock by an electric brake when the controller is turned back to the "off" position.

The tools are eight in number, of high-grade cutting metal, and four are mounted ready for work in a turret in front of each wheel. When the roughing tool has finished its work the operator releases the tool and turns the turret so that the next finishing tool is in position for instantly commencing its work.

Realization of the expected economy through installation of the new machine has come in reduction of wheel turning costs by two-thirds.



A feeder track with turntables connects the wheel storage tracks

Wheels Handled Quickly in Chicago Materials Car

The worn car wheels are transported to the shops for turning and the finished ones are distributed by means of a special materials car designed and built by the Chicago Rapid Transit Company for the purpose. In this car, which was built by the shop forces, wheels and other railway materials are handled quickly and moved from one division to another. The car has a capacity of twelve pairs of standard motor wheels mounted on axles. Special provision has been made for handling heavy equipment to be transported. A 4,000-lb. air hoist runs through the center of the car and the I-beam which supports it has a projection outside for loading and unloading materials. The hoist obtains its air supply from the car compressor and through its use it is possible to move a full load of mounted wheels in

Lifting a pair of wheels by means of the air hoist

Interior of car showing air tanks on either side near the roof and supports for the I-beams of the air hoist

nd out of the car in fifteen minutes. This equipment lso increases the safety of handling heavy parts.

Two channel frames at the roof on either end of the ar, equipped with brackets and rollers, support the -beam trolley rail for the air hoist. This rail is equipped with a ratchet, and by means of a lever it can be extended o as to project from either end of the car the distance necessary to pick up equipment for loading or unloading. When in position it is locked securely.

The subframe and superstructure of the car are constructed of steel and are designed so as to carry the capacity load of the air hoist to any point necessary for loading or unloading. The mounted wheels are placed in a diagonal position on the floor of the car. Substantial wooden blocks prevent any rolling which might injure the finished surface of the axles and also provide extra protection toward keeping the wheels stable while being transferred.

Steel Tower Supplants Seven Wooden Poles

POWER for operating the entire street railway system of Fort Worth, Tex., is supplied by one substation at East Front and Calhoun Streets. This station is so located that all of the feeder wires have to leave and enter it from one direction. For a long time these wires were carried on one line of poles, which had to be heavily guyed because of the tension on the feeders. One pole was directly in front of the main door of a large drug concern. All this brought about a crowded condition of both street and pavement.

A short time ago it became necessary to renew a number of these poles or to replace them with some other kind of structure. The latter plan was adopted, and the steel tower illustrated on this page was purchased from the Muskogee Iron Works, Inc. It is 40 ft. high, 5 ft. of which is imbedded in concrete. Two 2-ft. x 2-ft. towers, connected by 10-ft. bars, give a length of 14 ft. to the span. The total estimated load is 36,000 lb. The factor of safety is approximately two. Elimination of seven poles was made possible by the erection of the tower.

While the first cost of the tower was considerable, the company considers it has many advantages. One is reduced maintenance. Another is that at the corner where the tower was erected the street traffic is heavy, and with poles the feeder line had no real protection from interruption due to collisions by automobiles. The result of a bad blow from an automobile might have been a tie-up in the power supply. This, in turn, would have paralyzed the street railway transportation of the entire city. In addition to these engineering advantages, the Northern Texas Traction Company points out in its 1927 Coffin brief, from which this view and information were taken, that the appearance of the street has been improved. Many favorable comments have been received since the work was completed and the merchants near by are pleased.

This tower replaced seven wooden poles in Fort Worth, Tex. It makes the power supply more reliable and improves the appearance of the street

Restoring Worn Fits in Motor Frames

RECONDITIONING of 164 split-frame railway motors for active service is a problem recently solved by the Northern Ohio Power & Light Company, Akron, Ohio. The work included the reboring of the frames for oversized oil-sealed housings, the building up by welding and then reboring of bearing axle seats for standard Westinghouse axle bearings and the installation of new helical gears and pinions.

When the railway laid out a program for the rebuilding of 41 of its large city cars in order to make them suitable for one-man operation it was found advisable to overhaul the motor equipment.

At the start four cars were taken into the railway shops, the motor equipment was removed, the fields, armatures and brush riggings taken off and reconditioned and other overhauling done. Later the schedule was increased to six cars per week, which were taken out of service at one time. In the work of building up and remachining worn fits the axle bearing seats were built up by welding, this work being done by the railway company. After this was completed, the frames, sixteen at a time, were loaded on a work car and taken to the Westinghouse company's shop in Cleveland, where additional work was done. This work included careful checking of the frame, remachining of the housing fits and the complete equipping of the motors with new housing and heat-treated bolts. With the program properly organized sixteen frames were turned out every week. This met the schedule of the railway.

The work of machining the motor frames was done on a single spindle horizontal boring mill. The two motor halves were bolted together over a cast-iron drum, this being machined so as to fit exactly the pole piece seats. The drum was bored out in the center so as to make a perfect fit on the boring bar.

In the assembly for machining the entire motor frame was mounted on a movable plate, which after the armature bore had been made could be slid over 14 in. against a permanent stop. This brought the job in line for the second operation, of boring axle bearing fits.

As a result of this rehabilitation work the motors are running quietly and with an efficiency equal to that of new motors.

Set-up used for reboring the axle bearing fits of the motor

A cast-iron drum accurately machined to fit the pole piece seats was placed inside the motor frame

In transporting the motor to Cleveland small trucks and a supply car were used

De Luxe Cars Feature of New Service on Chicago & Joliet

ENHANCED by rebuilt units, a fast through electric service between Illinois cities and Chicago, with no change of cars, is now being offered by the Illinois Traction System in conjunction with the Chicago & Joliet Electric Railway. Four through trains daily in each direction connecting LaSalle, Utica, Starved Rock, Ottawa, Morris, Joliet and Chicago provide convenient service for the through traveler between the Illinois Valley and Chicago.

Nine of these comfortable rebuilt units are now being operated by the Chicago & Joliet Electric in conjunction with the Illinois Traction System as the feature of a fast through electric service between Chicago and Illinois Valley cities. Tangerine, cream and mahogany is the color scheme

The new rolling stock for this service is the last word in comfort from the standpoint of the traveler. Individual cross seats, designed by Karpen, supplant the old type double railway coach seats. They are of green wicker, set low at the exact angle for comfort, which is increased by high spring backs and air cushions. Natural leather was used for the upholstery. Car floors are covered with heavy taupe linoleum. The front observation feature of Illinois Traction System equipment, popular with the road's patrons, has been retained.

Exterior treatment of the through cars includes the familiar tangerine shade on the lower part of the car, while the upper work is finished with a cream shade, with a deep mahogany trimming. The cars carry the oval traction service symbol and there is painted on the window panel and boards the designation "Chicago and Illinois Valley Limited." Work of rebuilding nine standard one-man cars to fill this service was done in the Illinois Traction shops at Ottawa.

Schedules for the through Chicago and Illinois Valley trains have been arranged to fit the convenience of the travelers between Chicago and the valley cities. From LaSalle to Joliet the tracks of the Illinois Traction System are used and from Joliet to Chicago the cars operate over the line of the Chicago & Joliet Electric Railway. There is no change of cars at Joliet. Chicago bound trains switch from the Illinois Traction tracks on Van Buren Street in Joliet to the Chicago & Joliet Electric Railway tracks by means of the new double end connection which was jointly installed by the two companies. Limited cars from Chicago to Illinois Valley points are switched to Illinois Traction tracks on the return trip. Each company uses its own operators and methods of fare collection while the cars are on its rails. The Chicago & Joliet Electric Railway at Archer Avenue is convenient to surface line street railway service to the Chicago Loop district and other points.

Fares between Illinois Valley points and Chicago by this service are substantially lower than by other carriers. Because of the lower fares and added convenience the service is very attractive.

Erie Railway

Improves East Lake Road

East Lake road improvement under construction. One track located in its permanent position. Excavation work performed by modern apparatus

CONSTRUCTION work has been completed on the widening of East Lake Road, Erie, Pa., and the removal of the Erie Railway's tracks from the private right-of-way and their relocation in the center of the highway. The railway extends easterly from the old east limits of the city past the General Electric plant and terminates at Four Mile Creek, a distance of approximately 2 miles. Plans for the improvement specified that the width of the road was to be increased from 50 ft. to 120 ft. between property lines and that two 20-ft. asphalt drives were to be installed, with the two car tracks between on a 22-ft. non-paved strip. An overhead distribution system center-pole type was called for, with all other poles removed except one line on either side of the road for the lighting, telephone and telegraph companies. It was estimated that a required expenditure of at least $65,000 was necessary for this work.

This plan necessitated removal of the rails, feeders and trolley from the private right-of-way and reinstallation in the new location without interfering with a

Erie Railway's tracks relocated on East Lake road without any service interruption. Temporary track being shifted to permanent location

The new location of the tracks is on the private right-of-way in the center of the 120-ft. roadway, The old track at the left has been removed

ten-minute headway of the city cars and a one-hour headway of the interurban cars.

One hundred tons of new 70-lb. T-rail was purchased and laid in the proper center location on 7-ft. creosoted ties spaced on 30-in. centers. The foundation was 8 in. of cinders, carefully hand tamped until they were flush with the tops of the ties. This initial installation permitted removal of the old rail from the private right-of-way.

When this center section of track was completed, the service was diverted to it through suitable temporary switches. The track material removed from the abandoned section and found suitable for further use was reinstalled in the new center location in the same manner, and connected with the first completed section. This method of abandoning sections and building sections was repeated until all cars were running on the new center construction.

Each rail joint was bonded with one O-B type AW-8 welded bond, and the rails were held together with six-bolt fishplates. Bracket trolley suspension was adopted as most serviceable. The brackets were attached to Bates expanded steel poles 25 ft. long, placed 6 ft. 6 in. from the track centers. Each pole was installed in a concrete foundation of 18 in. diameter, 6 ft. deep. Poles were spaced approximately on 100-ft. centers. One crossarm at the top of each pole supports two telephone wires. A 500,000-circ.mil feeder extending the entire length of the improved section was fastened to each pole by means of a bracket.

In 1901 the owners of the transportation properties of the city of Erie constructed a two-track railroad from

Appearance of the tracks and overhead construction on the 22-ft. island located in the center of the East Lake Road improvement

the eastern end of the city to the Four Mile Creek amusement park. These tracks were laid on either side of the 50-ft. highway on a 10-ft. strip of private right-of-way.

In 1911 the tracks were extended to the Six Mile Creek and the interurban cars of the Buffalo & Lake Erie Traction Company were diverted over the line into the city of Erie. Shortly afterward the General Electric Company began the erection of a plant on a site adjoining the East Lake Road and near Four Mile Creek. When this plant was put in operation the handling of the employees over the Lake Road by rail and roadway became quite important. Additional transportation facilities had to be provided. Due to the narrowness of the roadway, it was soon found that considerable vehicular traffic congestion occurred, especially during those periods of the day when the General Electric employees were en route to and from their work. This congestion soon became so serious that it was determined that relief could be obtained only by widening the street.

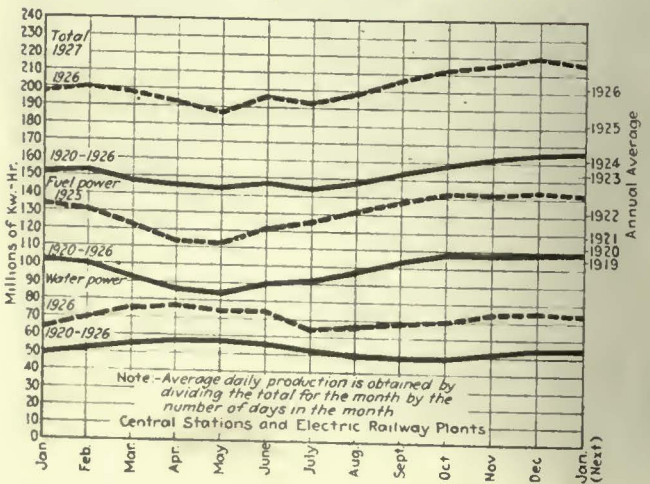
After considerable discussion between the city of Erie, the General Electric Company, the Hammermill Paper Company and the Erie Railway, a decision was reached in the spring of 1926 for the apportionment of the expense of widening of the road together with other work necessary to make the road an up-to-date transportation highway.

It was not only necessary to remove the tracks from the private right-of-way and reinstall them in the 22-ft. island located in the center of the road, but hills had to be cut away, hollows had to be filled and sanitary and storm sewers had to be installed. It was necessary to perform this work without any interruption to the street car service or vehicular traffic.

Since modern excavating and track building machinery was used throughout the entire work, it was possible to carry on the reconstruction in an efficient manner.

With the improvement completed, the Erie Railway now has a modern, up-to-date double-track installation capable of efficiently handling the additional heavy traffic. The city of Erie is provided with a broad, properly drained highway connecting with the main Buffalo and Cleveland highway via Iroquois Avenue and Harbor Creek, making an excellent entrance to the center of the city.

Average Daily Production of Electricity by Public Utility Plants in the U. S.



The Readers' Forum

Why Continue to "Soak" the Street Car for Paving?

UTAH LIGHT & TRACTION COMPANY
SALT LAKE CITY, UTAH, Aug. 24, 1927.

To the Editor:

Evolution has been taking place consistently in all branches of the street railway industry with one exception. This is the city's attitude toward paving about street car tracks, which in the majority of cities has not changed one iota from the day of the mule car. Operating conditions have changed considerably from the period in the past when companies were required to obliterate the tracks of their mules by filling in, surfacing and grading their rights-of-way on public streets. Other forms of speedy transportation have developed, with the result that today we find innumerable agencies by which people move from place to place.

Street railways whose tracks are in paved streets pay from one-third to one-half of the paving costs on such streets, yet on the basis of use made of street space and service rendered the greatest number of people per carrier a gross inequality exists because the use street cars make of streets is not equivalent to one-half of the total use made of such paved thoroughfares by all vehicles.

As to the question of street railways maintaining the pavement about their tracks and keeping the street in first-class appearance, let it be said that it is no easy matter to secure funds sufficient to maintain paving about them after expending large sums to put in the pavement. If street car companies had no paving to buy, but only the pavement about their rails to maintain, that portion of the street for which they are accountable would be the best preserved and appearing on the street.

It will readily be admitted that no business likes to spend money for something that will directly benefit its competitor, yet that is what happens when the street car company pays a paving assessment. Streets, paved and unpaved, are the thoroughfares provided by a city to handle its various kinds of traffic, and traffic of all types will use the streets. Now, when it is the duty of a municipality through its taxpayers to supply pavement, why should one taxpayer, namely the street car company, be obliged to furnish a half or a third of this street surface when it has to supply its rail on which to run?

The sum and substance of the matter is that street car companies throughout the country are, with the exception of a few that have been relieved of paving, still held in the "mule car" class, though they have no mules, whereas the trend of the times is such that the car company can't attract passengers unless it has up-to-date, speedy, modern, attractive equipment operating over smooth track. This requires money which isn't coming into its coffers, but is being diverted to and enjoyed by its competitors for whom it installs pavement. It seems time that the "powers that be" lent ear to the railway companies' side of the paving question and struck off the fetter that makes it almost impossible for them to exist, not to mention the difficulty they have in keeping in step with developments in the industry that necessitate adoption or dropping out of the ranks. The street car is a worthy utility; it is needed; it accommodates the greatest number of people for the space it occupies. Why not give it a square deal? F. D. HEIGES.

New Equipment Available

Hydraulic Feed Feature of New Surface Grinder

MORE rapid work with accuracy is provided for by a new type grinder offered to the industry by Gallmeyer & Livingston, Grand Rapids, Mich. An oil gear hydraulic feed reciprocates the table at a variable rate of travel. This provides a range up to 55 ft. per minute by turning the handle at the front of the base. The same oil gear is connected to a cross-feed engine mounted under the saddle. This is arranged so that in each reversal of the reciprocating table the cross-feed mechanism is actuated.

This grinder has self-contained motor drive in the base of the machine

The amount of cross feed for each reciprocation of the table is adjustable.

A one-piece base casting is used. The spindle head carries a very heavy spindle of 2 in. diameter by 8 in. long in the main bearing, with the auxiliary rear bearing $1\frac{3}{4}$ in. diameter by 5 in. long. For rapid raising and lowering of the operating table, a large handwheel gives a direct action to the elevating screw through a worm and gear. The handwheel is graduated in $\frac{1}{4}$ thousandths with a movable pointer, which can be set for convenient reading. A small knurled knob in the center of the handwheel provides a back-geared action to the elevating mechanism. The disk in the center of the handwheel has a graduated dial ring which can be set at zero in relation to the pointer mounted on the spoke of the large handwheel. Both inner and outer wheels turn, but the graduations on the inner wheel are arranged to read on this moving pointer, giving a vernier effect. By this means it is easy to get readings of adjustments in tenths of a thousand. This graduation makes for extreme accuracy in grinding the work.

Another feature of the new surface grinder is a variable speed for the work. Various materials call for different speeds and the variable speed feature gives greater efficiency to the grinder.

The illustration shows the machine with self-contained motor drive in the base of the machine. It is equipped for dry grinding only without any auxiliary equipment. A specially designed 10x24-in. working surface magnetic chuck is available. The machine is also offered with wet grinding arrangement, including pumps, tanks, convenient splash guards and piping if desired.

Refillable Window Cleaning Brush

WASHING of windows and other parts not readily accessible from the ground prompted the design of a combined brush and sprayer just placed on the market by the Specialty Manufacturing Company,

This new car washing brush combines the functions of a spray and cleaning brush

Cleveland, Ohio. The type illustrated is in use on several Eastern railways.

The bristles are trimmed to give a level cleaning surface and are set into an aluminum plate or block. The handle is attached to a back plate and be-

Maintenance Contest Stimulates Improved Methods

IN THIS issue is published the sixth group of articles submitted in ELECTRIC RAILWAY JOURNAL'S Maintenance Contest. The half-way mark has thus been reached. This was celebrated in a most pleasing manner at the Cleveland convention when 100 enthusiastic maintenance men sat down to a dinner in honor of those who submitted ideas in the contest. Four capital prizes amounting to $375 were awarded and the winners were given framed certificates of award testifying to the excellence of the practices that were described.

CONTEST STILL CONTINUES

As announced in the conditions of the contest published in the April 16, 1927, issue of ELECTRIC RAILWAY JOURNAL, pages 700-701, the contest is to run a year, and a prize of $25 will be given each month. The capital prizes were awarded in the middle of the contest instead of at the end because the convention offered the best opportunity of getting the various contestants together. Those who were present at the meeting were impressed particularly with the value of a broad interchange of ideas among maintenance forces. The greatest good will come from the contest by increased use on other properties of the practices which have been found of value on the railway from which the idea came. Maintenance men help put railway maintenance on the high plane necessary for popularizing electric railway service by submitting their ideas in the contest. Incidentally they may win one of the monthly prizes.

CONTEST CONDITIONS

1. Any employee of an electric railway or bus subsidiary may compete.

2. The author does not need to be the originator of the idea.

3. Articles may be submitted by several persons or by a department.

4. Any maintenance practice or device for electric railway or bus repairs may be the subject.

5. Articles should be 100 to 200 words long with one illustration, and in no event longer than 400 words with two illustrations.

6. Manuscripts should be mailed to the editor of ELECTRIC RAILWAY JOURNAL, Tenth Avenue at 36th Street, New York, N. Y. To be eligible for the monthly prizes manuscripts will be received until April 30, 1928.

7. Illustration material may be in the form of drawings, sketches, blueprints or photographs. All sheets should be marked "Maintenance Competition."

8. Details of the conditions not given will be found in ELECTRIC RAILWAY JOURNAL for April 16, pages 700-701.

tween this and the front is a hollow space made watertight by means of a rubber gasket. A length of pipe attached to a hose is screwed into a threaded opening in the back plate. Water is forced through a number of fine holes into the front plate.

The edges of the gasket project well beyond the edges of the aluminum water chamber so that the metal itself cannot hit the surface being cleaned and the brush plate may be shifted around on the handle easily so as to wear all bristles equally. When completely worn out the brush may be returned to the factory for refilling at a small cost. The manufacturers claim that this more than compensates for the somewhat higher initial cost as compared with ordinary brushes.

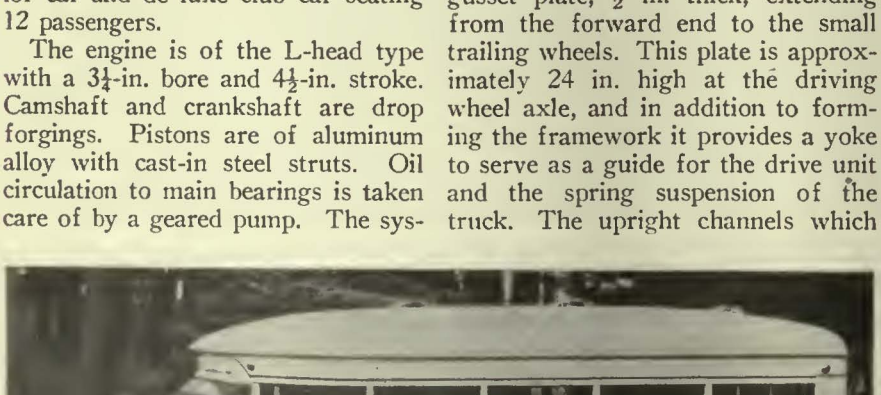
Six-Cylinder Bus Chassis Supplants Four

SIX-CYLINDER engined bus chassis to supplant former four-cylinder models are announced by Graham Brothers, Detroit, Mich. Special features include four-wheel Lockheed hydraulic brakes, four-speed gearset and ball-bearing cam-and-lever steering gear.

Although hoods on the new model are 7 in. longer than on the former units, there is no increase in wheelbase. By maintaining the 162-in. wheelbase better weight distribution on the axles is said to result. The present line includes a 21-passenger street car, 16-passenger de luxe parlor car and de luxe club car seating 12 passengers.

The engine is of the L-head type with a 3¼-in. bore and 4½-in. stroke. Camshaft and crankshaft are drop forgings. Pistons are of aluminum alloy with cast-in steel struts. Oil circulation to main bearings is taken care of by a geared pump. The system also includes an oil filter and a siphon arrangement to provide against stoppage of oil flow should the strainer become clogged. Electric equipment includes a 225-watt generator with voltage regulator and 215-amp.-hr. storage battery.

Rear springs are of the three-stage progressive type to afford easy riding under variable passenger loads. Riding comfort is further enhanced by the use of deep-cushioned seats covered with genuine leather. The 12-passenger vehicle has seats of the individual chair type, set at an angle to the body sides. The 16-passenger parlor car provides four double seats along the left side of the body and four single seats to the right of the central aisle. In addition, four individual seats extend across the width of the coach at the rear, one of the latter being removable to provide passage through the emergency rear door. Seat frames are constructed of tubular steel with hardwood bases, the whole being covered with fiber wicker and detachable genuine leather slip cover. Seats in the street car are likewise upholstered in genuine leather with deep spring cushions and spring backs.

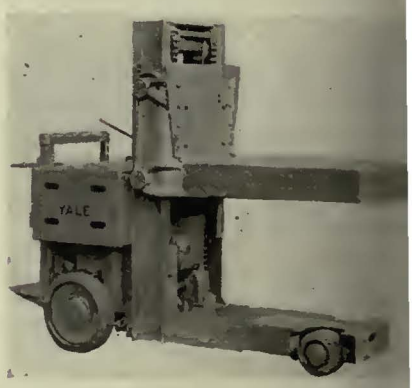


Twenty-one passenger street car body on Graham chassis powered with six-cylinder engine

High-Lift 3-Ton Truck

FOR the purpose of meeting increased load requirements, a new elevating truck has been added to its line by the Yale & Towne manufacturing Company, Stamford, Conn. The framework consists of a large gusset plate, ½ in. thick, extending from the forward end to the small trailing wheels. This plate is approximately 24 in. high at the driving wheel axle, and in addition to forming the framework it provides a yoke to serve as a guide for the drive unit and the spring suspension of the truck. The upright channels which serve as platform roller guides a attached to this gusset plate.

The elevating platform is rais and lowered by means of a 1½-i diamond roller chain passing over power-driven sprocket at the botto and an idler sprocket at the top. T reduce friction Hyatt heavy-du



New type of 3-ton high-lift truck

roller bearings are used in the idle sprocket at the top of the machine The shifts of the lower sheaves ru in a bath of oil, which also serves t lubricate the spur gear reductio units. The two ends of the rolle chain are attached to the platfor through a spring take-up devic which will adjust itself automaticall as the chain wears.

The hoisting motor is connecte to the spur gear pinion through spring ratchet so arranged that positive drive is obtained when rai ing the elevating platform. If, hov ever, the platform is checked in i downward travel the ratchet release

The elevating platform is supporte in the horizontal position by fo rollers bearing on the inside of t flanges of the vertical ship channel Platform members are heavy ste castings with large diameter boss to support the platform roller pin By placing the elevating unit betwe the vertical roller channels all of t available space is utilized. The ma drive unit is of the double reductic spur gear type, driving the whee through totally inclosed univers joints. The entire gear reductio with its differential and bearing runs in a bath of oil.

A four-wheel steering feature a lows a turning radius of 96 in. to t outside edge of the truck. By om ting braces it is possible to leave t top of the battery box clear and pe mit servicing or watering of the ba tery without sliding it out. The batte itself may be removed by hoisting from the battery box or by removi the side plates of the box and slidi the battery out sideways.

Hoist with Pressed Steel Frame

QUARTER-TON all-steel electric hoists at a moderate price are announced by the American Engineering Company, Philadelphia, Pa. This hoist is of the high-speed type with pressed steel frame, chrome-manga-

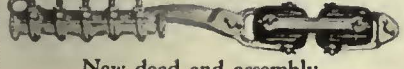
All working parts of this hoist are fully inclosed

ese steel in gears and shafts, ball-earings, non-spinning hoisting rope, l-bath lubrication, push-button con-ol and upper and lower limit fix-ures. All working parts are fully nclosed.

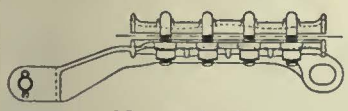
The hoist weighs 200 lb. and is ade with either plain trolley or hook uspension. The plain trolley type equires 16-in. and the hook suspen-on 18-in. headroom.

Dead End Assembly and Strain Clamp

FEEDERS of any size from 500,000 to 1,000,000 circ.mils can be sed with the dead end assembly for w-voltage feeder cable recently an-



New dead end assembly



New strain clamp

ounced by the Ohio Brass Company, Mansfield, Ohio. Its design is such hat when dead-ending heavy feeders t a corner with this device it is not ecessary to strip the insulation back, ass the cable through the insulator nd serve individual strands, which wastes from 6 to 8 ft. of wire, or about 25 lb. of copper.

Interlocked wet ware porcelain gives double insulation. The device has a high strength factor, all metal parts being of galvanized Flecto iron, and is so compact that ladders are not required for its installation in the overhead system.

A strain clamp has also been put on the market by the same manufacturer which permits turning corners on two or more poles without cutting or dead-ending the feeders in both directions. It is designed so that the feeder can carry straight through without any contact with the insulator assembly.

Dick Prescott Has Callers

And Gets a Surprise

WHEN Dick Prescott, young assistant superintendent of the Consolidated Railway & Light Company's shop, saw the noon hour approach his uneasiness increased. He could not quite understand the dissatisfaction which had developed in the truck shop and he wondered whether or not the men would send a committee to his office, as he had invited them to do.

In the meantime, we left Shorty Green, the ringleader of the malcontents, approaching big Pete Thompson, who had led the men back to work when Shorty failed to step out of the crowd on Dick Prescott's challenge earlier in the morning.

"Say, Thompson," said Shorty as he approached the big fellow, I've been doin' some thinkin'."

"What's the matter now?" growled big Pete, obviously not overjoyed at the sight of his visitor. "If some of you guys would do more work and less grouchin' around things in this shop would be better for all of us. I got a wife and kid at home and I ain't interested in your troubles or that bum Welcher either!"

"All right, Thompson, don't get huffy now. I was thinkin' about that committee the boss wanted this mornin'. You'd be a good guy to talk to him."

"Oh, you're tryin' to hand me the bag, are you? Well, there's nothin' doin'. You guys started a fuss just to be doin' somethin' else than workin'. You can't drag me into it no more. First thing you know some of you birds are goin' to land outside this shop on your ear."

"Wait a minute now and listen," pleaded Shorty Green. "I'm just beginnin' to wake up to what a jackass I've been. I ain't got nothin' agin' Prescott at all. Pete Welcher is the guy what's been doin' all the talkin' about Prescott bein' a four-flusher."

"Sour grapes, that's all that is," exclaimed Thompson impatiently.

"I think you're right," was Shorty's surprising answer. "I've just begun to get hep to that myself."

"Why don't you tell that to the boss, then?" demanded Pete.

"I will, Thompson, if you'll go along."

"You're on! No monkey shines, though.. You give the boss the whole works and tell him there ain't nothin' wrong in this shop except that bum Welcher."

Shorty and Pete talked a minute or two longer. They decided to get the men together as soon as the noon whistle blew to tell them what they proposed to do.

At a quarter past twelve every man in the shop had voted to demand the resignation of Pete Welcher, the plotting inspector. Green and Thompson were delegated to transmit their wishes to Dick.

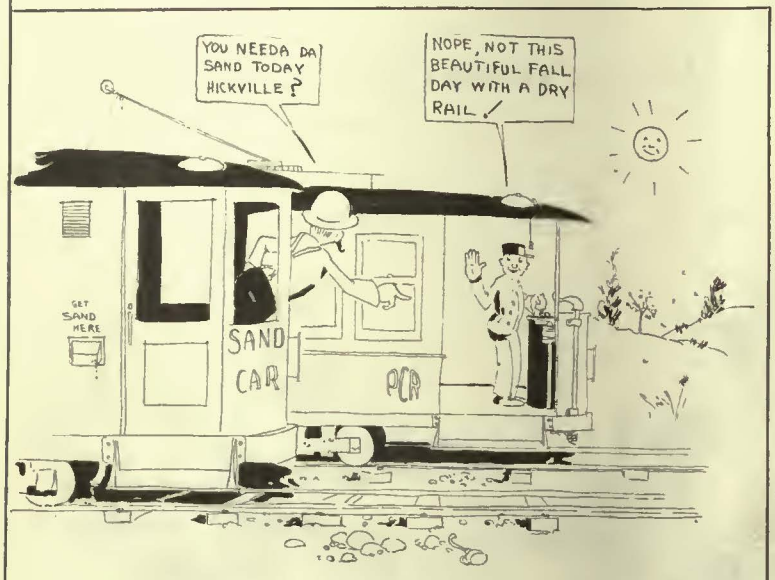
In a few minutes the surprised and relieved young executive was listening with amazement to Shorty Green's story, while big Pete Thompson sat silently by with his cap in his hand.

Adventures of

Old Man Trouble

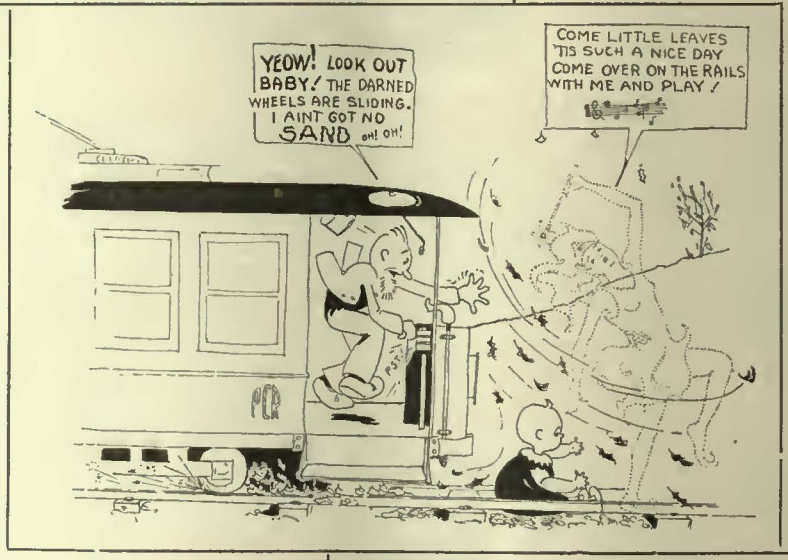
on the

Hicksville Railway



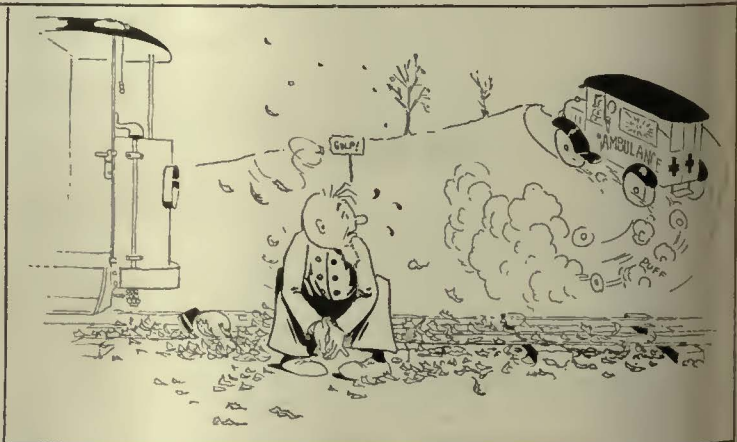
The best safety rule that was ever written is

Don't Take a Chance!



How many Hicksville motormen do you have who never take sand on a nice day? How many fail to report a bad order sander?

How many accidents could have been avoided had sand been available at the proper time?



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

J. M. Zimmerman and E. L. Proctor, Westinghouse Elec. & Mfg. Co.

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—MISCELLANEOUS—12

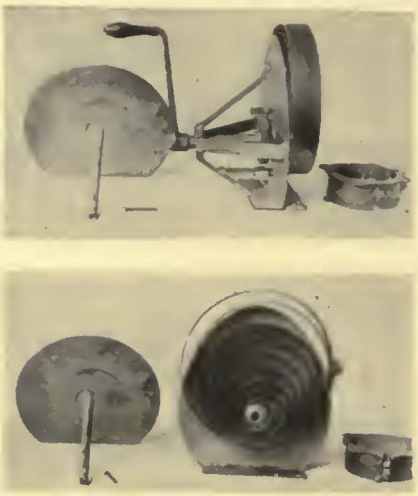
Machine Assists in Removal and Replacing of Trolley Retriever Springs*

By A. F. Rexroth
Master Mechanic Harrisburg Railways
Harrisburg, Pa.

WHEN trolley retriever springs break at the eye in the end of the spring, they are reclaimed in the shops of the Harrisburg Railways, Harrisburg, Pa., by drawing the temper at the spot with a welding torch and punching a new eye. The spring is then as good as new.

In order to assist in the removal and replacing of springs a machine has been constructed as illustrated. The spring is placed on this machine and is wound tight and then is held in position by a ratchet on the shaft. The spring can be taken out by removing the back plate and can then be placed in a retriever or held tightly by a clamp placed over the spring when it is to be stored for future use. The spring is released from the machine by lifting the ratchet and turning the handle to the left.

This machine has been of particular assistance in making repairs as it eliminates the danger from handling these strong springs. It is used in both removal and replacement of the springs and is a great time saver for this work.



Above, machine developed for removing and replacing trolley springs. Below, details of the machine

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

TRACK AND WAY DEPARTMENT—10

Smooth Pavement with Little Money*

By H. E. Bean
Engineer Way and Structures New York State Railways, Syracuse, N. Y.

SMOOTH pavements in car tracks add nothing directly to the revenue of the operating company, but public demand requires a higher degree of maintenance each year and frequently this results in repaving ordinances where many years of life still exist in the track structure. The use of hot tar or asphalt with crushed stone has been found to answer the demand at a comparatively small expense.

The Syracuse lines of the New York State Railways have more than 400,000 square yards of pavement, mostly brick or medium block. Each spring every line is covered by a repair gang of six men with two trucks. One is used for the coarse aggregate and the second for screenings and sand and to tow the tar tank. All depressions, faulty places, cuts or surface removals are patched and the general paving repairs completed by this means. Miscellaneous failures that develop around special work, etc., are repaired with small quantities of material hauled on a light truck.

In making patches, the hot tar, known as "Binder T" New York State Highway Department, is applied to the cleaned surface with sprinkling pots having slotted openings. Depressions are filled with No. 1 or No. 2 stone, according to depth, and more tar is applied to the stone. Screenings mixed with sand are thrown over the top to seal the patch and prevent automobile tires from picking up the tar. Patches may be run to feather edges and under traffic soon resemble asphalt. Proper temperature in tank is maintained by a kerosene burner in the firepot.

The local cost of tar at 10 cents per gallon and crushed stone at $1.50 per ton make a cost, including labor and truck charges, of approximately 50 cents per square yard. The advantages of this construction are speedy repairs, economy, decreased minor claims, less complaint and enhanced public relations.

Tracks in Syracuse, where pavements are kept in smooth condition

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

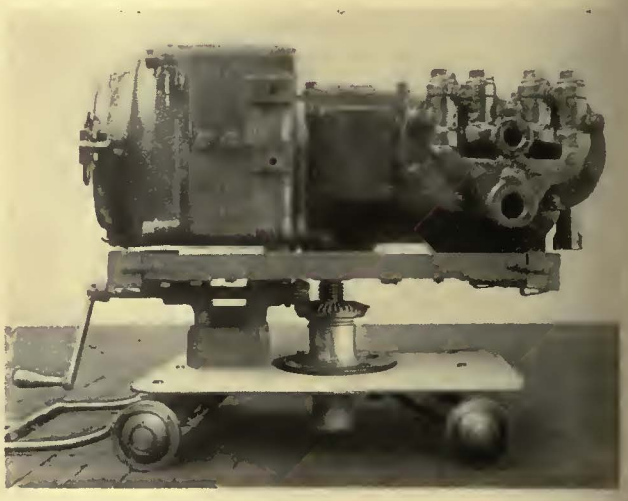
ROLLING STOCK—MISCELLANEOUS—13

Convenient Type of Compressor Truck*

By G. R. Fanning
Foreman Pneumatic Section, Hillcrest Shops,
Toronto Transportation Commission, Toronto, Canada

FOR the installation or removal from cars of air compressors, a small truck with roller bearing wheels has been made in the shops of the Toronto Transportation Commission. The body of the truck is a steel plate 5½ in. from the floor; on this is mounted a pedestal 4½ in. high with a 1¾-in. bore which acts as a support and guide for the 1¾-in. screw on which a turntable is fastened. This, in turn, supports the compressor.

The screw has four threads per inch and is operated by a crown gear and pinion, the crown gear turning on ball bearings. The table is raised or lowered by turning a handle at the front of the truck. This truck has reduced the time required to mount a compressor under a car very considerably, and when raised up the truck can be moved easily to the exact position to receive the compressor or to place it back under the car. Also, after a compressor has been removed from a car, it can be taken to the vacuum cleaner or sent to the repair department without any extra handling.



Truck for removing and installing air compressors under cars

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

TRACK AND WAY DEPARTMENT—11

Machine for Oiling Track Curves*

By I. O. Mall
Assistant Superintendent of Roadway New Orleans Public Service, Inc.
New Orleans, La.

TO PROVIDE a thorough and efficient means of oiling track curves, the machine illustrated was developed by the New Orleans Public Service, Inc. An airtight oil receptacle is mounted on two wheels and has a pipe extension arm. Air at a pressure of about 20 lb. is supplied to the oil by means of a hand pump attached to the handle. A flexible connection is provided from the pump to the top of the oil receptacle and a valve mechanism at the bottom for regulating the flow of oil is controlled by levers on the handle.

Three men with three of these machines are doing the work formerly requiring nine men, and results in a net saving of $3,500 per year. A uniform and continuous film of oil is placed on the guard rail where it is most effective, and the flexible control provided through the air pressure and the operator's control permits uniform lubrication irrespective of temperature conditions which affect the viscosity of the oil.

Due to the simple means of control, accident hazards are reduced, since the operator can give complete attention to traffic movement.

Track curve oiling machine

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

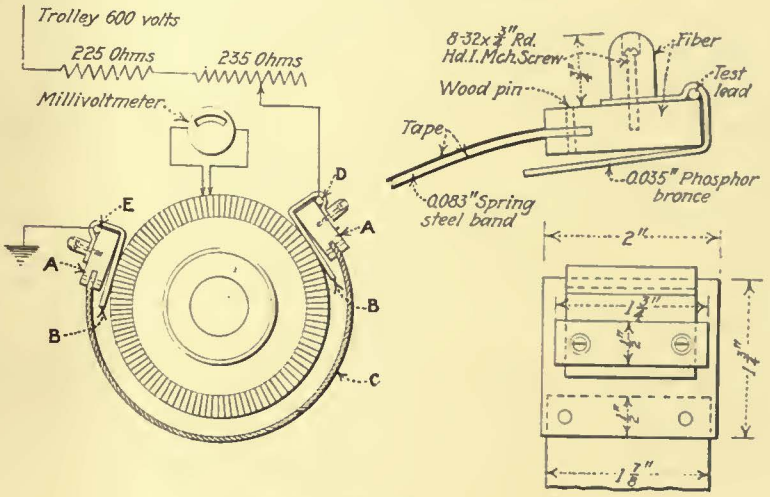
ROLLING STOCK—ELECTRICAL—23

Self-Adjusting Yoke for Bar-to-Bar Test*

By Arthur E. Clegg
Foreman Electrical Department,
San Diego Electric Railway, San Diego, Cal.

FOR testing armatures by the bar-to-bar method a self-adjusting yoke is used in the electrical department of the San Diego Electric Railway, San Diego, Cal. The accompanying illustration shows the yoke as used with a commutator having 35 bars between contacts.

Two white fiber pieces, marked *A* in the illustration, support the spring contacts and form a base for attaching the leads through which the series current flows. The spring contacts, *B*, have sufficient spring action to insure proper contact. The fiber pieces are fastened to a spring steel band designated as *C*. This band is insulated with oil linen and friction tape and holds the contacts securely on the commutator bars. For various types of commutators having different numbers of bars the steel band is changed. This testing yoke is connected in the series circuit by leads, *D* and *E*, with two steps of resistance, the last step being variable to give different values of current and provide a convenient deflection on the millivoltmeter. The source of power is 600 volts. With this arrangement an armature can be given a bar-to-bar test without removing it from the frame by taking out the brush-holders and placing the yoke around the commutator.



Self-adjusting yoke for armature bar-to-bar test

*Submitted in Electric Railway Journal *Prize Contest*.

Electric Railway Journal Maintenance Data Sheet

ROLLING STOCK—MISCELLANEOUS—11

Testing and Regulating of Thermostats Made Easy*

By Harvey L. Bullock
North Station, New York Central Railroad,
White Plains, N. Y.

REGULATION of thermostats used in multiple-unit cars of the electric division of the New York Central Railroad is done in a test cabinet that has been constructed by the shop forces at North White Plains, N. Y. This duplicates the conditions of heat and cold which occur in a car and furnishes an easy and accurate means for testing and adjusting these thermostats.

The test cabinet has two chambers, one above the other, each containing about 8 cu.ft. of air. The two are insulated from each other and are provided with glass doors so that the interior is visible from the outside. The chambers are provided with two 100-watt lamps for heating, and the lower chamber is kept cool by an electrically driven refrigerating machine, the Icemaster, which uses methyl chloride as the refrigerating agent. The pumps and condensing coils of the Icemaster are located on a shelf some distance from the cabinet.

An elevator connects the two chambers of the cabinet. The thermostat to be tested is placed on this and connections are made so that the lower temperature contacts of the thermostat will send the elevator up into the warm chamber and the high temperature contact will operate to return the elevator to the lower chamber promptly. The temperature in each chamber can be adjusted to any given value desired within reasonable limits. The elevator runs on

Test cabinet for the regulating and testing of thermostats

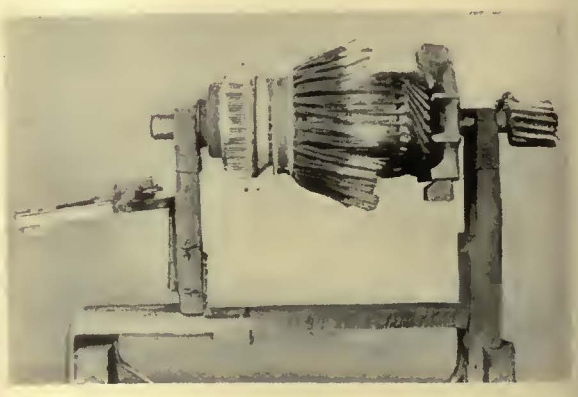
*Submitted in Electric Railway Journal *Prize Contest*.

(OVER)

Electric Railway Journal Maintenance Data Sheet
ROLLING STOCK—ELECTRICAL—24

Adjustable Armature Stand*

By M. S. Walker
Armature Winder Beaver Valley Traction Company, New Brunswick, Pa.



Handy type of adjustable armature stand

An adjustable armature stand that does away with old time stands has been devised by the mechanical department of the Beaver Valley Traction Company. With the several attachments used all armatures are wound speedily. In the construction of this stand two 3 in. x 6 in. x 24 in. long channels are spaced 34 in. apart and imbedded in concrete. A piece of ¼ in. x 4 in. channel iron, with a ¾ in. slot 18 in. long in the center is placed on top of the 3 in. x 6 in. channels. Then two uprights of 2 in. x 5 in. are cut out. The back one of these is bolted securely to the channel iron. The other is the upright for the front end and has a piece of angle iron ½ in. x 3½ in. x 5 in. with a ⅝ in. hole drilled in the center. To keep this upright from moving sideways on the channel iron the bottom of the angle that slides on the channel is slotted ⅛ in. deep and a piece of iron 1 in. x 3 in. x 4½ in., with a hole drilled in the center and tapped out, is placed under the channel. The front upright is on top of the channel and can be adjusted for any size armature.

By use of an extra attachment air compressor armatures can be held in this stand while being wound. The attachment consists of an old DH-16 compressor bearing with the threads turned on the outside. This is put on the standard and the compressor armature of short length is placed on it.

*Submitted in Electric Railway Journal *Prize Contest*.

Electric Railway Journal Maintenance Data Sheet
ROLLING STOCK—MISCELLANEOUS—11

Testing and Regulating Thermostats Made Easy*—Continued

two guide rods and is provided with two sealing plates at the top and bottom so that when it reaches the limit of its travel in either direction, both chambers are sealed from each other. The elevator is electro-pneumatically operated by two solenoid valves which control the action of a compressed air supply in a cylinder, the piston of which moves the car up and down. To facilitate rapid change of temperature there is an exhaust fan located at the top of the cabinet and a damper control enables the operator to exhaust either chamber at will.

By regulating the temperature of the room to the required degree and by observing the response of the thermostatically controlled elevator, a graphic and sensitive method of observing the speed and accuracy with which a thermostat responds to prearranged temperature limits is provided. In addition, the operation of the elevator through the rapid alteration in temperature forms a convenient method for testing the thermostat contacts a large number of times and thus assures proper operation in service.

*Submitted in Electric Railway Journal *Prize Contest*.

5 out of 7

Regularly use "TOOL STEEL" Gears and Pinions

In the Electric Railway Journal, Maintenance Competition, May 21, 1927, seven articles were submitted from men in Philadelphia, Chattanooga, Atlanta, Washington, New Orleans, Birmingham, and Portland, Maine. Presumably these companies are alert in an effort to keep down maintenance costs.

5 out of 7 of these companies regularly use "Tool Steel" gears and pinions,

and

3 of the 7 companies, when buying new equipment, have specified "Tool Steel" gears and pinions on their new motors.

also

In the April contest (April 16th issue of Electric Railway Journal) 5 out of 6 were submitted by "Tool Steel" gear and pinion regular users.

"Tool Steel" gears and pinions reduce maintenance costs; if you take almost any classification of the "Live Wires" in the industry you will find that the great majority keep down their maintenance costs with "Tool Steel" gearing.

The Tool Steel Gear & Pinion Co.
CINCINNATI, OHIO

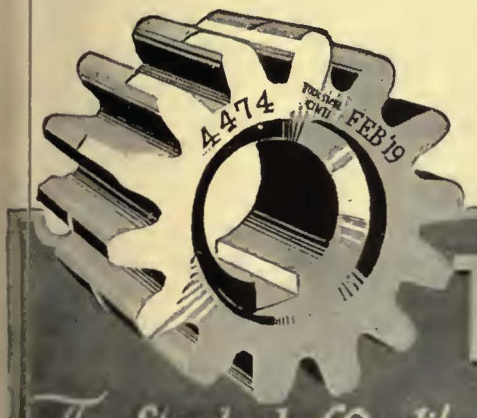
Here's the monthly record of Total rolling Stock Articles and users of "Tool Steel" gears

April	5	out of	6
May	5	out of	7
June	7	out of	8
July	4	out of	5
Aug.	6	out of	8
Total	27	out of	34

79%

Out of 34 Contestant articles, 27 came from Companies regularly using "Tool Steel" Gears and Pinions

THE FIRST CAPITAL PRIZE WINNER IS A "TOOL STEEL" GEAR USER



The Standard of Quality

TOOL-STEEL QUALITY GEARS AND PINIONS

Electric Railway Journal Maintenance Data Sheet

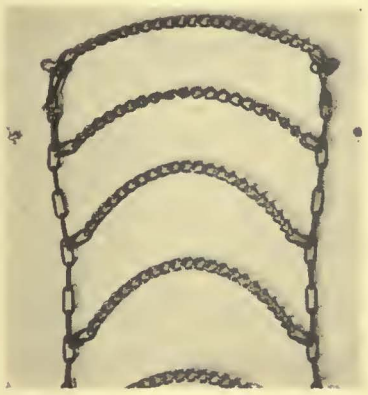
BUSES AND TRUCKS—7

Single-Type Tire Chains Reduce Labor of Application*

By D. S. Mackay
Supervisor of Automotive Equipment
Boston Elevated Railway, Boston, Mass.

During past winters physical difficulty has been experienced by the Boston Elevated Railway with buses operated with snow chains. To reduce the amount of labor necessary in applying, a single chain is used for 36 x 6 tires. These have snow links made of $\frac{3}{32}$-in. stock, cross links 1½ in. x 1 in. x $\frac{3}{32}$ in. with full half twist, a hook ¼ in. diameter and a locking device of $\frac{7}{16}$-in. material.

This type of chain provides a perfect fit and the full half twist links laid flat when in contact with the roadbed reduce breakage. The life of the single-type chain is much greater than the dual chain previously used.



Single chain used on tires of the Boston Elevated Railway buses

With the single chain it is unnecessary to jack up the rear end of a bus when it is applied and two buses can be equipped with single chains in the time that originally was taken for applying them to one bus. When applied to outside wheels, damage to brake rods, Alemite fittings, fenders and paint are eliminated. The mileage obtained per gallon of gasoline is also increased. The accompanying illustration shows the type of chain used.

*Submitted in Electric Railway Journal *Prize Contest*.

Electric Railway Journal Maintenance Data Sheet

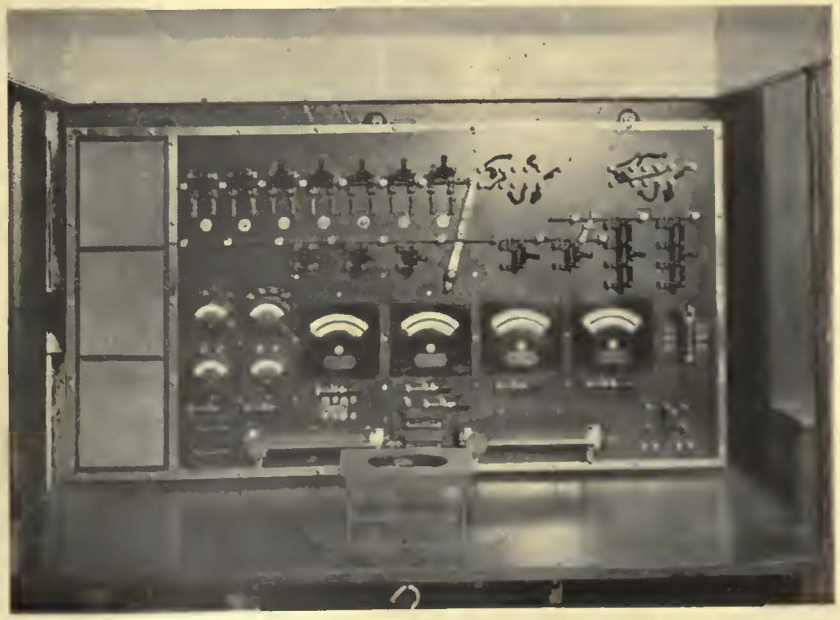
SIGNALS—2

Board for Testing Signal Apparatus*

By W. R. Hornberger
Elevated Signal Department, Philadelphia Rapid Transit Company,
Philadelphia, Pa.

Signal apparatus repaired in the shops of the Philadelphia Rapid Transit Company and in use on the subways and elevated lines is tested at a board designed and built by the shop forces. The variety of apparatus to be tested necessitates the use of three different values of current and seven different voltages. A corresponding variety of instruments is necessary. Weston instruments are used and include one 0-25 voltmeter, one 0-1 ammeter, one 0-50 milliammeter, one a.c. model 330 four-scale voltmeter, four a.c. model 155 ammeters.

The board is designed to facilitate the test for manipulation of switches, avoiding all necessary setups to prevent conflicting connections. A unique system of interlocking is provided which prevents mistakes and damage to instruments.



Signal test board used in shops of Philadelphia Rapid Transit Company

*Submitted in Electric Railway Journal *Prize Contest*.

(OVER)

Electric Railway Journal Maintenance Data Sheet

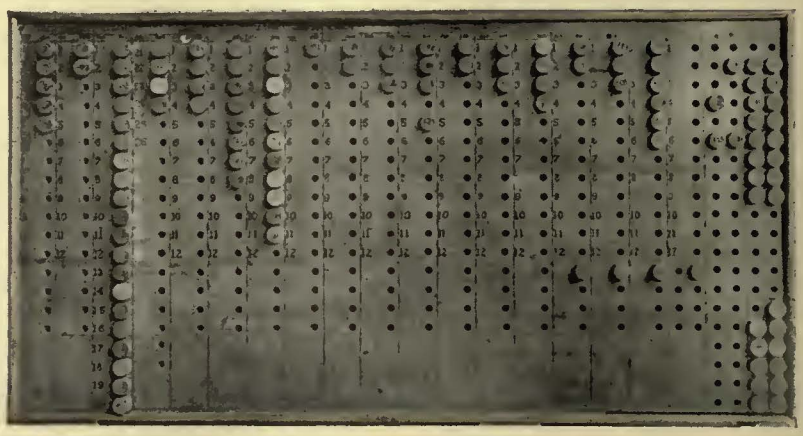
BUSES AND TRUCKS—8

Plug Board Shows Location of Buses at All Times*

By C. B. Lindsey
Superintendent of Automotive Equipment
Los Angeles Railway, Los Angeles, Cal.

GREAT assistance has been given by the plug board shown in the accompanying illustration, which was made by the engineering department of the Los Angeles Railway. It is used to show the locations of buses at all times. The clerks at the bus garage find its use indispenable in keeping track of the buses.

A plug is provided for each bus, which is numbered accordingly. When a bus is in service the corresponding plug is placed opposite the train run number on the line to which the bus is assigned. The board is divided into columns, a separate column being provided for each line. Buses on hand are kept in the column to the right of the board and are moved to the "O. K." column as they are inspected and reported in good order by the foreman. In this way the number of extra buses can be determined at a glance.



Type of bus plug boards used by the Los Angeles Railway

When trippers go out or replacements are made the plugs are moved accordingly, thus avoiding confusion and making it possible to locate any bus immediately.

*Submitted in Electric Railway Journal Prize Contest.

Electric Railway Journal Maintenance Data Sheet

SIGNALS—2

Board for Testing Signal Apparatus*—Continued

Taps in the upper right-hand corner of the board are connected with air-cooled transformers used in conjunction with the 250-volt, 25-cycle and 110-volt, 60-cycle supplies to provide the lower voltages. Direct current is obtained from a battery line. Fine variation in voltage is obtained by the use of two variable resistance units connected as potentiometers.

Both a.c. and d.c. buses are provided for testing at the board. These may be connected through interlocking switches to the electro-pneumatic tester. A miniature interlocking machine roller on the board controls the electro-pneumatic switch valves under test.

Interlocking of switches is accomplished by using sliding Bakelite bars placed to intercept the blades of conflicting switches and prevent closing. Six positions on the bars are provided, slots cut in them allowing the proper switches to be closed for each position. On switches mounted horizontally the bar intercepts a pin fastened to the blade. The lever controlling the bar also acts as a switch with six taps connecting the proper voltmeter across the buses.

Stands to accommodate the several types of relays may be mounted on a turntable, which may also be inclined to facilitate work. The turntable is on the bench directly below the board. The cover for the board, lined with white enamel, serves as a reflector for lamps mounted within the cover, thus providing indirect lighting when in a raised position. When lowered it protects the board and apparatus from dust.

*Submitted in Electric Railway Journal Prize Contest.

American Association News

Utilities Commissioners Consider Vital Subjects

Valuation, improvement of service, motor bus regulation, insurance and electric railway progress have attention at Dallas meeting

REPRESENTATIVES of regulatory commissions of 38 states attended the 39th annual convention of the National Association of Railroad and Utilities Commissioners, meeting during this past week from Oct. 17 to 21 in Dallas, Tex. Reports of committees and addresses covering a wide range of problems connected with the equitable regulation of public service companies occupied the attention of the convention. Among these were a number of subjects of direct interest to electric railway men. A report of the committee on valuation presented by Hon. Fred Woodruff of Iowa was followed by an address on this subject by Hon. W. A. Prendergast of the New York Public Service Commission, who stressed the need for agreement on an economically sound basis of determining utility values. He urged that regulatory bodies assume the responsibility for initiating and promulgating a sound and uniform basis of determining fair value, instead of leaving this important subject to legislative determination where, he said, it would be approached not on an economic, but on a political basis.

W. W. Atterbury, president Pennsylvania Railroad, called attention to the vast expenditures being made by the railroads of the country for the improvement of service. This progressive policy, he declared, can be continued only if the public will maintain fair treatment and permit a fair return for the capital being thus expended for the public service.

Motor Vehicle Situation Considered

Motor vehicle common carriers came in for consideration in the report of the committee on motor vehicle transportation presented by Hon. Amos A. Betts of Arizona. The report outlined the rapid growth of this new form of transportation and urged the need for adequate regulation that would protect the investments of responsible operators and the interests of the public. Hon. J. E. Benton, general solicitor of the association, outlined the status of the matter of federal legislation of interstate buses. Action on this subject, he said, is awaiting the completion of the report being prepared by the Interstate Commerce Commission based on its study of the problem of motor transportation throughout the country. When the Interstate Commerce Commission's study is completed, Mr. Benton predicted, the representatives of the state commissions expect to co-operate with that body in the final recommendation of the principles upon which interstate vehicle regulation should be based.

S. A. Markel, representing the Motor Bus Division of the American Automobile Association, expressed the views of his organization on this subject. He said that bus operators are in favor of the regulation of interstate passenger carriers, but favor the elimination of trucks from proposed legislation. This regulation, they maintain, should be delegated through federal authority to the respective states. Mr. Markel added that the next step in handling the motor bus problem would then be to secure uniform regulatory laws in the various states.

Another phase of the motor bus question, that of sound insurance, was discussed in an address by H. S. Ives, vice-president Casualty Information Clearing House, Chicago. Contrary to the general impression among bus operators, according to Mr. Ives, insurance rates on buses are fixed by the operators themselves through the accident record which they establish. The speaker decried the tendency on the part of some bus men who object to the present excessive high rates of insurance, to urge assumption of insurance activity by the state, and held that any step in the direction of government insurance is a blow at the entire business and industrial structure of the nation.

Lucius S. Storrs, managing director of the American Electric Railway Association, addressed the convention on the status of the electric railway industry. He called attention to the significance of the recent Cleveland convention in demonstrating the rapid progress which the electric railways of the country are making in meeting present-day transportation needs. Electric railways, said Mr. Storrs, are keenly alert to their responsibilities to the public, and are exerting their utmost effort toward the improvement of service and co-operation with local and state regulatory bodies. To carry out their objectives and their proper place in the life of the modern American community, however, they must be granted rates of fare which will produce a fair return on the capital invested in this basic industry. That there is a growing tendency on the part of the public to recognize the needs of electric railways is evidenced, according to Mr. Storrs, by the gradual rise in electric railway fares. He held that a maximum fare of 10 cents is entirely justified for electric railway service and cited that this rate is in effect in 214 cities of the 313 having a population of 25,000 and over.

Other committee reports of interest to electric railways included the work of the committee on statistics and accounts of railroad companies, public ownership and operation, uniform regulatory laws, statistics and accounts of public utility companies, and the report of the committee on public relations.

Mr. Wells Chosen President

The association elected as its officers for the ensuing year: H. G. Wells of Massachusetts, president; L. E. Gettle of Wisconsin, first vice-president; Charles Webster of Iowa, second vice-president. It also re-elected J. B. Walker of New York as secretary; J. E. Benton of Washington, general solicitor, and C. S. Bailey, Washington, assistant secretary.

Glacier National Park in Montana was selected for the next annual meeting, to be held on Sept. 10, 1928.

COMING MEETINGS OF *Electric Railway and Allied Associations*

***Oct. 26-27*—Public Utilities Association of West Virginia, annual convention, Parkersburg, W. Va.**

***Oct. 26-27*—Society Automotive Engineers, Transportation Section meeting, Hotel Sherman, Chicago, Ill.**

***Nov. 2-3*—Iowa Electric Railway Association, operating and maintenance sections, annual convention, Blackhawk Hotel, Davenport, Iowa.**

***Nov. 4*—Metropolitan Section, American Electric Railway Association, Engineering Societies Building, 33 West 39th Street, New York, N. Y.**

***Nov. 4*—American Institute Electrical Engineers, New York Section, Engineering Societies Building, New York City.**

Central Traffic Men to Meet Nov. 16-17

FORT WAYNE, IND., has been selected for the next meeting of the Central Electric Traffic Association, which will meet at the Keenan Hotel on Nov. 16 and 17. The first day's session will be called to order at 9 a.m., Central time.

U. S. Chamber of Commerce Has Four-Day Meeting

PURSUANT to a new plan, about 400 members of the U. S. Chamber of Commerce met at West Baden, Ind., over last week-end for a four-day meeting, packed with the sessions of committees, councillors and members of the board of directors. The sessions closed Oct. 18. Of first importance were reports on Mississippi flood control, tax reduction and a new civic objective for business. Additional subjects covered in general meetings were a project for getting out the vote at elections, reduction of postal rates, maintenance of the integrity of the Federal Reserve System, self-regulation by business, the part played by member organizations in legislation, and the relation of these organizations to the public and the press. Twenty different committees held meetings, reviewed the progress of their work, and, where advisable, laid out new plans. As always at U. S. Chamber of Commerce meetings the attendance included a large number of the leaders of American business, both from industry and trade. General judgment was that this new plan of grouped committee and national councillors meetings was a success, enabling all groups sharing in the chamber's work materially to advance their activities.

Mississippi flood control was presented through addresses by Lewis E. Pierson, president of the chamber; John M. Parker, former Governor of Louisiana, and through a report of the chamber's flood committee, headed by Frederic A. Delano. The report was ordered to be made the basis for referendum to chamber members. It recommends "(1) that the federal government should hereafter pay the entire cost of constructing and maintaining the works necessary to control the floods of the lower Mississippi; that is, from Cairo to the Gulf; (2) that the federal government should assume the sole responsibility for locating, constructing and maintaining such works; (3) that there should be an adequate appropriation to insure efficient, continuous and economic work, the funds to be made available as needed; (4) that flood control on the Mississippi is a work of such magnitude and urgency that it should be dealt with in legislation and administration upon its own merits, separate and distinct from any other undertaking."

In tax reduction the chamber is now asking member organizations to vote on a suggestion that the corporation income tax be reduced from 13½ per cent as now to 10 per cent. The chamber's committee, as already announced, asks a total tax reduction of $400,000,000. Reductions advocated include the abolition of the federal inheritance tax and excise taxes imposed as war measures.

The committee on postal service advocated the elimination of the higher rates made effective in 1925 on private mailing cards and circular matter, and also war rates on advertising in magazines and newspapers. This committee showed that the Post Office Department has lost revenue through these increases and that the existing rates are handicapping business.

Harry A. Wheeler, president of the Union Trust Company, Chicago, discussed the benefits of the Federal Reserve System and urged strong defense of the system by business. Improvements are to be expected by fundamentals should not be altered.

Judge Edwin B. Parker, chairman of the board of directors of the chamber, advocated regulation of business by itself, asserting that if it does not do so the government will. He commended the helpful attitude of the Federal Trade Commission in desiring to assist business to work out rules of business conduct in the interest of business itself, but in a manner to safeguard the interests of the general public.

In closing the session, President Pierson pointed out that the national councillors present had a grave responsibility, for on them rested the task of taking back to their organizations the problems studied by the chamber and there creating that informed public opinion which will bring its influence to bear on government for the common welfare.

American Association News

Side Wear on Brushes in Ventilated Motors

THE following report of special committee No. 8, Rolling Stock Division A.E.R.E.A., was received too late for publication in the report number of ELECTRIC RAILWAY JOURNAL.

Observations are being made on a number of railway properties to determine the effect on brush life of changes made in ventilated railway motors. Various schemes of ventilation have been worked out and data are being collected on these motors to find a means of obtaining increased life of the carbon brush without increasing commutator wear.

Side wear of carbon brushes was known before the advent of the ventilated railway motor. In such instances where it occurred in the totally inclosed motor it was no doubt due to high current density in the brushes, the erosion of the sides of the brush being caused by incipient sparking from brush to carbon box. In such instances the pigtailing of the brush was beneficial. Side wear of brushes has not been a serious factor in the series ventilated railway motor, this no doubt being due to the fact that the air enters the motor at a low velocity and not very large volume and the intake is at the pinion end.

With the development of the multiple ventilated railway motor, where the air enters at the commutator end, one stream of air passing across the field coils and the outside of the armature and the other stream of air flowing through the armature, it has been found that the life of the carbon brush has been materially shortened. It was quite some time before it was definitely determined that the side wear of brushes was caused by dust, which, entering with the ventilating air, lodges between the carbon brush and the carbon box and, acting as an abrasive, causes side wear of the brush and roughens the brush surface of the carbon box.

There may be instances where side wear of brushes in multiple ventilated motors is due to methods of taking current from the brush, causing sparking as referred to above in reference to the totally inclosed motors.

The following tests showed conclusively that dirt was the cause of side wear of brushes:

On a four-motor, 35-hp. equipment where side wear of brushes was very bad, the fourth motor on a car was cut out of the electrical circuit, new brushes placed in all four motors and the car put back in service operating on three motors. An inspection weeks later showed that the brushes in No. 4 motor had just as much side wear as the brushes in either of the other motors.

Another test was made by insulating the carbon box from the brush-holder, body current being taken from the brush by means of a pigtail and also through the brush-holder pressure arm. Results of tests showed that brushes in the special insulated carbon boxes had just as much side wear as did the brushes in the standard holders. Tests have shown that if movement of the brush in the carbon box can be eliminated or dust kept out of the motors, side wear of brushes will be negligible.

Inclosed brush-holders have been very effective in reducing the side wear of brushes; the objection to this construction is on account of additional maintenance of the covers, also on account of difficulty of inspection.

During the past two or three years manufacturing companies have made very extensive tests both in service and on the test stand to find some means of obtaining better brush life, and results in service indicate an increase of from two to ten times the life previously obtained.

Operators endeavoring to improve brush mileage should be careful not to do so at the expense of their commutators. Of first importance is the selection of a brush that will polish the commutator, thereby reducing the number of broken brushes and the flashing over of motors. A brush that does not polish but etches and roughens the commutator will not ride smoothly and will be bounced from the commutator when the car, traveling at high speed, hits special work or raised rail joints, resulting in flashing over of commutators.

The proper spring pressure on the brush is a prime requisite to successful performance of the motor and this value is dependent on the condition of track, speeds operated and the weight of the equipment.

The brush-holder spring pressure should be maintained so as to keep the brush on the commutator at all times.

News *of the* Industry

rand Rapids Rejoices in Coffin Award

Grand Rapids, Mich., was given an opportunity on Oct. 13 to show its appreciation of the honor conferred on it by the recent awarding of the Charles A. Coffin Prize to the Grand Rapids Railroad. The occasion was a dinner given by Clay H. Hollister, president of the Old National Bank, at the Hotel Pantlind, and the honor guests were Louis J. DeLamarter, vice-president and general manager, and his associates of the winning company.

Mr. Hollister lauded the rehabilitation of the local lines, which he termed the greatest contribution toward putting the railway systems of the country back in the category of staple utilities. Attorney Stuart E. Knappen described the difficulties of securing a rise in fares and of working out the present franchise terms following the critical post-war period. That Mr. DeLamarter was able to obtain the co-operation of the city administration and the general public in the face of such handicaps was termed a achievement of exceptional merit. In reviewing the history of the organization Clay Swarthout expressed his joy that the city and railway were able to combine their efforts to bring about such desirable results.

General Manager DeLamarter in expressing his appreciation eulogized the city government, newspapers and the public in bringing about a better understanding of what the city transportation business were doing. He disclaimed all personal credit for the award, giving the credit to his workers in the field.

The reasons back of the astounding success of this comparatively small railway serving a population of approximately 160,000 were enumerated in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 15, 1927, pages 728 to 738.

Boston Employees Charge Discrimination in Wage Settlement

The employees of the Boston Elevated Railway, Boston, Mass., all members of the Amalgamated Association, have brought suit against the company in the Superior Court claiming they were discriminated against in the recent wage increase granted by the Boston Elevated Railway. The men, who are variously employed as truck drivers, air compressor men, track operators, stablemen and teamsters, have asked in a bill of equity that the railway and officials of the union be enjoined from putting into effect a new wage scale and hour schedule.

The nine employees claim executives were influenced in leaving them out of consideration through pressure brought to bear by the International Brotherhood of Teamsters, Chauffeurs, Stablemen and Helpers, and the International Union of Steam Operating Engineers. These two organizations, it is claimed, sought to bring their various positions under the control of the two orders.

The Boston Elevated Railway is said to be willing to include the nine men in the new contract, but intends to enter into a contract with the other two unions. The men say they will be unable to get work elsewhere without joining the two unions named, and are anxious to have the benefits of the Amalgamated. They seek to void the working contract recently enacted and have it made over to include their work. The case will be heard Oct. 25.

Birthday Surprise for T. N. McCarter

On the occasion of his 60th birthday on Oct. 20 Thomas N. McCarter, president of the Public Service Corporation of New Jersey, was given a surprise party by 1,000 employees. A bouquet of American Beauty roses was presented to him by John Craig of Rutherford, N. J., who has a service of 35 years with the company.

When Mr. McCarter rose to accept the gift the chair in which he had been sitting became a luminous representation of a birthday cake, lighted with 60 electric bulbs and embellished with the seal of the Public Service Corporation.

Jitney Ordinance Constitutional

Supreme Court hands down decision eliminating jitneys from route of Detroit Street Railway. Five-year controversy ended. Municipal Railway must care for added patronage

THE United States Supreme Court dismissed the appeal of the Red Star Motor Drivers' Association to have the Detroit ordinance regulating jitneys declared unconstitutional, thus ending a five-year battle to drive the jitneys off the street. Although the formal court decision has not been received by the Detroit city officials, they were notified on Oct. 17 that the Supreme Court had held that it was without jurisdiction, no federal question being involved. The validity of the ordinance had previously been upheld by the State Supreme Court of Michigan.

It has not been announced what the city's next step will be, but it is unlikely that any action will be taken to oust the jitneys until after an official copy of the court decision has been received. Edward N. Barnard, attorney for the jitney drivers' association, stated that he would start at once to fight for a rehearing before the Supreme Court. Members of the City Council were of the opinion that the matter of ousting the jitneys from the streets of Detroit rested with Mayor John W. Smith, and decision is being withheld by the Mayor until Corporation Counsel O'Neil has had an opportunity to go over the court decision. The Mayor has announced that he will be governed by the opinion of the Corporation Counsel.

The finding of the United States Supreme Court was anticipated when the court declined to hear further arguments in the case. Additional briefs were to have been filed both by the city attorneys and attorneys for the jitney drivers. The case was advanced on the docket to first position after the city of Detroit sought its immediate dismissal early last spring.

The case was brought to the high court on a writ of error by the jitney drivers, against the decision of the Michigan Supreme Court. The Michigan Court had upheld the constitutionality of an ordinance which, in effect, would have barred the jitneys from main Detroit thoroughfares and dismissed an injunction issued in the Wayne County Circuit Court restraining the city from ousting them. While the case was pending before the United States court the State Supreme Court issued an injunction restraining the city from acting pending a final decision.

This so-called "jitney ordinance" bars jitneys from operating on Woodward, Jefferson and Grand River Avenues and on Fort Street, and proposes substitute routes which, it was cited in the brief filed in the case, are longer and involve many sharp turns. The ordinance was held unconstitutional by Wayne County Circuit Judge Ormond F. Hunt, and his decision was reversed by the State Supreme Court in a divided decision.

It was the contention of counsel for the jitney drivers' organization that the ordinance violates the Fifth and Fourteenth Amendments to the Constitution of the United States in that it causes serious discriminations and would result in confiscation of property without due process of law. It was

further claimed that in barring jitneys from streets where buses, street cars and taxicabs were permitted to operate the ordinance became class legislation.

A survey is being made by Del A. Smith, general manager of the Detroit Department of Street Railways, to determine whether the city department has transportation facilities available at present to care for the passengers carried daily by the jitneys. It is estimated that the ousting of the jitneys will add 35,000 passengers to the Detroit street railway traffic daily and that the jitney riders will bring an additional revenue of $3,000 per day.

The first of the 125 new street cars ordered by the Department of Street Railways has arrived and others are to arrive at the rate of eight per week. It has been stated that the new cars will more than care for the additional patronage due to the proposed ousting of the jitneys and that the Detroit United Railway has offered to rent cars to the city. The new express service which was recently put in effect on Jefferson Avenue requires the use of numerous city buses and the survey is being made to determine whether more equipment would have to be purchased to handle the additional passengers now making regular use of jitneys.

The various steps in the jitney controversy in Detroit have been covered in the ELECTRIC RAILWAY JOURNAL. It was said editorially in these pages last year that the management of the municipal railway had been embarrassed beyond measure by the unrestrained jitney competition, which in 1925 mulcted the revenues of the municipal system to the extent of more than $1,000,000.

South Jersey Desires Trolley Back

Residents of several towns below Gloucester in New Jersey recently appealed to the Board of Public Utilities Commissioners of New Jersey to require the Public Service Railway to restore railway service to those towns. The company abandoned its service below Gloucester in August of this year because of the alleged unsafe condition of the bridge over Big Timber Creek. In its place a fleet of buses was substituted. It is the claim of the people that bus service is entirely inadequate.

Handy Folder Gives Milwaukee Rail and Bus Schedules

A complete time-table, effective Oct. 10, is included in the fourteen-page booklet of the Milwaukee Electric Lines, Milwaukee, Wis. It includes service schedules in force on the lines of the Milwaukee Electric Railway & Light Company, the Milwaukee Northern Railway and the Wisconsin Motor Bus Lines. In addition, some general information is included and some helpful hints for the traveler.

Comment Continues on New York's Transit Problems

Reports, findings, opinions, hearings and hearsay on New York City's transit difficulties and developments continue to receive more than a little share of public comment and publicity in the newspapers.

Some new angles to the whole story include the publication on Oct. 19 of a legal opinion, written by William D. Guthrie, president of the New York City Bar Association; Nathan L. Miller, special counsel for the Brooklyn-Manhattan Transit Corporation, and John W. Davis, former Democratic candidate for president, in collaboration with Rushmore, Bisbee & Stern, holding that the city of New York may not recapture the lines of the Brooklyn-Manhattan Transit Corporation for from eight to ten years. In answer to this, Samuel Untermyer, the Transit Commission's special counsel, decided against further conferences with the Brooklyn-Manhattan Transit Corporation until after the city has taken steps to recapture the city-owned portions of the Brooklyn-Manhattan system.

Another happening in the transit situation was the reappearance on the scene of Major Charles E. Smith of St. Louis, who a few weeks ago submitted his report on the transit survey of New York City. He announced his willingness to appear unconditionally as a witness at the Transit Commission hearing conducted by Samuel Untermyer. He supplemented his interview with Comptroller Berry by a statement which had arrived in the mail from St. Louis giving his answer to ten questions on transit problems asked by the *World* following publication of the draft of his report.

Just prior to these developments there had been the statement that the Transit Commission would proceed at once to prepare a transit readjustment plan based on the recommendations of Mr. Untermyer, and would hold public hearings as soon as possible to enable it to present the plans to the Board of Estimate and the traction companies with a minimum of delay. Following this announcement came word that Comptroller Berry had offered to ask Major Smith to return to testify before the commission in explanation of his readjustment plan report. The next point of interest was the appointment of a non-partisan advisory committee of distinguished citizens to confer with the Transit Commission, city authorities and traction companies in an effort to reach the solution of these transit problems, which was urged by the Merchants Association.

On Oct. 18, with the active support of Mayor Walker, the Board of Estimate, meeting in committee of the whole, voted to put $20,210,000 for subway construction in the 1928 budget as the first step in the plan of John H. Delaney, chairman of the Board of Transportation, to preserve the 5-cent fare in the new city subway system by paying part of its cost out of taxes, thus lessening the interest charges and making them that much nearer self-supporting at a 5-cent fare.

Ten Cents in Binghamton

A 10-cent cash fare, four tickets for 30 cents on its two operating zones known as the City and the Endicott zones, were allowed the Binghamton Railway, Binghamton, N. Y., in an order of the Public Service Commission dated Oct. 7. The receiver, William H. Riley was authorized to put the desired rates into effect on Oct. 16 and to continue them until June 30, 1929, and thereafter until otherwise ordered. Sale of tokens on all cars in each zone was included in the order. The Binghamton Railway now charges a 7-cent fare in each zone.

The commission's decision fixed the value of the property of the railway upon which it was entitled to a return at $3,000,000, and the rate of return to the company indicated under the new fare rates will be 8 per cent.

The Binghamton line has been in the hands of a receiver since 1918 except from Feb. 23, 1924, to Oct. 25, 1925. In 1919 the company asked for a 6-cent fare. After controversies with the city over franchise conditions this was allowed until Jan. 12, 1925, when the company, the receiver having been temporarily discharged, asked for a 7-cent fare with a 10-cent fare between Johnson City and Endicott and a round trip fare of 15 cents. The city again waived any franchise conditions and the commission authorized a 7-cent fare. Notwithstanding the increase, the company again went into a receivership on Oct. 11, 1925.

When Receiver Riley asked for the 10-cent cash fare, the city protested the jurisdiction of the commission. The city secured a writ restraining the commission from acting upon the receiver's application during the proceedings in the Supreme Court which were terminated recently when the Court of Appeals held that the Public Service Commission had jurisdiction.

Suggestions Invited Through Portland Press

In each of the four daily newspapers of Portland, Ore., namely the *Oregonian*, *Journal*, *News* and *Telegram*, display advertisements will appear each week for a period of three months dealing with modern transportation in that city. The purpose of the Portland Electric Power Company in placing these advertisements is to invite its patrons to read and study the messages, and from this information to know something of the various phases of modern transportation service, both electric railway and bus. The company is inviting suggestions and it is through this medium it hopes to win the frank and honest opinions about important questions. Constructive criticisms which can be practically applied will help the company and give the traveling public better service.

City Ownership in Chicago a Possibility in New Lisman Offer

A revised plan for the solution of Chicago's transit problem, providing for the immediate construction of an independent combined subway and elevated system and for acquisition of ownership by the city on terms reasonable and satisfactory to the city, was recently proposed to Mayor Thompson and Alderman Joseph B. McDonough, chairman of the local transportation committee, by John M. Harlan, attorney for the F. J. Lisman interests of New York.

As outlined in Mr. Harlan's letter the new plan provides for the purchase of the Surface Lines' properties by the Lisman interests and for the immediate transfer of these properties to the city, in consideration of a lease to the company to operate them. Later, it is pointed out, the elevated lines can be acquired, while subway construction could start at once.

"If the city will grant the Lisman plan ordinance to a company organized by my clients," Mr. Harlan declared, "the that company, after it acquires the intangible properties of the surface lines executes its mortgages, issues its securities and exchanges some of them for those of existing companies, would, when requested by the city, give and transfer to the city all these tangible street railway properties." Legal ownership by the city, which is made possible by this plan, Mr. Harlan added, means an estimated saving in taxes of $3,600,000 a year and would do away with the possibility of interference in control by the Illinois Commerce Commission, inasmuch as that body's act expressly excludes city-owned public utilities from commission jurisdiction.

The original Lisman plan, as presented to the City Council last November and subsequently drafted into ordinance form, provided for the return of the surface lines and the subway system to the city of Chicago for $1 at the end of 30 years operation. This was to be accomplished by retiring all obligations through the operation of a sinking fund.

Another St. Louis-Kansas City Application Filed

The St. Louis-Kansas City Short Line Railroad has filed a new application with the Missouri Public Service Commission for a certificate of convenience for the construction and operation of an electric interurban line from St. Louis to Kansas City, Mo. Such a permit has been sought since January, 1925.

The commission denied the original petition on the ground that the company had not made adequate showing of its financial ability to carry through the project. The company then went to the Cole County Circuit Court and later to the Missouri Supreme Court. This appeal was dismissed in the Supreme Court a few weeks ago.

The proposed line would cost $55,000,000, according to the estimates of its promoters. Surveys, franchises and right-of-way already secured are listed at a valuation of $20,000,000, while expenditures made to date total $26,000. The former application was vigorously opposed by the steam railroads operating between St. Louis and Kansas City. They contended that the towns traversed had adequate service.

St. Paul Fare Hearing on Nov. 1

The city of St. Paul, Minn., will ask for a lower valuation of the property of the St. Paul City Railway at the hearing of the company's application for a higher rate of fare before the Minnesota Railroad and Warehouse Commission. E. W. Bemis and other traction experts have the case under preparation. The hearing was set for Oct. 24 and postponed to Nov. 1.

The voters on Sept. 8 failed to pass a charter amendment which would have enabled the city to offer the railway relief from paving between tracks and other charges to offset the low return on its investment. The present rate in each city is 8 cents cash or six tokens for 40 cents. Corporation Attorney A. A. Stewart has as yet not agreed to such a retaliatory measure as action to banish the company's buses from the streets because operated without franchises or to compel the company to pave between tracks for 16 miles, which would cost $800,000. Details of the company's petition were given in the ELECTRIC RAILWAY JOURNAL, issue of Sept. 17, page 536.

Illinois Traction Will Co-operate to Serve Football Fans

Tariff information concerning several of the important football games has been released by the Illinois Traction System's traffic department. For the Illinois-Michigan game and annual homecoming, Oct. 29, a rate of one fare for the round trip from Illinois points and St. Louis to Champaign-Urbana is authorized good going and returning on Oct. 29. A rate of 1½ fare for the round trip is authorized for the same game going Oct. 28 and 29 with final return limit to leave Champaign not later than midnight Oct. 30.

For the Illinois-Chicago game and Dad's day, Nov. 12, the one-fare, round-trip rate is in effect good going and returning Nov. 12, and the rate of 1½ fare for the round trip going Nov. 11 and Nov. 12 with final return limit to leave Champaign not later than midnight Nov. 13. The minimum fare for both games is $1.

Piedmont & Northern Railroad Will Renew Efforts to Extend

The Piedmont & Northern Railroad is prepared to continue its efforts to extend its lines in North Carolina and South Carolina before the Interstate Commerce Commission until the full commission has had an opportunity to vote on the proposal. Officials of the line have made this announcement.

Five-Cent Increase on Penn-Jersey Route

An increase in fare from 15 cents to 20 cents has been put in effect on Route No. 5, operating between Philadelphia and Moorestown, by the Penn-Jersey Rapid Transit Company, operated by the Philadelphia Rapid Transit Company. The old rate was 15 cents per zone. This will make the minimum fare on the line 20 cents.

Increase Rates on Illinois Lines

Fares on the Illinois lines of the Tri-City Railway, operating in East Moline, Moline and Rock Island, Ill., were increased Oct. 15 from seven tickets for 50 cents and fifteen for $1 to three for 25 cents, with the 10-cent casual fare basis retained. Children's fares were raised from 4 cents to 5 cents. Efforts to win a higher fare date back to 1925, when identification cards were discontinued.

Garden Club in Portland

A large and well-organized Garden Club is the latest idea of Bill Strandborg, the ever-progressive publicity agent of the Portland Electric Power Company, Portland, Ore. He believes that within the personnel of the company are hundreds of experienced and enthusiastic flower growers who might capitalize on their knowledge and the wonderful opportunities afforded in the territory of Portland for plant development. Annual contests for trophies, flower show exhibitions, improvement of individual gardens, comforts for hospital patients, even improvement of the landscaping values of the company's properties—all such objectives might be worth the carrying out of the idea. All those who are interested have been asked to send names, addresses and names of departments to publicity department.

Eight Cents Sought in Allentown

The Lehigh Valley Transit Company, Allentown, Pa., has petitioned the Pennsylvania Public Service Commission for permission to charge an 8-cent fare. The present rate is 7 cents.

Season for Learning Opens in Boston in November

In a ten-page pamphlet the educational program of the Boston Elevated Railway, Boston, Mass., is set down with a foreword to all "L" employees announcing the opening of the fifth season of the company's educational plan. As last year, the season will cover practically the five months from Nov. 1 up until March 31.

The 1927-1928 program includes the continuation and repetition of some popular courses and the introduction of two or three new ones. Such subjects as "making the most of one's personal resources," "woman's interests," "caring for automobiles, buses and trucks" and

"investing one's funds" are listed. A popular course in every-day law is especially recommended. The schedule has been arranged so that an employee willing to devote an evening a week to mental improvement, relaxation and good-fellowship can get a variety of opportunities.

Service Annuity Plan for Alabama Workers

A service annuity plan has been authorized by the board of directors of the Alabama Power Company, Birmingham, Ala., effective Oct. 1, which makes provision for all employees incapacitated by age and whose service records entitle them to recognition by the company. The company has heretofore made provision for death benefits through the Group Insurance Plan. The Alabama Power Company operates 89 miles of line, including the systems at Anniston, Gadsden, Huntsville, Montgomery, Sheffield and Tuscaloosa.

Ten Cents in Holyoke

The Holyoke Street Railway, Holyoke, Mass., was authorized by the Public Utilities Department Oct. 20 to increase cash fares from 6 to 10 cents. At the same time the department ordered a readjustment of the rate schedule so that residents of Chicopee and Chicopee Falls may ride between those points for a single fare instead of two fares, as proposed in the company's schedule.

Baltimore Appoints Counsel in Fare Hearing

Mayor William F. Broening of Baltimore has announced that the city will be represented by Simon E. Sobeloff, who has just been appointed Deputy City Solicitor, at the hearing on the application of the United Railways & Electric Company for a permanent 10-cent fare. The hearing will open on Oct. 27 before the Maryland Public Service Commission.

Trained Musicians Hail from Pittsburgh

Whether it be symphony, operatic selection or just plain jazz, the band of the Pittsburgh Railways, Pittsburgh, Pa., is doing a real job, and if it had not won a name for itself in its own city, it surely established itself as an institution at the recent American Electric Railway Association convention in Cleveland. Returning delegates are loud in their praise of the band, which attracted throngs to the Esplanade every day to hear its concerts.

This organization of 40 musicians,

J. B. Donley

who play under the leadership of Alois Hrabak, is composed entirely of employees of the Pittsburgh property. Great credit for the excellence of the band is due to Conductor Hrabak himself, who worked with untiring effort to bring the band to the popularity it enjoys today. But back of all this success is the dogged determination of Joseph B. Donley, director of public relations of the Pittsburgh Railways, who acts as manager of the organization, which is considered part of his department. Mr. Donley is the up-and-doing, progressive type that will bring to this organization the credit it deserves. The musicians themselves have taken a great interest in its suc devoting each Thursday night aft hard day's work to the practice of ous numbers.

Port Arthur Council Show Faith in Utility

In response to a communication J. G. Holtzclaw, manager of the Ea Texas Electric Company, reque that an extension of time be gr that company for concluding the t over of the interests of the Port A Traction Company, Port Arthur, the City Council granted an indefinit tension of time. In his letter Mr. H claw said that he was quite sure what the people of Port Arthur de was a transportation system which adequately fill the needs of a gr city. He was quite sure that the Council would carefully weigh any osition which might be put to furnish transportation to the city.

P. R. T. Men Don Nava Type Caps

More than 6,000 trainmen an supervisors of the Philadelphia Transit Company, Philadelphia, blossomed forth in new naval type on Oct. 15. The caps are simil those used by commissioned and commissioned officers of the naval ice, being of a dark blue felt w semi-flexible crown. This headgea be more comfortable and of longe than the winter headgear for standard on the system. An adde vantage lies in the fact that the new will be usable the year round, wh it has hitherto been necessary for men to purchase not only a felt ca winter use but a straw headgea warmer weather.

The supervisors—men who are streets day and night to maintain s ules and to handle emergency tra tation conditions—will have a new to be worn at the front of the ca above the visor. Trainmen's badge be unchanged.

Strike up the Pittsburgh band

Recent Bus Developments

Votes to Deny Indianapolis Bus Purchase

The Indiana Public Service Commission at a special meeting Oct. 14, voted not to change its order denying the Indianapolis Street Railway permission to buy the stock of the Peoples Motor Coach Company for $500,000. This means that the transcript of evidence heard by Circuit Judge Harry O. Chamberlain, Indianapolis, on the appeal of the car company against the commission's order, will be returned to the court and Judge Chamberlin will rule upholding or reversing the commission's order. The commission twice has refused the merger on the grounds that $500,000 was too high a price for the bus company. Under the last utility legislation, the car company appealed to the Circuit Court. Transcript of the court testimony was sent to the commission so that it might change its order, if it desired, before the court acts.

The communication to the court pointed out that the car company still intends paying 8 per cent interest for $500,000 it must borrow to purchase the bus company and declared that while the bus company made $6,493 in the first seven months of 1927 the history of the railway did not indicate it could operate the bus lines and make a net profit above interest charges on the purchase price.

Tramway Would Run Desired Line in Denver

Business men of Denver, Col., have asked the city officials to sanction a bus route from the Union Depot up Eighteenth Street to the outer edge of the city. The Denver Tramway shows a willingness to operate the buses and intimates that if the project is sanctioned it will issue transfers between the buses and its cars with a fare of about 10 cents. The carfare now is 8 cents or two tickets for 15 cents. The Denver Tramway operated cars up Seventeenth Street to the outer edge of the town some 6 or 7 miles, but abandoned the service on Eighteenth between the Union Depot and Broadway about two years ago.

Railway Would Prevent Bus Interference in Indiana

Suit for an injunction to prevent the Marion-Fort Wayne Motor Coach Company of Indiana from operating a bus between Fort Wayne and Waynedale, Ind., until authority has been secured from the Indiana Public Service Commission has been filed in the Circuit Court at Fort Wayne by the Indiana Service Corporation, railway operator in that section. The bus company has not the authority to carry passengers between Fort Wayne and Waynedale, the complaint alleges. The Indiana Service Corporation does have authority to carry passengers between these two points.

Buses to Serve on Certain Connecticut Runs

The Connecticut Company will cease operation on the Green line between Waterbury and Milldale, Conn. It is proposed to continue this line only between Waterbury and the Mountain. The New England Transportation Company, a bus subsidiary of the New Haven, will operate a line from Waterbury to Hartford which will furnish the transportation for the other part of the Waterbury-Milldale line.

Comforts of the Auto

STREET cars are being built with automobile trimmings, according to report from the American Electric Railway exposition, in order to lure back their rapidly deserting patronage. New cars are to have tilting seats, upholstered in leather, vestibules built on windshield lines and motor horns in place of gongs.

This may be a good beginning, but still it is hardly enough to make the confirmed autoist feel at home in a street car. Before this is accomplished it will be necessary to put a number of bumps in car tracks and lower the roof of cars so that passengers can crack their domes against the top every once in a while. Another improvement should be the removal of straps so that passengers will be required to sit in one another's laps. This will appeal particularly to the high school and college trade.

Then it should be arranged that, at stated intervals when the car is bound toward town with a load on the way to work, it will blow a tire and the passengers will have to get out and help the motorman change it.

There should, by all means, be a parking problem created to give patrons a real sense of having driven down in their own cars. It ought to be arranged that each street car, upon arriving at the downtown section, must drive around the block at least six times before finding a place to stop, where passengers may alight.

It would also help further the illusion if the cars can be saturated with an aroma compounded of the smells of exhaust gas, hot oil and burning rubber.

When these reforms are accomplished a good beginning will have been made at equipping street cars with all the comforts of the auto.

—*Omaha World-Herald.*

Bus Service in Iowa Planned

The Iowa Railway & Light Company has filed a petition in the Marion County District Court, Cedar Rapids, Iowa, asking for authority to abandon its interurban line connecting Cedar Rapids, Mount Vernon and Lisbon. The company, which has operated bus lines in part-time service over the routes, will establish complete bus service later.

Increased use of automobiles, especially since the paving was laid, was credited with the slump in business on that line, necessitating its disuse. The interurban line was built in 1912. Corporation officials say that at no time did it yield a profit.

Petitions for Kansas City, Kan., Bus Line

A petition for a bus line to connect the Rosedale and Argentine districts of Kansas City, Kan., was filed Oct. 4 with the City Commissioners by the Castle Hill Improvement Association. The commissioners will refer the petition to the Kansas City Public Service Company. Street car patrons at present must go through Kansas City, Mo., to travel between the two districts.

Boston Shoppers Ride Free

A free bus service for shoppers in Boston, Mass., has been arranged by the retail trade board of the Boston Chamber of Commerce with the Motor Mart in Park Square and the Bowdoin Square garage, which are on opposite sides of the shopping district. A ten-minute schedule will be maintained from 8 a.m. until 6 p.m. between these garages and about twenty co-operating stores, which are the leading stores in the city. It is expected that this will induce people coming into the city in their own automobiles to park them at the garages for the day or for the visit and ride to their destination in the free buses, thus relieving street congestion. Many prominent mercantile houses are sponsoring the service.

Hearing on Westchester Fare

A hearing on the Westchester Street Transportation Company's petition to increase from 10 to 20 cents its fare from White Plains to Tarrytown, N. Y., was heard on Oct. 19 by acting Public Service Commissioner H. M. Chamberlain in the offices of the Public Service Commission, New York, N. Y. Officials of the petitioning company and the Third Avenue Railway, which recently purchased the Westchester Street Transportation Company for $70,000, attended. The fare increase is sought on the ground that the company is losing money.

Financial *and* Corporate

Kaw Valley Reorganized

Interest charges cut from $82,470 a year to $30,000 under plan promising for the future

THE Kansas City, Kaw Valley & Western Railroad has been incorporated in Kansas to take over the properties of the Kansas City, Kaw Valley & Western Railway in accordance with the reorganization plan submitted by the protective committee for the holders of the first mortgage 6 per cent ten-year gold bonds of the old company, sold at foreclosure Sept. 12 and purchased for $300,000 by the bondholders' protective committee. The new company is capitalized as follows:

First morgage 4 per cent twenty-year bonds, authorized	$1,000,000
Non-cumulative 6 per cent preferred stock (par $25) authorized	250,000
Common stock without par value, shares	12,000

The first mortgage bonds are to be dated Oct. 1, 1927, bear coupons payable semi-annually at the rate of 4 per cent per annum and be in the denomination of $25, $75 and $1,000. Bonds shall be secured by a first mortgage upon properties of the company. In order to provide the company with funds for capital improvements without resorting to an assessment against depositing bondholders, the first coupon on the bonds due April 1, 1928, will be detached and surrendered to the company for cancellation.

The preferred stock is to be issued in shares having a par value of $25, be entitled to non-cumulative dividends at the rate of 6 per cent per annum, be preferred as to assets to the extent of $25 per share and be subject to redemption by the company, at its option, at par. Each share of preferred stock is to carry the same voting rights as each share of the common stock.

There are to be 12,000 shares of authorized common stock without nominal or par value.

Upon surrender of certificates of deposit, the holder will be entitled to receive first mortgage bonds in principal amount equal to 75 per cent of the principal amount of Kansas City, Kaw Valley & Western Railway first mortgage bonds deposited by him, and preferred stock having a par value equivalent to 25 per cent of such principal amount, together with voting trust certificates for one share of common stock for each $100 of the bonds deposited by him. The common stock is to be held for a period of three years by voting trustees to be originally selected by the committee under an agreement approved by the committee.

Of the new first mortgage bonds not needed for this exchange, $150,000 in principal amount is to be delivered into the treasury of the company, to be used for general corporate purposes and the balance of the authorized first mortgage bonds is to be subject to issuance only upon conditions to be provided in the mortgage.

A small number of shares of preferred stock not needed for exchange will remain as authorized unissued stock. About 30 per cent of the authorized common stock will not be needed for the exchange and this stock will be held in the treasury of the company and all or part of it set aside to be used by the directors for the purpose of procuring a successful operating management, the committee being convinced that it will be to the interest of the new company to have the management financially interested in the prosperity of the company.

The outstanding capitalization of the new company, upon completion of the plan, would then be substantially as follows:

First mortgage bonds	(a) $784,500
Preferred stock	211,500
Common stock, shares	(b) 12,000

(a) $150,000 will remain in the treasury of the company. (b) 3,540 shares to be available for management.

The petition for the foreclosure of the mortgage securing the first mortgage bonds was filed with the court on July 15, 1924, but due to the pendency of the litigation was not acted upon by the court until June 15, 1927, at which time the petition was granted and an order of foreclosure and sale was entered, the sale being later set for Sept. 12, 1927. Just previous to the filing of the petition the company informed some of the bondholders early in July, 1924, that it would not be in a position to make payment of the first mortgage bonds which were to mature Aug. 1, 1924. At the time of the formation of the committee, members understood that $846,000 of these bonds were outstanding, but upon investigation discovered that $224,000 additional bonds had recently been taken from the treasury of the company and that its books showed the amount of bonds outstanding to be $1,070,000. In the meantime, the U. S. District Court for the District of Kansas had appointed Harry C. Jobes receiver, and at the request of the committee the receiver brought an action to cause the bonds taken from the company's treasury to be returned. The case, having been decided in favor of the receiver, was appealed to the U. S. Circuit Court of Appeals, where the trial court was sustained and later a petition for rehearing in the Circuit Court of Appeals was denied.

The committee has kept in touch with the operations of the receiver and believes that the property has been ably managed under him by W. R. Taylor and his associates. The operating statement is shown in the table below.

While the passenger business has been decreasing, there is an encouraging tendency for the freight business to increase. The receiver has continued policies begun by the company in 1916 to build up the freight business and has made considerable expenditures to this end. The company interchanges more than 11,000 carloads of freight a year with several large railroads and the management believes that additional freight business can be obtained. The prospect for an increase in the passenger business, however, is not encouraging the increase in this department in 1926 over 1925 being due to special road conditions which are not likely to recur. The opinion of the management and of the committee was that any reorganization of the company should not involve fixed capital charges in excess of $30,000 per annum. After thorough analysis of the figures, and after making allowance for the additional costs of the receiver and certain unusual maintenance charges the committee was of the opinion that the company could pay fixed charges of that amount.

It will thus be seen that interest charges on this 41-mile road have been reduced under the reorganization from $82,470 a year to $30,000 a year under terms that have taken into account only the holders of the first mortgage bonds.

OPERATING STATEMENT KANSAS CITY, KAW VALLEY & WESTERN RAILWAY

	Six Months Ended June 30, 1927	Calendar Years 1926	1925	1924
Total operating revenue	$208,623	$460,926	$366,845	$375,528
Operating expenses	134,735	299,408	261,046	234,591
Maintenance of way, structures and equipment	53,134	102,732	89,326	82,458
Taxes	6,000	12,054	6,800	19,698
Net revenues	$14,754	$46,732	$9,673	$38,781
Other income—less other deductions	1,666	458	761	10,292
aNet vailable for interest and depreciation	$16,420	$47,190	$10,434	$49,073

Private Company Would Take Over Municipal Properties

A struggle over the issue of municipal ownership of public utilities impends in Seattle. It will be ushered in in the form of a drive by the Puget Sound Power & Light Company to force the city of Seattle out of both the light and power and the railway business, it is stated. A. W. Leonard, president of the power company, has declined to disclose details of plan, but letters to Western Washington residents who have recently purchased shares in his concern say:

We have never made a political appeal to our stockholders, but we shall, of course when the time comes—and some of them will come to the front for us.

The plan was brought to a head when Mr. Leonard made an offer to the city

furnish power for lighting city streets a rate considerably lower than that w charged by the municipal light de- rtment. The City Council refused to tertain the offer, and Mr. Leonard s demanded that it be reconsidered, claring that the light department is ing into debt at a rate so alarming at within five years its payments on tstanding bonds will exceed the ount of its gross revenues. Mr. Leon- d says:

The solution is for the city to lease its wer and light and its railway properties a private company, like ours, at a rental sed upon fair valuations. Because we uld not be required to pay taxes on these operties and through economies resulting m the elimination of duplications—we uld not have to increase our overhead all—we would be able to make a sub- ntial reduction in rates here under such arrangement.

ankruptcy Petition in Hannibal

The Hannibal Railway & Electric mpany, Hannibal, Mo., filed a peti- n in bankruptcy in the United States urt in that city on Oct. 10 and Frank . Hodgdon, local banker and president the company, was appointed receiver. o schedule of liabilities was filed but n officer of the company estimated that e company owed $200,000.

Control of the company was purchased st winter by owners of the Hannibal ransportation Company, operating bus nes in and out of Hannibal. It was ated that the bankruptcy proceedings ere taken to dispose of the indebted- ss taken over with that deal. As a result of settlement of a suit for paving bills and for power the company owes the city more than $16,000.

Wisconsin Taxes Total $3,945,497

Electric railways operating in Wisconsin will pay taxes of $3,945,497 on the basis of assessed valuation of $209,155,000, according to figures revealed by the Wisconsin Tax Commission. The tax rate was slightly higher this year than last year.

A. E. Fitkin & Company Retire from Utility Field

A. E. Fitkin, who recently bought the Stock Exchange membership of Walter L. Ross for $240,000, will hereafter conduct the firm of A. E. Fitkin & Company, New York, N. Y., as a general investment and Stock Exchange house. This announcement was made on Oct. 17 by A. E. Fitkin, who made known his own retirement from the public utility field and the sale of the Inland Power & Light Corporation for $30,000,000 to Samuel Insull & Sons, Inc. Only a few miles of railway line in Arkansas are included in the Inland Power & Light Corporation.

Mr. Fitkin will leave for Europe on Oct. 26, where he will establish foreign connection for his firm. He entered the public utility field fifteen years ago. Since that time he has acquired properties all over the country. He has been disposing of them for the past year.

Conspectus of Indexes for October, 1927

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

	Latest	Month Ago	Year Ago	Since War High	Since War Low
treet Railway Fares* 1913 = 4.84	Oct. 1927 **7.54**	Sept. 1927 **7.53**	Oct. 1926 **7.40**	Oct. 1927 **7.54**	May 1923 **6.88**
lectric Railway Materials* 1913 = 100	Oct. 1927 **142.1**	Sept. 1927 **141.6**	Oct. 1926 **155.4**	Sept. 1920 **247.5**	Sept. 1927 **141.6**
lectric Railway Wages* 1913 = 100	Oct. 1927 **228.2**	Sept. 1927 **228.0**	Oct. 1926 **226.2**	Sept. 1920 **232**	March 1923 **206.8**
m. Elec. Ry. Assn. Construction Cost Elec. Ry.) 1913 = 100	Oct. 1927 **199.2**	Sept. 1927 **199.4**	Oct. 1926 **202.9**	July 1920 **256.4**	May 1922 **167.4**
ng. News-Record Construction Cost General) 1913 = 100	Oct. 1927 **204.4**	Sept. 1927 **203.6**	Oct. 1926 **209.8**	June 1920 **273.8**	March 1922 **162.0**
. S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Sept. 1927 **145.7**	Aug. 1927 **146.6**	Sept. 1926 **150.5**	May 1920 **246.7**	Jan. 1922 **138.3**
radstreet Wholesale Commodities 1913 = 9.21	Oct. 1 1927 **13.26**	Sept. 1 1927 **12.90**	Oct. 1 1926 **12.79**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
. S. Bur. Lab. Stat. Retail Food 1913 = 100	Sept. 1927 **154.0**	Aug. 1927 **152.4**	Sept. 1926 **158.5**	July 1920 **219.2**	March 1922 **138.7**
at. Ind. Conf. Bd. Cost of Living 1914 = 100	Sept. 1927 **162.8**	Aug. 1927 **162.0**	Sept. 1926 **166.8**	July 1920 **204.5**	Aug. 1922 **154.5**
teel Unfilled Orders (Million Tons) 1913 = 5.91	Sept. 30 1927 **3.148**	Aug. 31 1927 **3.196**	Sept. 30 1926 **3.594**	July 31 1920 **11.118**	May 31 1927 **3.051**
ank Clearings Outside N. Y. City (Billions)	Sept. 1927 **18.62**	Aug. 1927 **17.92**	Sept. 1926 **18.12**	Oct. 1925 **20.47**	Feb. 1921 **10.43**
usiness Failures Number Liabilities (Millions)	Sept. 1927 1418 **40.08**	Aug. 1927 1448 **44.37**	Sept. 1926 1250 **35.29**	Jan. 1924 2231 **122.95**	Aug. 1925 1353 **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.

35,000 Shares of Pennsylvania-Ohio Stock Offered

The Pennsylvania-Ohio Power & Light Company, Youngstown, Ohio, through a syndicate including Bonbright & Company and Eastman, Dillon & Company, is offering at $99 per share and accrued dividend, to yield about 6.05 per cent, 35,000 shares of its $6 cumulative preferred stock. The proceeds from the sale of this issue of preferred stock will reimburse the company for expenditures for additions and improvements to its properties and provide funds for other additions and improvements already contracted for. The Pennsylvania Power & Light Company controls the Shenango Valley Traction Company.

Byllesby Buys Wisconsin Property

Acquisition of the Wisconsin Valley Electric Company, Wausau, Wis., by the Standard Gas & Electric Company was announced on Oct. 18 by H. M. Byllesby & Company. Nine miles of railway line is included in the deal.

Boston & Worcester Sale Approved

Approval of the reorganization of the Boston & Worcester Street Railway under a new name and new capital was asked in a petition presented in Boston on Oct. 18 to the State Department of Public Utilities by Henry B. Rising of Newton, Mass. Mr. Rising and fifteen associates bought the railway following a Supreme Court decree of foreclosure issued on behalf of Middlesex County. The court confirmed the sale. The new company would be known as the Boston, Worcester & New York Street Railway Company, with a total capital stock of $2,152,000. The sale was mentioned in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 15, page 758.

Piece of New Jersey Property Sold

The New Jersey Board of Public Utility Commissioners has granted permission to the Public Service Railway, Newark, N. J., to sell a parcel of land at Bonhamtown for $9,000. The property has been purchased by a church.

Increase in Capital Stock in Bristol

The Bristol Traction Company, Bristol, Conn., has filed notice of an increase in capital stock from $50,000 to $750,000. To provide for the increase the company has issued 7,000 additional shares of a certain class of stock with a par value of $100. Stockholders recently voted in favor of the increase. The company was only recently incorporated and previously was operated as a part of the Bristol Electric Light & Power Company.

Personal Items

F. W. Doolittle Heads East St. Louis Properties

No more logical successor to the post vacated by W. H. Sawyer as president of the East St. Louis & Suburban Railway and its affiliated properties in East St. Louis, Ill., could be found than F. W. Doolittle, vice-president of the North American Company, New York, N. Y., controlling company. Mr. Doolittle's appointment was recently made following the resignation of Mr. Sawyer to assume the presidency of Stevens & Wood. Mention of the latter change was made in ELECTRIC RAILWAY JOURNAL, issue of Oct. 15, pages 762 and 763.

F. W. Doolittle

For several years Mr. Doolittle was intimately identified with the activities of the North American Company and its subsidiaries as a special rate and valuation engineer with headquarters at Milwaukee, Wis. Early in 1923 Mr. Doolittle was made vice-president of the North American Company along with J. F. Fogarty. He had been retained by the North American Company since 1916 as consulting engineer and had handled investigations of its new properties and rates and valuation cases for its subsidiaries before various commissions. Prior to that he had been director of the Bureau of Fare Research of the American Electric Railway Association and had won no little attention for the publication of his book on electric railway rates and service known as "Studies in the Cost of Urban Transportation Service."

Mr. Doolittle was born in Hopkinton, Iowa, in 1883. He was graduated from Princeton University and the University of Colorado. He taught engineering at the University of Colorado and the University of Wisconsin and assisted in the development of the statistical department of the Wisconsin Railroad Commission. From there he went to Springfield, Ill., where he did similar organization work for the first Illinois Public Utilities Commission.

The system over which Mr. Doolittle becomes president covers 126 miles of line serving an estimated population of 131,000. The controlled companies operate the electric railway system of East St. Louis, the only electric line over the Eads Bridge connecting East St. Louis with St. Louis, and interurban lines from East St. Louis to Belleville, Edwardsville and Lebanon.

Control of the operations of the East St. Louis railway properties will be lodged in George W. Welsh and Thomas W. Gregory, resident vice-presidents. The changes are effective Nov. 1.

N. M. Garland to Retire from Active Service

N. M. Garland, affiliated with the Ohio Brass Company, in the New York office, since 1902, will retire on Jan. 1, 1928. He will remain a director of the company, with headquarters in New York, acting in a consulting capacity.

The electrical career of Mr. Garland began in 1892, when he took over the Eastern agency of the Emerson Electric Manufacturing Company. Five years later he became general agent for the Manhattan Electric Light Company and he continued with this utility for a time after it was merged with others to form the New York Edison Company. In 1902 Mr. Garland became Eastern representative of the Ohio Brass Company and since that time he has made a host of friends for the company, has been instrumental in that company's success and has set valuable standards for salesmanship in general. He had the good fortune to become connected with the electrical industry in its earliest days and has made a genuine contribution to its upbuilding.

Mr. Garland is a member of many organizations, among them the New York Railroad Club, Engineers' Club, New York Electrical Society and New York Welding Society. His retirement is deeply regretted, but his friends and business associates are rejoicing with him in his ability to follow congenial pursuits.

N. M. Garland

Otto H. Jorgensen, Car Expert, with Cummings Car & Coach

A well-known car builder and designer has become affiliated with the Cummings Car & Coach Company at its shops in Paris, Ill. Otto H. Jorgensen, with the title of engineer, rail car department, will have a part in all new design, development and construction for the company. Car expert is what Mr. Jorgensen really is, judging him in the light of his experiences and accomplishments.

Mr. Jorgensen is best known in the industry as chief draftsman and acting engineer of equipment of the Chicago Surface Lines, where he worked under H. H. Adams, superintendent of shops and equipment from 1921 to 1926. He left Chicago to accept a position with the Pullman Car & Manufacturing Company as assistant engineer and was engaged in that work at the time of his recent appointment.

O. H. Jorgensen

It was in Copenhagen, Denmark, that Mr. Jorgensen received his education and was graduated as an electrical engineer. His first work in this country was as draftsman in the railway department of the General Electric Company, Schenectady, N. Y. This was at the time the first New York Central locomotive was being designed and built. Since that time he has been car-conscious and car-concentrating, devoting all his time and expending much energy on the designing and building of cars of various types, ranging from mine cars, through all types of freight cars, passenger cars and street cars to Pullmans. Covering this intensive period he gave his services to some of the principal car companies in the country, among them being the Standard Steel Car Company, Koppel Car & Equipment Company, now owned by the Pressed Steel Car Company, and the Pullman Car & Manufacturing Company.

During the war Mr. Jorgensen served as First Lieutenant, Q.M.C., and was with the American Expeditionary Forces one year in France and Germany, most of that time with the first division motor supply train. He now holds a commission as Captain in the Reserves.

G. J. Baker Has Served Industry a Quarter Century

George J. Baker, whose appointment as general manager of the Buffalo & Erie Railway, Fredonia, N. Y., was announced in the ELECTRIC RAILWAY JOURNAL, issue of Oct. 8, 1927, page 721, is well known in traction circles in New York State, where he has had considerable experience.

Twenty-five years ago Mr. Baker entered the employ of the Hamburg Railway at Buffalo as a conductor. Five years later he was promoted to inspector. At this time he took an electric railway correspondence course and made

G. J. Baker

a special study of train rules, train dispatching and time-table making, under R. H. Douglas, then general superintendent of the Buffalo & Lake Erie Traction Company. The latter company had taken over the Hamburg Railway and had started to build the interurban line between Buffalo, N. Y. and Erie, Pa. Operation was begun in 1908, supervised by three different divisions, of which Mr. Baker was in charge of the Eastern Division, Buffalo to Dunkirk.

His first big promotion came on July 1, 1911, when he was promoted to general superintendent of the interurban lines, in charge of all three divisions. Then success virtually followed him. In May, 1913, he was promoted to general superintendent of transportation of the Buffalo & Lake Erie Traction Company, which was then operating in the city of Erie, the Buffalo & Lackawanna Traction Company, the Hamburg Railway and the interurban lines between Buffalo and Erie. In 1917 Mr. Baker was advanced to assistant general manager under A. R. Myers of Erie, Pa., who was then general manager of the Buffalo & Lake Erie Traction Company. He continued in this position until 1924, when the line between Buffalo and Erie was taken over by the Chandler management under George MacLeod as vice-president and general manager. Mr. MacLeod appointed him superintendent and acting general manager during his absence from the property.

Mr. Baker was born in Towanda, Pa., on Aug. 15, 1876. He attended the schools of that village and at the age of eighteen moved to Philadelphia, where he took up tool making and variety lathe turning. He pursued this work until 1902, when he entered the transportation field.

W. W. Wheatly with Investment Bankers

W. W. Wheatly has joined the banking house of George M. Forman & Company, Inc., with offices at 120 Broadway, New York, to assist in the program of that company for widening the scope of its activities in the railway and public utility investment fields. In the past this old-established house, with main office in Chicago and branches in New York and many other cities, has devoted much attention to real estate first mortgage serial and sinking fund bonds, but more recently has been catering to domestic and foreign securities, purchasing whole issues of government, municipal, railroad, utility and industrial securities for distribution at wholesale and retail. It has also been a participant in national underwritings.

Mr. Wheatly is well known in the railway field. He was long connected with the old Brooklyn Rapid Transit Company and subsequently served with the Public Service Railway of New Jersey, the Mexico Electric Tramways in Mexico City and the Metropolitan Street Railway in Kansas City, Mo., now the Kansas City Public Service Corporation. In each of these cities his work gained substantial recognition, particularly in the trying situation incident to the management of the railways in Mexico's capital. There he represented the English investment firm of Werhner, Beit & Company, by which he was intrusted with the entire details of the management of that property. He represented the Marconi Wireless Telegraph Company in its dealings with the Mexican Government.

Mr. Wheatly's experience, wide and notable as it is, should strengthen materially the organization of Forman & Company in connection with their plan to enter more extensively into the financing of railways, bus lines and other public utilities. This they intend to do, particularly through their New York office.

John A. Miller, Jr., Honored

On the recommendation of a special committee the board of direction of the American Society of Civil Engineers has awarded the Arthur M. Wellington Prize to John A. Miller, Jr., associate editor ELECTRIC RAILWAY JOURNAL, for his paper on "Increasing the Efficiency of Passenger Transportation in City Streets." This paper was presented at a meeting of the society held in New York City June 2, 1926. An advance abstract was published in the JOURNAL May 8, 1926. The Wellington Prize is awarded annually by the American Society of Civil Engineers for the best paper presented during the previous year on the subject of transportation by land, water or air.

C. N. Chubb Goes to Lincoln

In addition to his appointment as president of the newly formed company known as the Iowa-Nebraska Light & Power Company C. N. Chubb has been appointed president of the Lincoln Traction Company, which supplies transportation service to Lincoln, Havelock and College View as well as the immediate surrounding territory in Nebraska. For the past three years Mr. Chubb's work has covered a wide field as vice-president of the United Light & Power Engineering & Construction Company and as managing supervisor of United Light properties in Iowa,

C. N. Chubb

Nebraska and several other states.

Mr. Chubb has been a prominent figure in utility affairs for many years. In fact, it is said that during his school days he decided that some phase of the utility business should become his life work. Toward this end he studied civil engineering, specializing in steam railway construction, in the Massachusetts Institute of Technology and graduated with the class of 1901. After working for a short time in the steam railway business he saw greater opportunities in gas and electric utilities and joined the Harrisburg Gas Company of Harrisburg, Pa., a subsidiary of the United Gas Improvement Company. Here he served his apprenticeship and for fifteen years continued in the service of properties operated by the United Gas Improvement Company. In addition to his work at Harrisburg he followed gas engineering and superintendence of gas plants at Kansas City, Mo., Sioux Falls, S. D., and South Bend, Ind.

In 1925 Mr. Chubb became vice-president of the United Light & Railways Company and supervisor of the Iowa-Nebraska properties of the United Light.

Mr. Chubb will move his home to Lincoln from Davenport about Nov. 1 with the intention of giving the supervision and management of these properties his entire time and undivided attention.

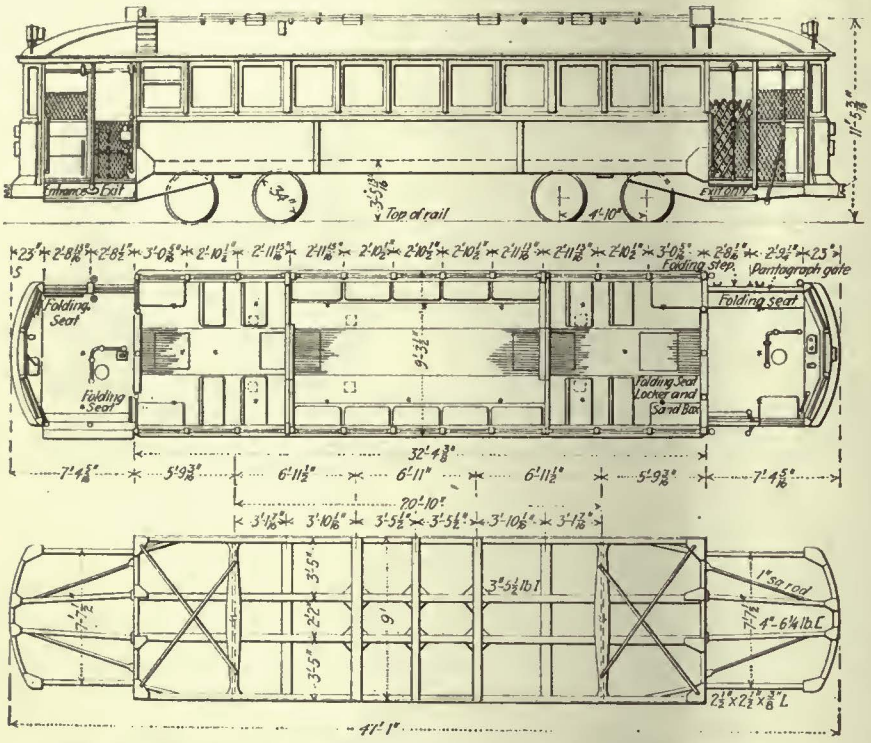
F. KRUG was recently appointed general manager of the Porto Rico Railway, Light & Power Company, San Juan, P. R. He has been serving as acting general manager.

Manufactures and the Markets

Specifications for Ten New Units for Municipal Railway

Subjoined are specifications, seating plan, and general dimensions of the ten two-man city type cars ordered recently by the Municipal Railway of San Francisco, mention of which was made in the JOURNAL for July 23. These cars are being built by the St. Louis Car Company from specification used in the construction of the fifteen units delivered by the St. Louis company in May. The units will have a seating capacity of fifty passengers each and are to be of semi-steel construction, similar to the 145 units that were built by the company last year.

Typical interior view of two-man cars recently ordered by the Municipal Railway of San Francisco from the St. Louis Car Company



Framework and seating plan, also elevation, of Municipal Railway's new units

Spanish Railroads to Electrify

The Oerlikon Company has recently received a contract for the complete electrical equipment of all the substations of a Spanish railroad, the Ferrocarriles Vascongadoes, connecting San Sebastian with Bilbao, on which high-tension direct current is being adopted as the traction system. The substations are fed with three-phase current of 29,000 volts, 50 cycles, which is converted into direct current by means of a rotary converter equipment. The converters are notable, as regards both capacity and pressure. They are being designed for a continuous output of 1,200 kw. and for a terminal pressure of 1,750 volts on the d.c. side.

Exterior appearance and specifications of new 50-passenger, semi-steel units for Municipal Railway of San Francisco, ten of which were ordered recently. These are similar to the fifteen units delivered in May

Number of units	10
Type of unit	Two-man, motor, passenger, city, double end, double truck
Number of seats	50
Builder of car body	St. Louis Car Company, St. Louis, Mo.
Weight, total	50,000 lb.
Bolster centers	20 ft. 10 in.
Length over all	47 ft. 1 in.
Length over body posts	32 ft. 4⅞ in.
Truck wheelbase	4 ft. 10 in.
Width over all	9 ft. 2½ in.
Height, rail to trolley base	11 ft. 8 in.
Window post spacing	2 ft. 11 in.
Body	Semi-steel
Roof	Arch
Doors	End
Air brakes	Westinghouse SME—D1
Armature bearings	Babbitt
Axles	E-6 forged steel
Car signal system	Faraday high voltage
Compressors	Westinghouse DH-16
Conduit	Pipe conduit
Control	Westinghouse HL
Couplers	Anti-climber
Destination signs	Hunter
Door mechanism	National Pneumatic
Doors	Sliding
Fare boxes	Johnson
Finish	Paint
Floor covering	Industrial carpet on platforms
Gears and pinions	Nuttall helical
Glass	A.A. and plate
Hand brakes	Peacock, Dayton handle
Headlights	Golden Glow SR-95
Headlining	Haskelite, three-ply
Interior trim	Birch-stained cherry
Journal bearings	Plain
Journal boxes	4½x8 in. No. 88Q1
Lamp fixtures	Safety Car Heating & Lighting Co.
Motors	Four Westinghouse 306-CA, outside hung
Painting scheme	Gray—gold stripe, cherry sash
Roof material	National standard FF roofing canvas
Seats	Hale & Kilburn 400-A
Seat spacing	30 in.
Seating material	Slat and plywood
Slack adjusters	American, type J
Steps	Folding
Step treads	Kass
Trolley catchers	Ohio Brass
Trolley base	Nuttall 20-A
Trolley wheels	Kalamazoo
Trucks	Brill 27-E
Ventilators	Garland exhaust
Wheels	Rolled steel, 34 in. diameter
Wheelguards	Eclipse

Built with uniform lines and attractively painted, the Rockford & Interurban Railway units present a striking appearance

Rockford Receives Seven New Interurban Cars

The Rockford & Interurban Railway, Rockford, Ill., has accepted delivery on seven new cars ordered on March 2 from the American Car Company of St. Louis.

As mentioned in the JOURNAL of July 30, these cars are of the combination passenger, smoker and baggage car type. The new cars embody the latest in interurban car design and have several new features. Built with low and uniform lines and attractively painted, the cars present a striking appearance. The rear end is of the observation type with a wide center window and awning, as shown in the illustration below.

No ceiling lighting fixtures are present, the indirect lighting system being used. Seats are of the semi-individual type, upholstered in leather. An interesting feature is that each car is equipped with different color seats and interior trim. Consistent with the uniform lines throughout is the one-level floor from end to end.

The cars, which have a seating capacity of 52, are of semi-steel construction and designed for a speed of 60 m.p.h.

Details of the cars are repeated here:

Number of cars ordered	Seven
Builder of car body	American Car Company
Type	Combination passenger, smoker, baggage
Seating capacity	52
Weight, total	35,750 lb.
Bolster centers, length	25 ft. 6 in.
Length over all	45 ft. 6 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 8¾ in.
Height, rail to trolley base	10 ft. 8 in.
Body	Semi-steel
Interior trim	Agasote
Headlining	Agasote
Roof	Arch
Air brakes	General Electric, straight
Armature bearings	Ball
Bumpers	Channel
Car signal system	Faraday
Car trimmings	Bronze, oxidized
Compressors	CP-72
Control	K-75
Couplers	American Car Company
Curtain fixtures	Curtain Supply Company
Curtain material	Pantasote
Destination signs	Hunter
Door-operating mechanism	National Pneumatic
Gears and pinions	General Electric
Hand brakes	Brill vertical
Heater equipment	Railway Utility
Headlights	Crouse-Hinds
Journal bearings	Ball
Journal boxes	J. G. Brill Company
Lightning arresters	Aluminum
Motors	Four GE-247, inside hung
Sanders	Nichols-Lintern Company, No. 4
Sash fixtures	Schechter post casing
Seats	American Wicker Works
Seating material	Leather
Springs	J. G. Brill Company
Step treads	Kass safety
Trolley catchers	Ohio Brass Company
Trolley base	U.S. 20
Trolley wheels	U.S.
Trucks	Brill 177-E-1
Wheels	26-in. rolled steel

Pullman Gets Order for Fifteen North Shore Line Cars

Orders for fifteen new high-speed interurban motor cars for the Chicago, North Shore & Milwaukee Railroad were received Oct. 1 by the Pullman Car & Manufacturing Corporation, Chicago. Each car will be equipped with individual bucket type easy chairs for 52 passengers and will contain a commodious smoking compartment and two lavatories.

N.E.M.A. to Discuss Market Development at October Meeting

Market development will be the keynote of the Briarcliff, N. Y., meeting of the apparatus division, National Electrical Manufacturers Association, during the week of Oct. 24, according to a statement by J. M. Curtin, vice-president in charge of this division. Morning sessions will be devoted to section meetings and business. There will be a banquet Thursday evening and a meeting of the board of governors in New York City on Tuesday evening. On Thursday morning a meeting of the board will be held in conjunction with

At left, view showing the observation type rear end with wide center window of Rockford cars. At right, interior view showing the one-level floor and the deep-cushioned individual type seats. Note the absence of dome ceiling lights

all officers of the sections and divisions. The above outlines the program planned in connection with the gathering.

Trackwork of International Railway Making Rapid Strides

The International Railway's $250,000 track and paving reconstruction program in Buffalo, N. Y., is making rapid strides toward completion, according to President B. J. Yungbluth. Work was begun on Fillmore and North Parade on Aug. 8, and since that time a force of 150 men have been working steadily laying more than 2 miles of track and concrete, at the average of 267 ft. per day. The company is also laying new tracks and paving on Fillmore Avenue from North Parade to East Ferry Streets. Work on the northbound track has been completed, including concreting. The asphalt surfacing will be finished during the next few days. The stretch from North Parade to Ferry Street on the southbound track has also been completed, the only remaining work being the surfacing of the track from Utica to Ferry Street. Special trackwork being installed at Utica and Ferry Streets is practically finished. It is estimated that with favorable weather conditions the surfacing should be finished and all other work completed on Fillmore in a short time.

On Seneca Street, where work was begun Aug. 15, the eastbound track and paving has been completed from Buffalo River to Graymont Street, except for the stretch between Seneca-Parkside and Cazenovia, where the new track and concrete paving have been laid. On the westbound side of the street, where work was started Sept. 26, new track from Buffalo River to Stevenson has been installed. The excavating machines are rapidly closing the gap on the westbound track from Duerstein to Stevenson, where rails and concrete work are being pushed to completion.

Copper Sales Largest in Eight Months

Extremely heavy copper sales last Thursday, Friday and Saturday at 13¼ cents in the East and 13⅜ cents in the Middle West, following many weeks of dullness, were the feature of the metal market for the week ended Oct. 19. A large tonnage of lead has also been booked, particularly in the Middle West, where prices have advanced.

After having resolutely held out for 13¼ cents for many weeks without getting much business at that level, copper sellers without exception found buyers willing to pay that price last Thursday. An extremely heavy tonnage was sold on that day and the two succeeding days, partly at 13¼ cents delivered in the East, and some at 13⅜ cents in the Middle West. The last three days have been much quieter, but the total business for the week has been the largest since that for the week of Feb. 9.

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

Metals—New York	Oct. 18, 1927
Copper, electrolytic, cents per lb	13.025
Copper wire, cents per lb	15.25
Lead, cents per lb	6.25
Zinc, cents per lb	6.00
Tin, Straits, cents per lb	58.50
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.175
Somerset mine run, Boston, net tons	1.80
Pittsburgh mine run, Pittsburgh, net tons	1.825
Franklin, Ill., screenings, Chicago, net tons	1.575
Central, Ill., screenings, Chicago, net tons	1.625
Kansas screenings, Kansas City, net tons	2.425
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$5.50
Weatherproof wire base, N.Y., cents per lb.	16.00
Cement, Chicago net prices, without bags	2.05
Linseed oil (5-bbl. lots), N. Y., cents per lb.	10.6
White lead in oil (100-lb. keg), N. Y., cents per lb	13.75
Turpentine (bbl. lots), N. Y., per gal	$0.58

Oct. 18 and Oct. 19 slight concessions in price were made by certain interests, but the market is generally firm. Second-hands are also offering prompt copper a little below the 13¼ cents level.

The zinc market has been as quiet as that of copper has been active. Early in the week prices hardened to 6.10 cents, with slightly higher quotations on occasional lots, but on Oct. 18 and Oct. 19 the metal was offered as low as 6 cents, St. Louis.

Lead sellers have enjoyed an unusually active week, although inquiry on Oct. 19 quieted somewhat. Demand was keener in the Middle West than in the East, and on Friday and Monday good-sized transactions were made at 6.075 cents. In New York the American Smelting & Refining Co. continued its official price at 6.25 cents, and this was the ruling figure for the "outside" market also.

In the New York market prices are firmer, but business is dull. Spot metal commands a ¼ cent premium over late October and ½ cent over December.

ROLLING STOCK

Fresno Traction Company, Fresno, Cal., is reported to be planning the purchase of ten new trolley cars valued at $150,000.

Chicago, Aurora & Elgin Railroad reports receipt of five of the fifteen new de luxe passenger steel coaches, details for which were given in the Journal recently.

Winnipeg Hydro-Electric Company, a municipally owned concern in the Province of Manitoba, Canada, has recently purchased a 20-ton gas-electric locomotive manufactured by the Davenport Locomotive & Manufacturing Company, Davenport, Iowa. The new unit is rated at approximately 160 net horsepower. Gasoline engines are controlled by one hand throttle and the electric motors by a foot accelerator. The cab is equipped with a lighting, heating and ventilating plant. According to advices, two 30-ton models are now in process of construction.

TRADE NOTES

Eric H. Ewertz, past-president of the American Welding Society and formerly general manager of the Bethlehem Shipbuilding Corporation, has opened an office at 50 Church Street, New York, N. Y., as a consulting engineer on problems relating to welding, mechanical and economic engineering.

Alexander Milburn Company, Baltimore, Md., manufacturer of welding and cutting apparatus, has organized an office in Boston to be known as the Alexander Milburn Sales Company, Wiggin Terminals Building, 50 Terminal Street, Boston, Mass. This office is under the supervision of M. B. Crouse and G. B. Malone, both experienced executives in welding and cutting equipment, who will handle the sale and distribution of Milburn equipment throughout New England.

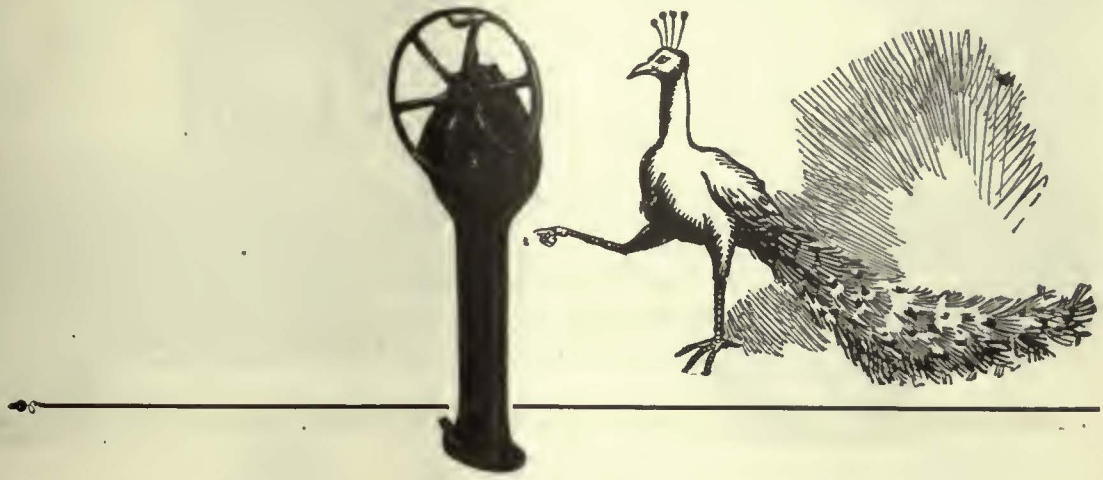
Roller-Smith Company, New York City, announces the appointment of the D. H. Braymer Equipment Company, W.O.W. Building, Omaha, Neb., as its representative for Nebraska and western Iowa. D. H. Braymer is at the head of this organization. The Braymer company will handle Roller-Smith instruments, relays and circuit breakers in the territory specified.

ADVERTISING LITERATURE

Parker Appliance Company, Cleveland, Ohio, has sent out a booklet on Parker tube couplings for copper tube water and gas services.

Linde Air Products Company has issued a 72-page booklet consisting of a report of the design, development, fabrication and testing of a series of oxyacetylene welded roof trusses of the Fink type. It includes drawings, illustrations and tables. As far as possible the contents are arranged in chronological order. The booklet is by H. H. Moss of the development section, engineering department of the company.

General Electric Company, Schenectady, N. Y., has recently issued the following loose-leaf bulletins: G-E squirrel-cage motors, "500 series"; adjustable varying speed motors, type BSR; air compressor governors; vertical "500 series" induction motors; type BTA motors: CR 1038 motor-starting switches; G-E general purpose synchronous motors, "7500 series"; new form R-totally inclosed induction motor, "500 series"; CR 1923-A1 a.-c. jack type disconnecting switches; G-E air heating units and G-E clamp-on units; improved brush-holders and ventilating covers for GE-275 railway motors; primary cutouts for railway signal high-voltage power lines; switchboard recording instruments; horizontal edgewise instruments, types H-5, H-6 and DH-5, and CR 2940 push-button stations.



They cannot *choke with chain*—

WE suggest that you, personally, test out exactly how useful your hand brakes are.

See to it that there is enough slack in the brake rigging to require full piston travel in the air brake system. Get the car rolling and then swing the hand brake into action. Few hand brakes, other than the Peacock Staffless, will even make a partial application under these conditions.

A Peacock Staffless Brake will stop the car under the most extreme conditions of slack. It will wind all the chain there is to wind and do it without clogging. Peacock Staffless Brakes are dependable emergency equipment. They stop the car every time.

National Brake Company

890 Ellicott Square, Buffalo, N. Y.

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

Graham Brothers Motor Coaches are now more economical, dependable and efficient than ever before.

Recent changes have made possible—

More speed and power due to the new 6-cylinder engine—

Increased flexibility and quiet, a wide power range and a greater operating economy due to the 4-speed transmission—

Greater safety with 4-wheel brakes (Lockheed hydraulic)—

Added comfort and riding smoothness as a result of the 3-stage progressive type rear springs.

Ask your local Dodge Brothers Dealer about these new Graham Brothers Motor Coaches.

$4045
12-Passenger Parlor Coach (f. o. b. Detroit)

$4060
21-Passenger Street Car Type (f. o. b. Detroit)

$4290
16-Passenger Parlor Coach (f. o. b. Detroit)

GRAHAM MOTOR

SOLD BY DODGE BROTHERS DEALERS EVERYWHERE

One INDUSTRIAL ADVERTISER captured 40% of a rich market

FIVE years ago an important industrial change appeared on the horizon. It meant a new market and new profits. At that time it was anybody's market, a new field for all, with no established leader.

A score of producers saw the opportunity, but one alert manufacturer nominated himself for the post of leadership. During the period when buyers were testing, comparing and experimenting with his and competing products, this manufacturer dominated buyers' thoughts by the forceful use of Industrial Advertising.

By so doing, this manufacturer "beat the gun" in the rush to the new field of profits. In 1926, after four years of Industrial Advertising, 46 per cent of all buyers in this particular field were his customers. His output constituted 40 per cent of all sales to this market last year. Over the four-year period, when competitors were fluctuating up and down in rank, strong Industrial Advertising kept this one manufacturer entrenched in the lead.

Industrial Advertising vs. "Using Space"

His competitors also advertised but this manufacturer continuously used the most effective space units of Industrial Advertising to win this new industry's recognition of his product. His advertising appropriation was large enough each year to carry on the leadership job originally mapped out. His copy reflected an intimate knowledge of the buyers' problems and talked their language. There was no stinting of effort in obtaining and presenting vital performance facts. Industrial advertising men combed the field for data before the advertising copy was prepared.

This advertising was published almost exclusively in two McGraw-Hill Publications that are recognized for the vital guidance and help they have given to the industry that constituted this manufacturer's market.

In this case the persistent use of liberal space was true economy and extremely effective. It not only hastened the industrial change and gained for the manufacturer that much-desired buyers' recognition, but it is now enabling him to hold the lead and advance to still greater sales volume.

Details Differ, But Not Fundamentals

Your industrial selling problem may differ in detail from the case cited. One set of circumstances demands dominant Industrial Advertising from the start; another situation may recommend a different program. The proper procedure in any case is more easily determined when the McGraw-Hill book, "Industrial Marketing at Work," is studied, and its basic principles applied. This book is based on a study of numerous cases in which the Four Principles of Industrial Marketing have been used.

If your markets lie within any field of industry broader than your strictly local territory, a McGraw-Hill representative will be glad to discuss this study and leave with you or your advertising agent a complimentary copy. Your request should be directed to the nearest McGraw-Hill office.

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 $2.00.

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.....$3.50 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.

POSITIONS VACANT

WANTED—Shop foreman of ability and experience to take charge of modern equipment of twenty cars in city of 50,000 within 100 miles of New York City. State age, experience and salary expected. Address, Room 1509, 43 Cedar Street, New York City.

POSITIONS WANTED

A working barn foreman can wind armatures do any kind of wiring and controller repairs. 12 years' experience both single and double truck. PW-54, Electric Railway Journal, 1600 Arch St., Phila., Pa.

GENERAL superintendent or manager; fifteen years' successful experience. PW-55, Electric Railway Journal, Tenth Ave. at 36th St., New York.

SALES engineer, wide acquaintance in railway and bus industry both manufacturers and operators, desires permanent connections with reliable firm. PW-52, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

POSITIONS WANTED

SUPERINTENDENT transportation, qualified by wide experience, fine record in city and interurban operation and coordination rail and bus service. Exceptional ability in dealing successfully with labor, public, public officials, resulting in increased revenue, reduced operating costs. A progressive efficient operating official with high grade references. Correspondence invited. PW-53, Electric Railway Journal, Guardian Bldg., Cleveland, Ohio.

WOULD like to correspond with any company needing a high-grade official in any capacity, in city or interurban railways. Can manage any or all departments in the most efficient manner. PW-33, Electric Railway Journal, Guardian Bldg., Cleveland, O.

SEARCHLIGHT SERVICE SECURES SATISFACTORY SALES

CURTAIN SUPPLY CO.

Moving to larger office same building will sublet present office 583 square feet including private office all over-looking Hudson River.

50 Church St., Hudson Terminal Bldg., New York City

WANTED

20 Westinghouse 306—C.V. 4.
20 K. 36—J Controllers.

W-51, Electric Railway Journal
Tenth Ave. at 30th St., New York City

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.

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.
Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M 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.
Carnegie Steel Co.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works
Westinghouse E. & M. Co.
Babbitt Metal
National Bearing Metals Corp.
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.
National Bearing Metals Corp.
St. Louis Car Co.
Westinghouse E. & M. Co.
Bearings, Center and Roller Side
Cincinnati Car Co.
Columbia Machine Works
Stucki Co., A.
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
Lang Body Co.
St. Louis Car Co.
Body Material, Haskelite & Plymetal
Haskelite Mfg. Corp.
Boilers
Babcock & Wilcox Co.
Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.
Bonding Apparatus
American Steel & Wire 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.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.
Book Publishers
McGraw-Hill Book 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.
Morganite Brush Co.
Westinghouse E. & M. Co.
Brushes, Graphite
Morganite Brush Co.
Brushholders
Columbia Machine Works
Bulkheads
Haskelite Mfg. Corp.
Buses
Graham Bros.
White Company
Yellow Truck & Coach Co.
Bus Lighting
National Ry. Appliance Co.
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.
St. Louis Car Co.
Wason Mfg. 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.
National Bearing Metals Corp.
Castings, Gray Iron and Steel
American Bridge Co.
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.
Ceilings, Car
Haskelite Mfg. Corp.
Ceilings, Plywood Panels
Haskelite Mfg. Corp.
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. Service Supplies Co.
General Electric Co.
Hubbard & 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 Changers
Johnson Fare Box Co.
Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.
Johnson Fare Box Co.
Coin Sorting Machines
Cleveland Fare Box Co.
Johnson 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.
Commutator Truing Devices
General Electric Co.
Commutators or Parts
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.
Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.
Condensers
General Electric 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.
Cutting Apparatus
Electric Railway Improvement
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse Electrical & Mfg. Co.
Dealer's Machinery & Second Hand Equipment
Curtain Supply Co.
Electric Equipment Co.
J. W. Gerke
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.
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
Bylleeby Co., H. M.
Day & Zimmermann, Inc
Faile & Co., E. H.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
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
Westinghouse E. & M. Co.
Exterior Side Panels
Haskelite Mfg. Corp.
Fare Boxes
Cleveland Fare Box Co.
Johnson Fare Box Co.
Perey Mfg. Co.
Fare Registers
Electric Service Supplies Co
Johnson Fare Box Co.
Fences, Woven Wire & Fence Posts
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
Floors
Haskelite Mfg. Corp.
Floors, Sub
Haskelite Mfg. Corp.
Forgings
Brill Co., The J. G.
Cincinnati Car 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
Gasoline
Texas Company
Gas Producers
Westinghouse E. & M. Co
Gates, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car 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.
Tool Steel Gear & Pinion 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)
Texas Company
Grinders, Portable
Railway Trackwork Co.
Grinders, Portable Electric
Railway Trackwork Co.
Grinding Bricks and Wheels
Railway Trackwork Co.
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.

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Harps, Trolley
Columbia Machine Works
Elec. Service Supplies Co.
National Bearing Metals Corp.
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.
Railway Utility 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.

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.
Westinghouse E. & M. Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish & Ins. Co.

Hose, Pneumatic
Westinghouse Traction Brake 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.
Westinghouse E. & M. Co.

Insulation Slots
Irvington Varnish & Ins. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass 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.

Jacks (See also Cranes, Hoists and Lifts)
Buda Company
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.

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
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.
National Bearing Metals Corp.
Ohio Brass Co.
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.

Lubricating Engineers
Universal Lubricating Co.

Lubricants, Oil and Grease
Texas Company
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.

Oils (See Lubricants)
Texas Company

Omnibuses (See Buses)

Ovens
Young Bros.

Oxy-Acetylene (See Cutting Apparatus)

Oxygen
International Oxygen Co.

Packing
Westinghouse Traction Brake Co.

Paints and Varnishes (Insulating)
Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.

Paints & Varnishes, Railway
National Ry. Appliance 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.

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, Ties, Posts, Piling & Lumber
Naugle Pole & Tie Co.

Poles, Trolley
Elec. Service Supplies Co.

Poles, Tubular Steel
Elec. Ry. Equipment Co
Elec. Service Supplies Co.

Portable Grinders
Buda Company
Railway Trackwork 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.
Westinghouse E. & M. Co.
Westinghouse Traction Brake 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.

Rail Welding
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 & Bus
Haskelite Mfg. Corp.

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.

Seating Materials
Haskelite Mfg. Corp.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Elec. Service Supplies Co.

Seating Materials
Brill Co., The J. G.
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
Curtain Supply Co.
Electric Equipment Co.
J. W. Gerke

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. Service Supplies Co.
National Bearing Metals Corp.

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)

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
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs
National Ry. Appliance Co.

Springs, Car and Truck
American Spiral Spring Co.
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)

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
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

Testing Instruments (See Instruments, 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.)

Tokens
Johnson Fare Box 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

Truck Grinder
Railway Trackwork Co.
Ramapo-Ajax Corp.

Track, Special Work
Buda Company
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.
National Bearing Metals Corp.
Ohio Brass Co.

Trolley Bases, Retrieving
General Electric Co.
Ohio Brass Co.

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

Trolley Material, Overhead
Elec. Service Supplies Co
National Bearing Metals Corp.
Ohio Brass Co.
Westinghouse E. & M. Co

Trolley Wheel Bushings
National Bearing Metals Corp.
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.

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

Trucks, Motor
White Company

Truss Planks
Haskelite Mfg. Corp.

Tubing, Yellow and Black Flexible Varnish
Irvington Varnish & Ins

Turbines, Steam
General Electric Co.
Westinghouse E. & M. Co.

Turntables
Elec. Service Supplies Co

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