ELECTRIC RAILWAY JOURNAL

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January 31, 1925

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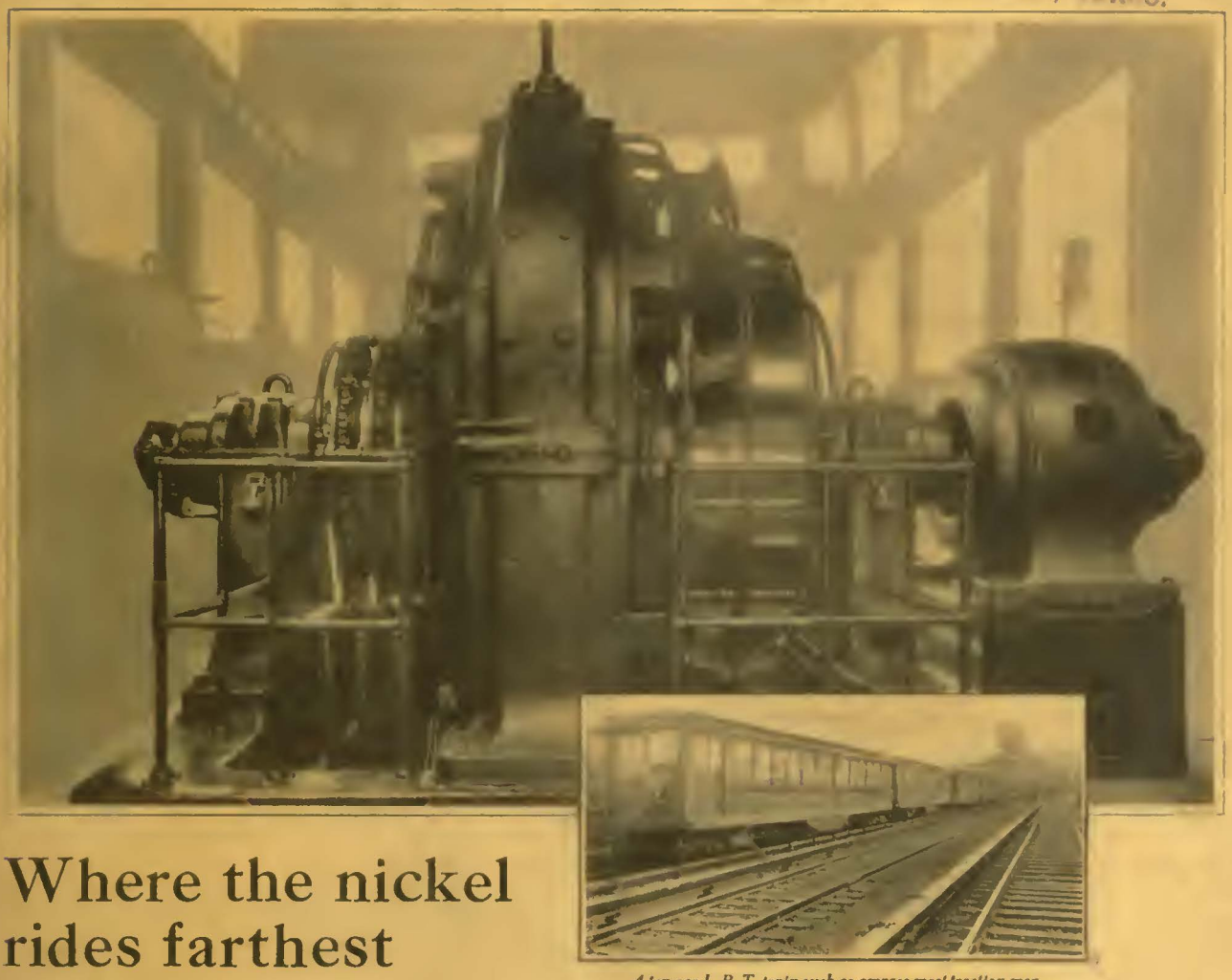

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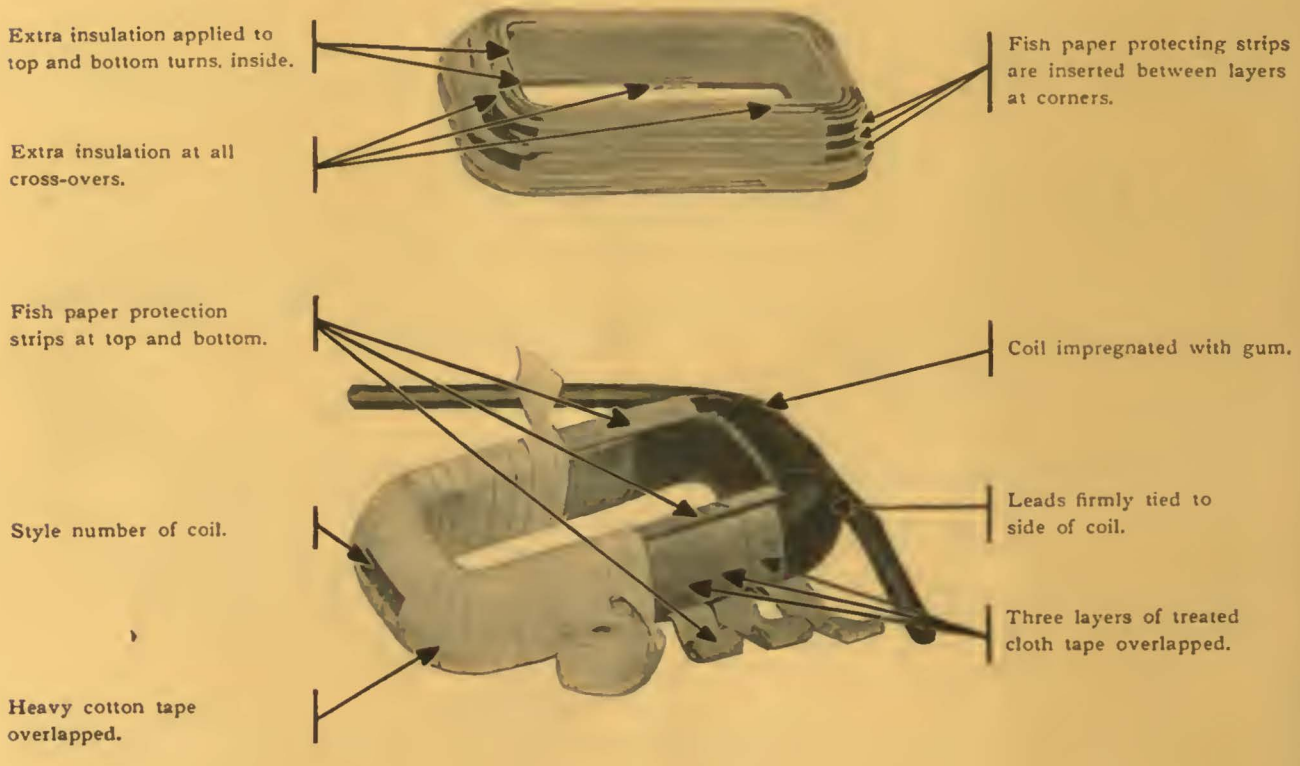

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ELECTRIC RAILWAY JOURNAL

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JANUARY 31, 1925

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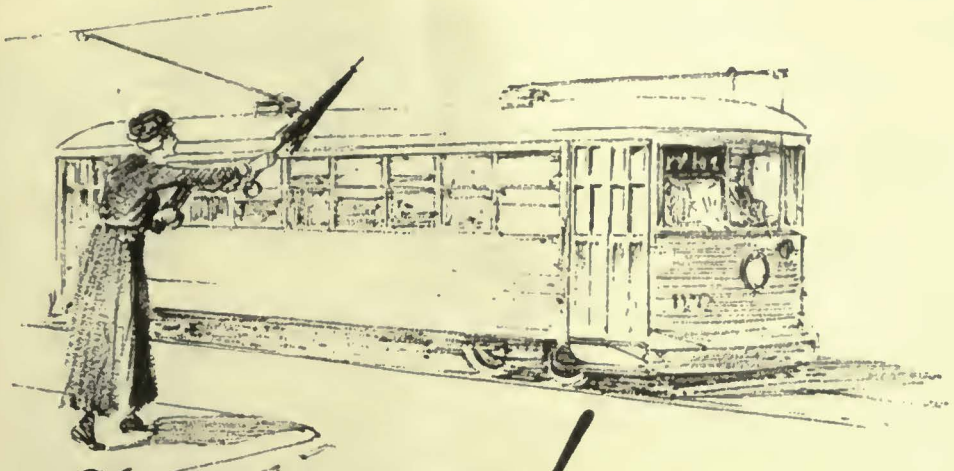

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AND then she probably walked or took a taxi. Just another fare lost for the Company—another possible friend antagonized.

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Every ***International*** Tie is permanently marked with our monogramed dating nail as assurance to you that the timber is sound, the grade accurate, the seasoning thorough and the treatment correct.

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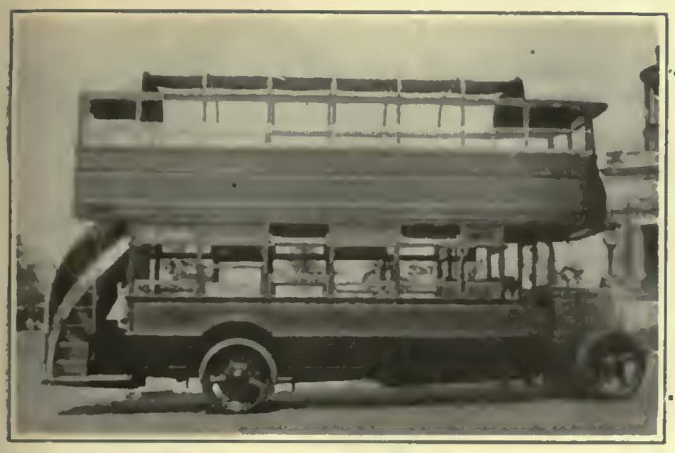

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Low step, comfortable seats, adequate illumination, easy-riding, quiet operation, the open air ride in mild weather, the upper-deck protected in inclement weather —these are but a few of the big points of unquestioned superiority of Fifth Avenue Type L Double-Deckers.

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All-weather top for the upper deck

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Double-deckers unquestionably are the answer to traffic problems in congested city streets. Fifth Avenue Type L Buses occupy only 3.4 square feet per seated passenger. With such a short-wheel base, and a short-turning radius, they are the most practical units available for handling passenger transportation in heavy traffic.

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New York, N.Y.

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Is Galena Quality Necessary?

GALENA Lubricants have as a base the finest crude oils obtainable—unique distinction.

But for electric railway use, is this high quality essential?

Would some cheaper oil perform well enough?

Galena knows it would not.

So much that Galena refuses to resort to lower grades even to meet price competition.

How easy it would be for Galena to make a cheaper lubricant, but it won't. It can't afford to.

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New York, January 31, 1925

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Company, Inc.

HARRY L. BROWN, *Editor*

Volume 65
Number 5

Getting First-Hand Information Concerning Quality of Service

ADVERSE criticism of electric railway service is occasioned much more frequently by small things than by really serious shortcomings. Cold cars, windows that cannot be opened or closed easily, buzzers that don't buzz, dirty platforms and stations, abrupt starting and stopping, and annoying little delays at carhouses or fare limits, cause about nine-tenths of the complaints. To the passenger the arrangement of seats is of much greater importance than the type of motor used underneath the car.

In this motorized age, the general manager of nearly every electric railway has his own automobile to take him from place to place, and the use he makes of his own railway is comparatively infrequent. It is the more difficult for him on this account to know exactly what his customers are thinking. An example showing how far a railway official who does not ride his cars may misjudge public opinion is furnished by an operating man, who some time ago sought to "improve the service" by taking out all cross-seats from his cars and putting in longitudinal seats. Whatever gain might have been made in carrying capacity was more than outweighed by the resulting general dissatisfaction among the riders.

On the other hand, some managers make a practice of riding the cars regularly just to get the point of view of the passengers. That is well worth doing. The layman does not and never will understand nor be interested in the major problems of running a railway. These he rightly leaves to the management for solution. But he is interested in the small things that affect his comfort. If these are well taken care of he has a good opinion of the company, but if they are neglected he is antagonistic. It behooves the railway therefore to pay particular attention to such details, however unimportant they may appear.

Tardy but Not Too Late

DOWN East there is a small electric railway struggling for existence. It shall remain nameless, for it is not the property but the circumstances surrounding it that count. Fares had been kicked up and up and up without result in giving more revenue. A charge of $1 per passenger would have done no good. The railway had cut off lines. It had trimmed sail in what it thought was the orthodox fashion. Each time it did so a bus turned up to afford the service which the railway had decided it could no longer give profitably. Not only that, but the buses were not content merely to cover the route discontinued by the trolley. The operators ran into the business districts.

Unlike some other cases, the management has seen the error of its ways. It has begun to study the methods of its competitors, and it is now preparing to modernize and merchandise. In a short time its cars, repainted and refurnished, will glide down the main street through the maze of limousines, vying with them in the degree of comfort afforded rather than being in strange contrast to them in that respect. Moreover, residents who have been accustomed to jump at the shrill blast of an air whistle will take warning hereafter from a siren carefully toned down. It is a small thing, but whistles don't differentiate between patrons and those they are intended to startle. The management knows this now. Another thing, resort is to be made to the use of the bus where it will be of value, particularly because the railway management has become convinced of the versatility of that vehicle. In this case, as in so many others, the bus operators were not more formidable; they were just a trifle more resourceful. They are to be met now on their own terms, with the prospects all in favor of the electric railway with its co-ordinated operation.

Sectional Associations Cultivate Broader Thinking

ONE of the most important functions that may be performed by sectional associations is that of helping to bring men up for the job ahead. This was one of the principal objects in the formation of the Mid-West Electric Railway Association, as expressed at a recent meeting of that association by F. G. Buffe, general manager Kansas City Railways. It was pointed out that the association hoped to encourage department heads and their assistants to take part in the discussion of some of the broader problems of the industry.

Undoubtedly, the programs and procedure for such meetings should be planned with this object in view. Such plans should receive the wholehearted support of the managements of member companies to the extent not only of encouraging department heads to take part in the discussion of subjects of general interest, but of urging them to do so. The average department head is far too prone not to be interested in subjects outside of his department specialty. This applies particularly to technical men as a class. They tend to overlook the broader aspects of their industry and to become so absorbed in the specialized work of their respective departments as to lose sight of the problems of transportation as a business.

Association work offers an opportunity for broadening the viewpoint of men down the line. At sectional association meetings, time for full and free discussion can be made available. Thus in addition to its function of taking up questions of local interest to the member companies, the sectional association may perform the very useful purpose of helping to bring men up for the job ahead.

Neglected Publicity Opportunities in the Smaller Cities

EVERY town large enough to have an electric railway has at least one hotel. Somewhere in the lobby of this hotel will be found a time-table rack displaying advertising folders of various railroads, steamship lines, hotels in other towns, intercity bus lines, and the like. But it is seldom that one sees any electric railway publicity matter in such a place. Unfortunately, this is usually not because these folders are so much in demand that the supply has been exhausted, but rather because the railway management does not take the trouble to furnish them.

This important field of publicity endeavor has been neglected by a majority of the railways in the moderate size towns. There are, of course, a number of companies which have done good work along these lines, but they are the exceptions. Many of these exceptions merely supply time-tables, missing the opportunity for something more attractive and having more selling appeal. This is a field well worth cultivating.

A large number of the hotel guests are potential patrons of the electric railway. In summertime some of them may be transient automobilists, but for the most part they are strangers with no private means of transportation. To get around the town, or to leave the town, they must either walk, take a taxi, ride a bus, the trolley or steam railroad. When no effort is made to familiarize them with the railway service, it is hardly surprising that many choose the steam railroad, taxi or bus.

The average man likes to plan his movements ahead of time, and wants to have information available which will permit him to do so. Moreover, he is naturally disinclined to ask questions. If he can pick up a folder giving the routes and schedules of the electric railway and study them during his spare time, he is much more likely to use the railway than if considerable effort is needed to find out where and when cars run.

Designing Cars to Please the Public

THE demand for changes and innovations in transportation is being repeatedly emphasized in the discussions of railway men generally. One subject where this is particularly noticeable is in the design of electric railway cars, which was the subject of several papers before the New York Electric Railway Association last week. Though modern electric railway cars are a decided improvement over most of the cars built 25 years ago, they are not radically different in their general appearance. The bus, on the contrary, gives the public an impression of being a new type of vehicle, designed along new lines, and capable of being operated in a new way. Hence it has a special appeal to a certain element of the public as something novel and radically different from that to which the riders have been accustomed. Inherently, any difficulties that may be attached to the task of improving the appearance of transportation vehicles are greater in the case of the bus than in the railway car. Consequently, there seems to be no good reason why marked improvements in the appearance of cars cannot be made so that an important passenger-attracting factor will be added. Why not, then, design with an eye toward that distinctive appearance and element of novelty that creates a natural desire to ride on the new vehicle—and perhaps couple that design with a new kind of service?

Some progress in this direction has been made in some of the cars described before the meeting. The Illinois Traction car, for instance, was worked out with the particular thought of pleasing the traveling public. More comfortable seats, better heating and ventilation, better toilet facilities, easier ingress and egress and a pleasing appearance, both inside and out, have all contributed to the success of the new cars. Their light weight and low operating cost have also made it possible to couple the novelty of the design with a new type of service, in which better headways are given and high speeds are maintained.

The result was easy to foresee—receipts have increased, according to Mr. Bosenbury, who prepared the paper. This is the most substantial way in which the public finally voices its approval of the new car and the improved conditions that it has brought about.

Give Chicago Voters a Fair Choice

INCREASED attention is being attracted to Chicago as the discussion of its local transportation situation progresses. With the time of expiration of the existing surface lines' franchises now only two years off, an attempt is being made to work out a comprehensive plan that the voters will accept, which will provide a unified transportation system, and which will permit extensions and improvements to be made as needed.

Two major plans have been made public. One originated with the Mayor and his advisers; the second with Henry A. Blair, president of the Chicago Surface Lines. A third proposal by Samuel Insull offers immediate extension and improvement of the elevated lines, but does not make any provision for inclusion of the surface lines as a part of a comprehensive system.

All of the physical plans include the construction of subways in the congested business district. A general similarity appears as to the remainder of the two major physical plans. There is, however, one important difference between the views of the Mayor and Mr. Blair. The Mayor maintains that it will be impossible to grant a franchise for a long enough period to enable extensions and improvements to be privately financed. He has endeavored to work out an arrangement under which the city can purchase its transportation facilities by the issuance of so-called Swartz certificates—a lien on the income of the properties. Mr. Blair, on the other hand, maintains that private ownership will insure freedom from political management and that a franchise permitting a comprehensive plan to be financed would be approved by the voters provided that the subject were fairly presented.

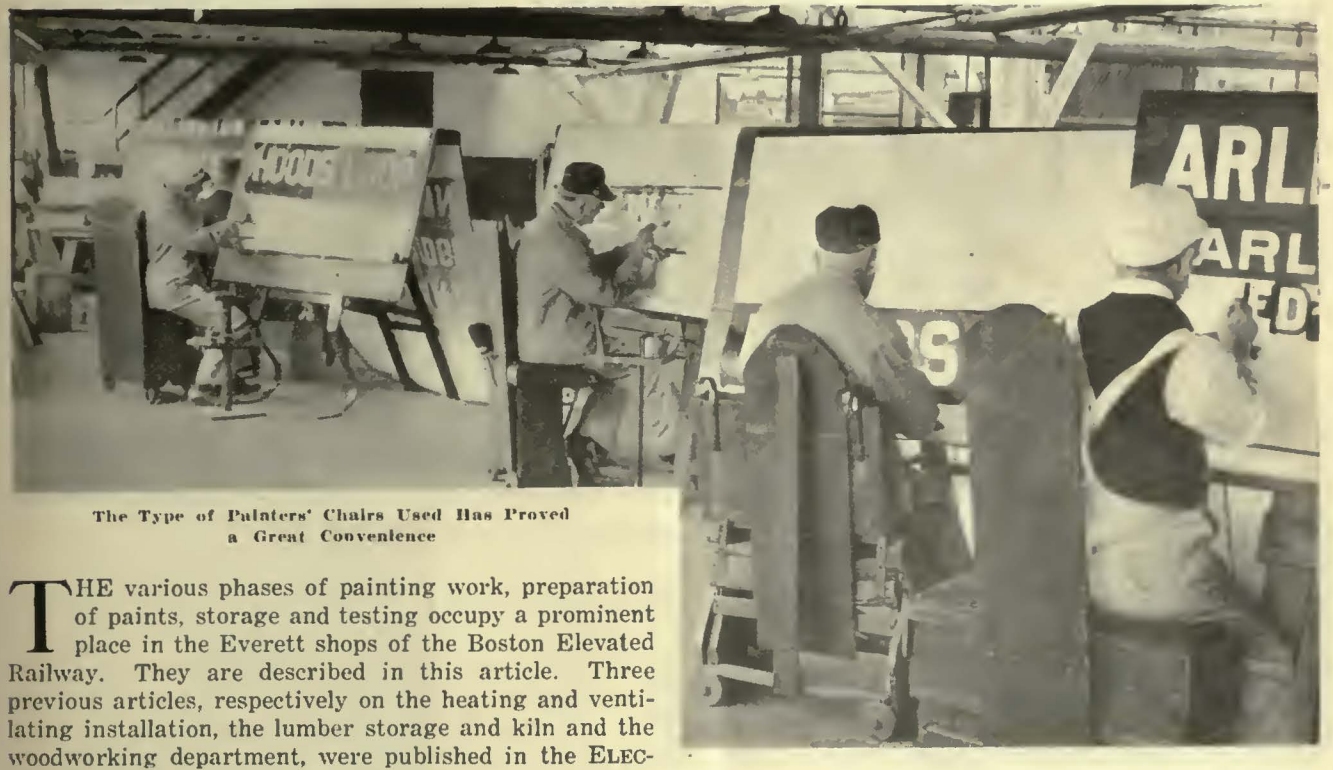
So far, the Mayor has shown no inclination to put the subject squarely before the voters. A referendum will be held, as it is necessary under the law. But the Mayor's program, as disclosed so far, contemplates putting the city purchase plan alone on the ballot.

It is generally considered that Chicago's Mayor is sincere in his views of the local transportation problem. In that the city is more fortunate than under the former administration. But a sincere effort to secure the best transportation plan would mean at the least putting both the Mayor's and Mr. Blair's proposals on the ballot. Instead of this the Mayor would ask the people to say "yes" or "no" to one plan only. Acceptance means municipal ownership; refusal is generally considered to mean a receivership or long delay in improvements.

Modern Painting Methods Used in the Everett Shops, Boston

Fourth Article

Many Types of Modern Motor-Driven Equipment Used for Paint Preparation Include Paint, Enamel and Putty Mixers, Pebble Grinders and Lead Cutters—Very Complete Facilities for Paint Storage—Records of Paint Tests Kept—Procedure Followed in Painting of Cars, Signs and Various Fittings Is Described



The Type of Painters' Chairs Used Has Proved a Great Convenience

THE various phases of painting work, preparation of paints, storage and testing occupy a prominent place in the Everett shops of the Boston Elevated Railway. They are described in this article. Three previous articles, respectively on the heating and ventilating installation, the lumber storage and kiln and the woodworking department, were published in the ELECTRIC RAILWAY JOURNAL for Nov. 22, Dec. 13 and Dec. 27.

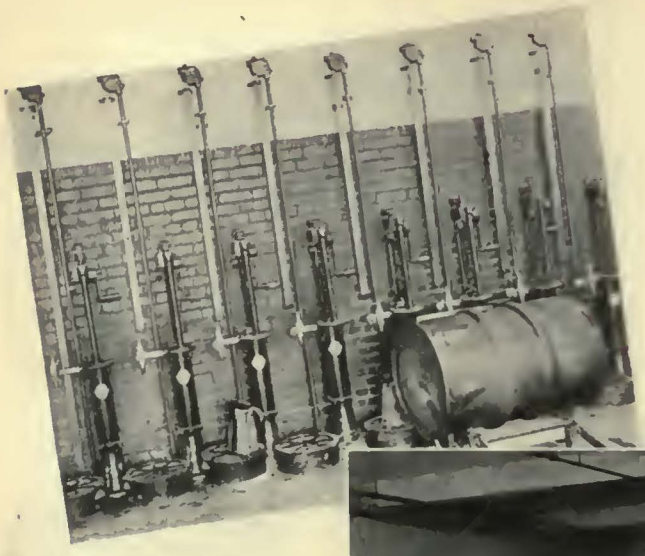
The paint shop is of the same general design from the building standpoint as the wood mill. It has 22 tracks available for car painting, with space for handling 52 surface cars of the largest type operated on the system. The floor is of reinforced concrete, finished with a surface treatment to keep down dust. Between the rails are drains in the floor to take care of the drippings from the cars. The floor, however, is practically level, to facilitate the operation of traveling painting stagings. The small amount of water coming in is taken care of by sweeping it into the drains.

Special provision has been made in this building, as in the others of the Everett group. for adequate toilet facilities. Urinals in the centers of the painting spaces are concealed with small screens. Thus the men do not have to walk any great distance. Excellent lavatory facilities are also furnished.

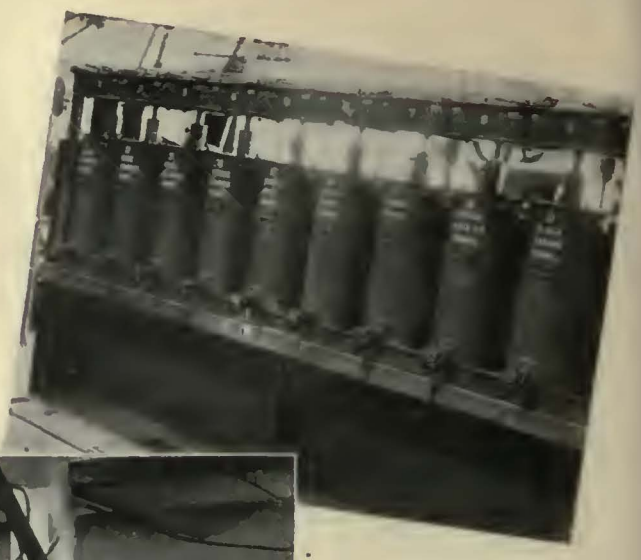
A thoroughly modern paint mixing and stock room is located on the ground floor, with a complete and well arranged layout of slate shelving for storage and motor-driven machinery for mixing paint and making putty. Adjoining the paint storage is a glass department, where glass is stored in cases, according to size, and so distributed as to be available at all times. The south end of the paint shop floor is assigned to the painting of trucks and buses. Beneath the paint stock room is a basement containing supply tanks from which turpentine, oil, varnish, etc., are pumped for delivery inside the storage room.

A balcony extending over the paint and glass storage rooms is connected with the ground floor by an electric elevator. This balcony is devoted to sign painting, locker rooms, shower baths and the office of the superintendent of the Everett shops. In this building the height from the top of the rails to the under side of the roof trusses is 20 ft. and the bays are 32x44 ft. The skylights were designed with the lower half stationary and the upper half movable. It was found that sufficient ventilation could be had in this way, with the operating mechanism kept at a minimum. As in the wood mill, the operating sash are moved by motor-driven equipment controlled by push-buttons from the first floor. About 150 ft. of sash can be handled satisfactorily in a run from a single motor.

The paint stock room, about 63 ft. long by 39 ft. wide, combines preparation and storage functions and is exceptionally well equipped with power-driven machinery. Three fire doors in the wall separate this section from the paint shop interior proper, another fire door on the north side leads into a stock room for dry colors and a fifth fire door opening into a driveway on the east



Battery of Self-Mensuring Pumps Which Are Connected with the Basement Tanks. In the Foreground Is a Drum in Position for Emptying Into One of the Tanks



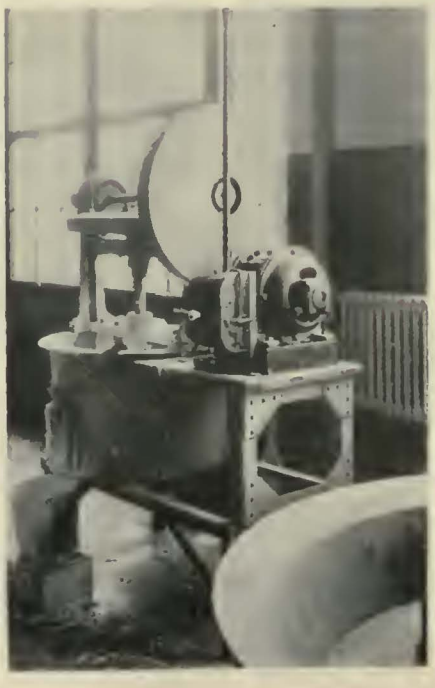
Battery of Enamel Agitators Driven by Motor Mounted on the Ceiling. These Are Used for Mixing Ten Different Enamels

Three Heavy-Duty Paint Mixers

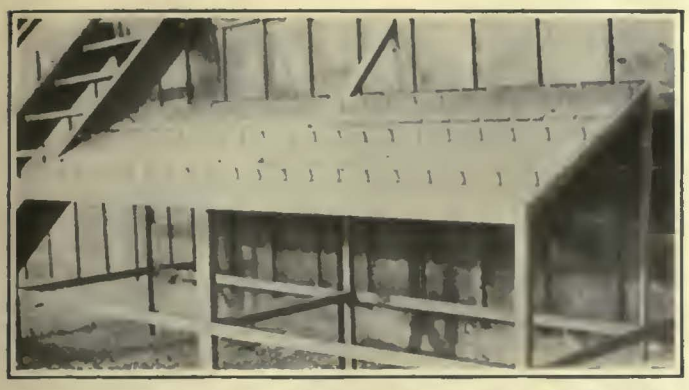
Paint Storage and Mixing Equipment in the Everett Shops, Boston

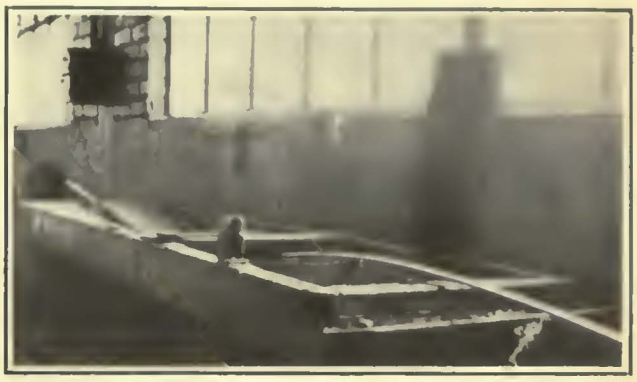
Portable Paint Mixer—An 80-Gallon Tank, One of Twelve Units in the Everett Shops, Is Shown on the Truck

Pigment Mixer



Pebble Mills and Shellac Cutters. A Row of Paint Grinders Is Shown in the Background





At Left, Test Rack for Paints. After Attaching Panels to Rack, They Are Exposed to the Weather. At Right, Method of Feeding Beading Through Staining Tank

side of the building is used by motor trucks in delivering supplies to the paint storage section. The handling of materials has been simplified by this door arrangement. Barrels of turpentine, linseed oil, driers and varnish are rolled off the trucks by hand and skidded into the stock room. These are then rolled over to the west side of the room, tilted upon cradles equipped with sieves and discharged into basement storage tanks through floor funnels terminating in short pipes feeding the tanks below. Racks for the storage of containers are also provided in the stock room and in the basement, these raising the containers above the floor about 12 in. to facilitate tapping.

On the west side of the stock room is a battery of 11 hand-operated self-measuring Milwaukee pumps connected with the basement tanks and discharging into receptacles as required in the stock room. Nine of these tanks are in the basement, but to give fire protection a 500-gal. tank for the storage of gasoline and another of the same size for the storage of alcohol are placed underground below the driveway. These are filled from tank trucks by outside hose connections, and the liquids are drawn through pipe connections leading through the stock room basement to the tank outlets.

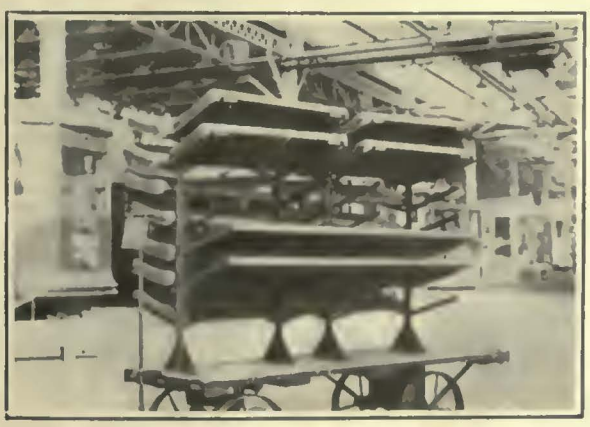
Containers for soluble oil, orange shellac, white shellac, paint remover, "cotelac" and electric car oil are racked on the east side of the stock room. These materials are used in color mixing and thinning and for lubrication.

In this shop the method of mixing or agitating has been carefully worked out. Most of the machinery in the stock room was designed and built by the J. H. Day Company, Cincinnati, Ohio. Economy of labor was kept in mind at every stage. Centrally located is a group of three agitators served by removable containers holding 80 gal. each. These containers are kept in the stock room on the east side just beyond the color mixing and thinning section and hold bronze-green truck paint, zinc-white floor paint, lead-colored roof paint and bunter white. The battery of agitators is driven by a 5-hp. motor mounted on the ceiling. Each agitator is belted to a central overhead pulley chain-driven from the motor pulley. Idler pulleys for each agitator enable any unit to be cut out of service independently. The containers used with these agitators are mounted on wheels to facilitate rapid placing and removal. The mixers are so arranged that the operator can grind his color material into the requisite can, roll the container to the mixer and either thin down or tint for use as necessary.

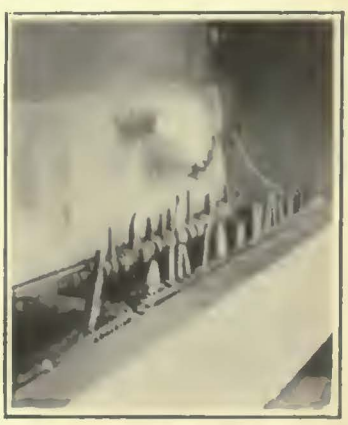
Beyond the east door of the paint stock room are located a white-lead cutter, a 350-lb. putty mixer and a steam-jacketed kettle for breaking down and recovering paint skins from pots, etc. The lead cutter, a 50-gal. "Hero" mill, is used in breaking down and mixing heavy pastes preparatory to their grinding and thinning. This machine is driven by a 5-hp. motor with starting switch on the mill frame. Next is a 350-lb., 48-in. putty chaser, group-driven with a 50-gal. kettle from a 3-hp. motor mounted overhead. At the north end of the room are a 20-gal. pebble mill, an 80-gal. orange shellac cutter and a similar one for white shellac, group-driven by a 5-hp. motor which also drives three water-cooled mills in group. Any one of these six machines can be cut out of service by a clutch without interfering with the others.

The pebble grinder is a No. 7 Abbe mill with Silex lining. It is specially designed to keep the material out of contact with the outside air and is particularly valuable where the thinner is volatile and must be

Hopper Truck for Receiving Paint Scrapings



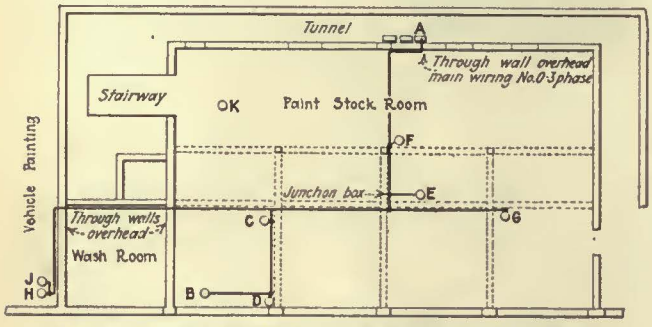
Hand Truck with Backing to Hold Seats and Backs for an Entire Car



Brushes Are Held by Spring Clips in a Water Tank

confined absolutely during the grinding process. The three 15-in. diameter color mills are arranged in gang to enable one mill to be used for a particular color, thus saving cleaning and the possibility of discoloration which sometimes results where a mill is employed for several colors. The stones are dressed for color grinding and the mills are used extensively in the preparation of delicate coach colors.

Three 200-gal. Paragon mixers group-driven by a 5-hp. motor in the center of the stock room are used in thinning down and tinting paint produced in quanti-



Wiring Layout for Motors and Ovens Used in Paint Stock Room, Everett Shops

ties and are each provided with a clutch for separate operation.

Between the pebble mill and the pump and serving shelf section of the paint stock room is a battery of 10 10-gal. enamel mixers group-driven by a 5-hp. motor. Each has an independent clutch. These mixers are assigned to the following enamels, keeping each intact for one kind of material—outside car green, inside light green, inside dark green, outside pullman, inside white, outside white, cherry, outside black, black baking and orange. A portable "Revolvator" driven by a 4½-hp. motor is in service in the paint shop.

The tank installation in the paint stock room basement consists of seven 50-gal. tanks assigned to compressor oil, machine oil, compensator oil, kerosene, lard oil, lacquer and lacquer thinner, two 300-gal. tanks for japan and driers, five 500-gal. tanks for finish varnish (3), black varnish (1) and rubbing varnish (2), and two 1,000-gal. tanks for linseed oil and turpentine. The tanks beneath the self-measuring pumps are equipped with floats connected through chains to indicators beside the pumps in the stock room.

Motor Drive Keeps Stock Room Clean

A major factor in the selection of the motor drive for the machinery in the paint stock room was the elimination of the extensive amount of belting and shafting so generally associated with this class of work. This virtually does away with the throwing of dirt and flaky scales and helps in the preparation of purer colors. The use of induction motors also does away with the objections common to direct-current commutators. In general, the motor starters in the stock room are mounted on columns adjacent to the controlled machine units and the wiring is carried in iron conduit. In addition to the complete automatic sprinkler installation, the paint shop is equipped with chemical extinguishers and a private fire alarm box, with standpipe and hose centrally located.

A great variety of paints are prepared at Everett for use in all parts of the system. A few of the more important preparation jobs are described in the following paragraphs:

Putty is made up in the mixer in batches of 350 lb., about 4 hours being required. Red putty is made by mixing 330 lb. whiting, 25 lb. oil lead, 7 gal. linseed oil and 10 lb. dry Venetian red. The last ingredient is omitted in making white putty. The red putty is used largely in setting sash in cars with cherry trimmings, the white being used mainly in setting sash outside buildings. In the mixer the putty is rolled by a 900-lb. steel wheel, whereas by the old hand methods only 25 lb. was kneaded at once.

Semi-white lead paint is used largely around stations. In a typical batch about 575 lb. of white lead is broken up for an hour in the lead cutter, and with 3 gal. of linseed oil and 15 gal. turpentine the mass is agitated in one of the 200-gal. tank mixers for 4 to 5 hours, the necessary colors being added during the latter process. The paint is then drawn as required from the agitator tank.

Structural gray paint is used largely on the elevated structure. About 1,200 lb. of white lead is prepared in the lead cutter. Zinc white, ground in oil in the water-cooled mills, is added to the white lead and made into a paste. To this are added 400 lb. of French yellow ochre ground in oil and 60 lb. oil lampblack; 70 gal. of linseed oil is then added, the proper colors having been added during the grinding process in the 200-gal. agitators. The paint is served as required from the agitator tanks.

Dry red lead is hand-mixed into a batter with oil and thinned with turpentine and driers. It is then delivered over the counter to the painters.

The ground color used as a base for orange enamel consists of white lead, red lead and golden ochre. They are mixed and thinned with turpentine and drier to form a flat color. About 60 gal. is mixed at one time in the agitators near the pebble mill and drawn off as required. Lead color, used on trucks as a base for green enamel, consists of white lead mixed with lampblack in oil and thinned with turpentine and driers. The mixing is done in the same agitator battery.

Surface car gray roof paint is an oil paint consisting of white lead mixed with oil lampblack and thinned with linseed oil and driers, with the addition of a small quantity of turpentine. The paint used for elevated car roofs is an oil paint consisting of white lead and French ochre in oil mixed with Venetian red which has been ground in oil in the agitators. This is thinned with linseed oil and driers. Plow paint is made in the

PAINT STOCK ROOM MACHINES, MOTOR DRIVEN

Ref. Letter	Description of Unit	Manufacturer	Hp.	Manufacturer	Type	R.P.M.	Control Information
A	200-amp. safety switch						
B	Puttychaser, 48-in	J. H. Day Company	3	G.E.	KT 938	1,200	CR 1,038 G.E.
C	Three heavy-duty mixers	J. H. Day Company	5	G.E.	KT 946	1,200	CR 1,038 G.E.
D	50-gal. white lead mixers	J. H. Day Company	5	G.E.	KT 946	1,200	CR 1,038 G.E.
E	80-gal. portable mixers	J. H. Day Company	5	G.E.	KT 946	1,200	CR 1,038 G.E.
F	Ten 10-gal. portable mixers	J. H. Day Company	5	G.E.	KT 946	1,200	CR 1,038 G.E.
G	Paint grinder	J. H. Day Company	5	G.E.	KT 916	1,200	CR 1,038 G.E.
H-J	Electric ovens						
K	Revolvator		4½			1,800	Trumbull switch, 150-volt, 30-amp.

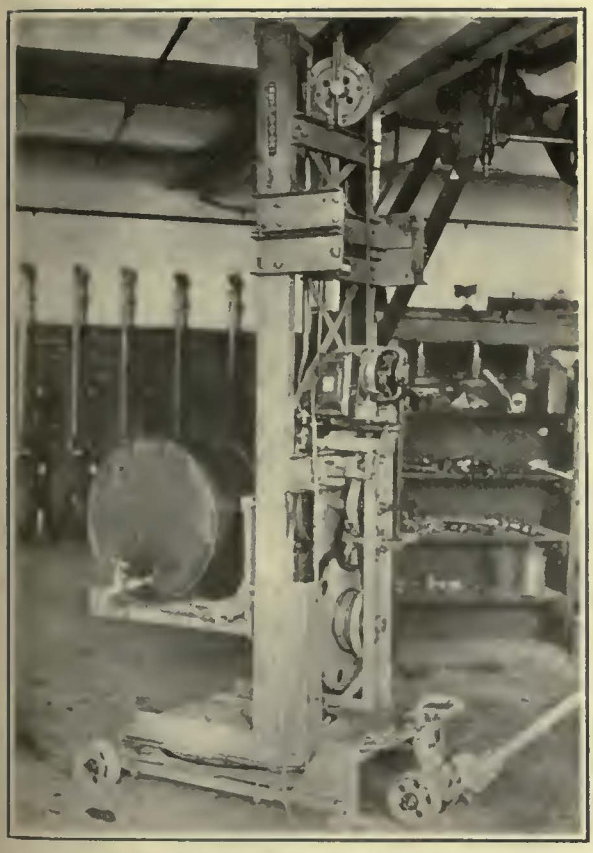
same way except that burnt sienna is used in place of Venetian red.

Cherry ground paint used on doors, sash, etc., as a base for enamel consists of white lead and burnt sienna mixed by hand and thinned with turpentine and drier. Bronze green used on service cars, coal cars, derricks, etc., is broken up in oil in the mills above mentioned and drawn for use.

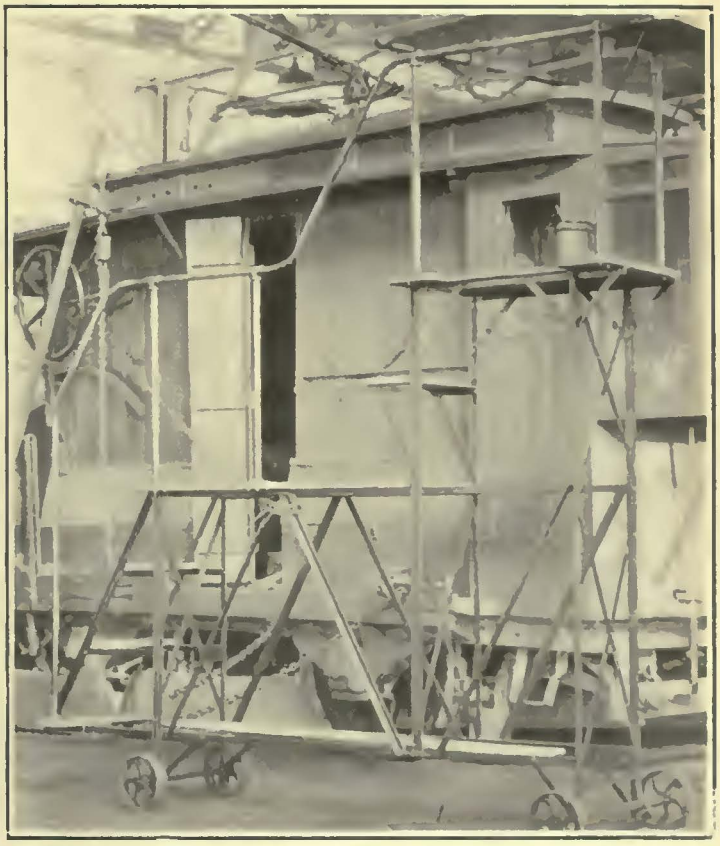
Elevated car paint consists of white lead colored with raw umber, hand-mixed. This forms the basic color for the Pullman car enamel used on the outsides of the car bodies. On the insides of these cars white enamel and two shades of green enamel are used, the basic ground paint being white lead and green, thinned with turpentine and drier. All cars on the system are painted with white enamel on the insides of the roofs.

Truck paint is prepared by first boiling skins scraped of red lead and wood is primed with a light-colored lead primer. Holes are puttied and dented spots looked after. The roof is painted a battleship gray and the main body coat is applied. This kills the green color without changing the color of the finish coat. When the main body coat is dry an enamel coat is put on the body and sash. While in some cases the enamel is the final coat, it is customary to finish with a varnish coat in order to increase the life of the enamel. The numbering and lettering follow the finish coat.

While the exterior is being painted, the repainting of the interior is in progress. As a rule this includes only the sash, doors and headlining, the rest of the work being varnished. The conductor's stand, brake staff and air piping are blacked off and usually the floors are given a heavy coat of dark gray oil and lead paint. The ceiling is washed and touched up with white



Revolvator Used in Paint Stock Room



Scaffolding Mounted on Wheels for Painting Exterior of Cars

from pots in a steam-jacketed kettle. Linseed oil is gradually added. After straining, 150 lb. of white lead is added to each 25 gal. of boiled skins to give the necessary body. This is done in the agitator tanks and lampblack and umber are added, thinning with linseed oil and turpentine to obtain the proper consistency.

Cars Are Being Repainted Orange Color

At present the railway is repainting its surface cars orange for the sake of increased visibility over the previous standard dark green. This work will probably take three years. About four days is required to repaint an average car. The car is thoroughly cleaned, scraped and sandpapered, stripping to the bare metal or woodwork. A chemical paint remover is used where necessary. Nearly three-fourths of the cars are steel units. The paint is scraped into a hand truck equipped with a detachable hopper from which the paint refuse is later emptied and burned. Bare metal is given a coat lead and enameled. The trucks are given one coat of dark gray paint while the body is in hand. After the last coat is put on and is dry the glass is cleaned and the brasswork, seat backs, seats and screens are put in place. Small hand trucks, one for each car, are used to hold the entire set of seats. These trucks are of the flat platform type with racks built of 1-in. x ¼-in. angles. Screens are dipped in a tank near the south end of the shop and if any enamel baking is required two electric ovens are available.

One man is assigned to roof painting and at the same time two men clean the car body and apply the priming coat. The roof dries in about 24 hours and the car body from 24 to 48 hours. Two painters then enamel the body and one enamels the sashes. Forty-eight hours later two men varnish the body, sash and doors. One man paints the trucks with one coat, which dries in about 24 hours. On the car interior three men are usually required.

Three electric ovens are being used in baking enamel at the Everett shops. These were designed and built by the Oven Equipment Company, New Haven, Conn., electrically equipped by the Westinghouse company, and with Bristol temperature control. One 33-kw. and two 10-kw. ovens are in use. One of the latter is in the temporary machine shop and the two others are in the paint shop near the paint stock room.

The larger oven is designed to accommodate a car truck. The outside dimensions are 8 ft. wide, 7 ft. 6 in. high and 7 ft. deep. Heaters are placed on the side walls and are covered by screening to prevent damage by contact. A motor-driven blower and duct system above the heaters circulates the heated air through the oven. The motor and fan are mounted on the roof. If desired, the oven may be moved on rollers as a unit or taken down in sections and transported to another location without injury to the insulation. This oven is used chiefly for baking enamel on automobile hoods, mud guards, fenders and other large pieces. About 10 minutes' baking at the maximum temperature of 365 deg. F. is required.

The smaller oven in the paint shop is used chiefly in baking enamel on light work. Hand strap brackets and conductors' seat stands are ordinarily baked an hour at 350 deg. and tin cases for car signs 10 minutes. Car springs are also enameled in this oven, one hour at 350 deg. being required per batch.

Car screens are dipped once each by hand in a tank of Watertown black and dried on a rack in the paint shop. A tank is also provided here for washing and bleaching car seats with oxalic acid. Used sign cloths are passed through the washing tank and are then used as old rags. A tank with a roller is provided for coating canvas with lead paint. Three men can put through 650 yd. in an hour, compared with three weeks by the old methods of hand painting.

Beading is run through a staining tank 27 in. wide and 8 ft. long, mounted about 3 ft. 6 in. above the floor and equipped with hinged wipers of plush, each about 6 in. wide and 1½ in. thick. These wipers are clamped in pairs to the top edges of the tank. The beading strips, a dozen or more at a time, are dipped in the stain solution and pulled through the wipers by hand. At least twenty times the length of beading can be stained in this way per hour as was possible with the old methods of brush coating.

The sign painting section occupies a rectangular space on the balcony above the paint stock room, 75 ft. long by 35 ft. wide. Most of this work is done by hand except where several hundred small signs bearing the same designation are required. In the latter event, the silk stenciling process is used. Signs like "Enter at Front" and "No Smoking" are stenciled when required in quantities.

The eight easels provided for sign painting are used very extensively for painting Hunter signs, which the company has used for many years. The chairs are mounted on rollers to enable the painter to change position without rising. To keep the knees from striking the easel supporting leg and to enable the painter to move sideways without "hitching" his chair backward, the easel legs are curved inward, these legs being of 2-in. x ½-in. straps.

In painting Hunter signs paper patterns are used to outline the lettering and then the surface of the cloth is painted black around the letters, leaving these white. Patterns are stored in a portable rack made of 1½-in. angles. It is 5 ft. 6 in. long, 4 ft. high and 2 ft. wide and has 11 shelves. The shelf bracing is of 1-in. angles and the rack easily will hold 2,500 "pounce" patterns of drafting paper. Hunter signs are rolled out flat on the floor in drying. From 6 to 8 hours is required to paint a 26-exposure Hunter sign and dry it.

These Hunter signs are painted on Holland linen and are given one coat of "Hunter sign black." This is made up in 17-lb. batches composed of 10 lb. oil lampblack, 5 lb. Prussian blue, 1 qt. linseed oil and 1 qt. flex compound. If necessary signs can be painted with "drop black" and dried in about 2 hours. Tin signs are usually given two coats of lead paint and after lettering one of varnish. Sheet-iron illuminated signs are given two coats of black enamel and two coats of white lead for lettering. About 2 days is required for these signs. Miscellaneous wooden signs are hand-painted with two coats of white lead and one of enamel, the lettering being of drop black.

Sampling and Testing Paints

A convenient record of paint samples is kept in a series of slotted drawers in the paint stock room office. These drawers or sample boxes are of ½-in. whitewood and are each 11 in. long, 4½ in. wide and 5½ in. deep and are provided with inside vertical slots ⅛ in. wide and deep, spaced ½ in. apart. Each pair of slots holds a plate of white glass 5 in. square and ⅛ in. thick and each plate carries a paint sample with a paster card giving the data upon the former. Each drawer holds 14 plates and a cabinet is provided with a capacity of 30 boxes.

A testing rack for paints and enamels has been set up on the roof. This is of metal, 10 ft. long by 3 ft. 4 in. wide, with inclined plane surfaces carried 30 deg. from the horizontal and fitted with spring clamps by which the sheet-iron test plates can be fastened to the flat surface. There are three panels or flat test surfaces separated from each other by 1¾-in. gaps for drainage and for hanging the test plates in place. The test plates are 11¾ in. long by 5 in. wide. The ends are looped over to form an L-shaped piece, which helps keep the test piece in place in all weathers. The rack will hold 66 plates and faces the south. It is made with a frame of 1½-in. angles for uprights, with 3-in. upright channel braces in the center and is 4 ft. 4 in. high at the back and 3 ft. high at the front. The clamps for these test pieces are made of ¼-in. brass pipe split at the ends and threaded inside to receive a bolt and spring under the testing surface. The clamps rest on ⅝-in. x ¾-in. rubber feet to prevent electrolysis. Holes drilled in the test plane receive the bolts holding the clamps in place and the rack is provided with metal feet about 3 in. square and is braced to a wall and stairway.

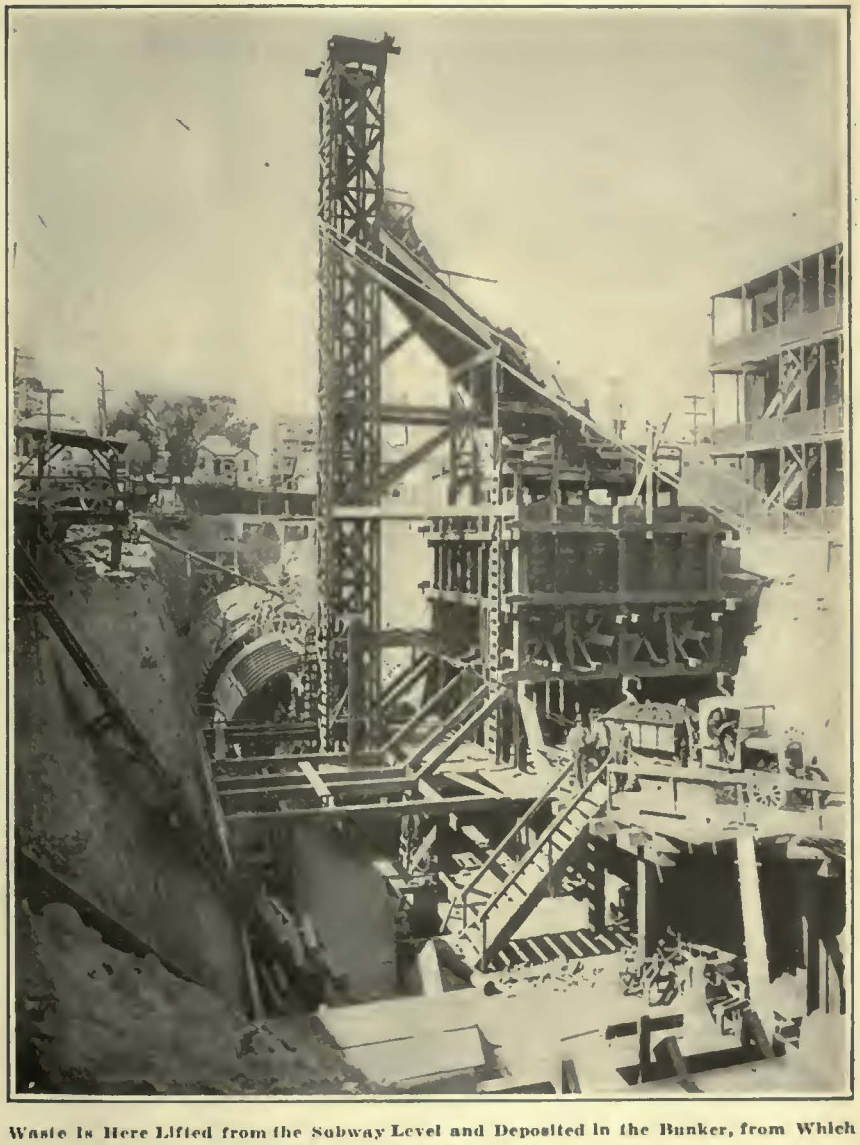
Twelve portable scaffolds are used for car painting. Each is about 8 ft. long, 15 in. wide and 9 ft. high. There are two platforms at different levels connected by four steps. These are carried on a frame of 1-in. angle irons and fitted with ⅞-in. pipe railings, as shown in the illustration. The structure is mounted on four 8-in. diameter cast-iron wheels with a 2-in. tread. The difference in height between steps is about 1 ft. so that the painter can easily reach any part of the car body. He can propel the entire scaffold forward or backward without descending to the floor level. An 18-in. x 10½-in. shelf at the top carries supplies for the roof painter, and the steps can be used as platforms or for carrying supplies.

Sub-Surface Terminal for Los Angeles

Plans for Hollywood-Glendale-San Fernando Valley Subway, Now Under Construction, Have Been Altered to Include an Underground Terminal Station in a New $4,000,000 Building for the Pacific Electric Railway—Provision Will Be Made for Other Subways Planned for the Near Future

INSTEAD of a surface terminal at Hill Street, Los Angeles, for the Hollywood-Glendale-San Fernando Valley subway, now being built by the Pacific Electric Railway, the plans have been changed to call for the construction of a sub-surface station in the basement of a large new terminal building. The former plan, which was briefly described in ELECTRIC RAILWAY JOURNAL for Sept. 6, 1924, called for five loading and unloading tracks at the street level, together with platforms and other station facilities. Under the new plan the sub-surface terminal will have the same number of tracks, but will be entirely below ground. An additional expenditure of about $500,000 will be necessary.

Authorization for the change was made on Jan. 5 of this year by the California State Railroad Commission. As a result it is expected that the tunnel will not be completed until Oct. 1, instead of next March. The feasibility of connecting the subway now under construction and the new terminal with a general subway system for the city was an important factor affecting the decision to depart in this way from the original plans.



Waste Is Here Lifted from the Subway Level and Deposited in the Bunker, from Which Motor Trucks Haul It Away

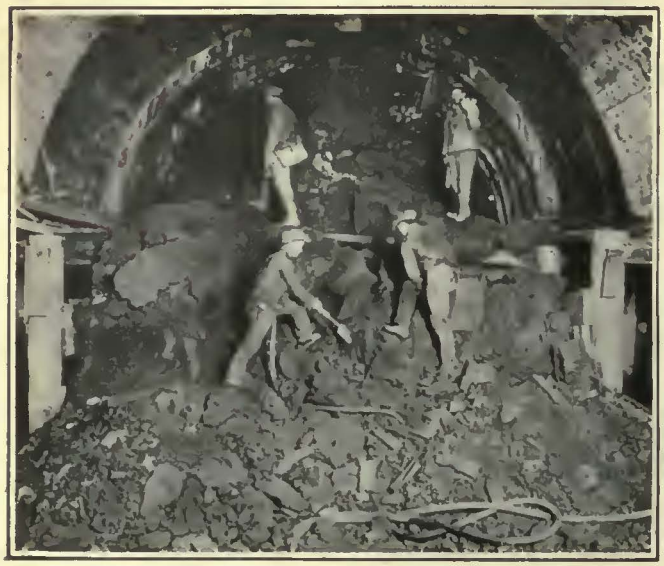
PROGRESS OF SUBWAY DIGGING IS RAPID

In order to complete the new subway in record time, the work has been carried on in three places. After starting the initial bore eastward from First and Glendale Boulevards the contractor then began to dig both east and west from a section temporarily opened up between Flower and Figueroa Streets. Three shifts totaling 650 men are employed. During December progress on the three bores totaled 780 ft. This was an average of about 30 ft. per working day. The placing of the concrete lining was accomplished at approximately the same pace.

Excavated material is hauled out of the subway in small cars operated over a light railway. By this means it is brought to the foot of a hoist, which raises it and drops it into a bunker just below the street level. From this bunker trucks haul the soil away. Arrangement of apparatus for doing this is shown in the accompanying illustrations.

Conditions of soil so far encountered have been favorable for progress except for the presence of a certain amount of water. Emergency timbering at locations where water was encountered, however, has enabled the work to proceed without interruption. On the basis of 4,250 ft. of actual tunneling to be done the excavation and placement of reinforced concrete on Dec. 1 was approximately 71 per cent complete, a total of 3,040 ft. having been dug. There remained some 500 ft. of difficult going eastward from Flower Street to the Hill Street station. It is expected, however, that the actual digging will be completed in the spring, although the construction of the terminal building and approaches will postpone the completion of the entire project until some time in the early fall.

Following the decision of the Railroad Commission in the matter of changing the grade of the subway terminal, it has been decided to erect a large $4,000,000



At Left—By Working 24 Hours a Day in Three Shifts the Railway Has Been Able to Dig the Subway at a Speed of About 30 Ft. a Day. At Right—Excavated Material Is Carried from the Bore to the Foot of the Hoist by a Light Railway

terminal building on the site of the Pacific Electric Railway's present Hill Street building. The exterior of the new terminal will be of granite and terra cotta. Schultze & Weaver, Los Angeles and New York, are the architects. Leonard Schultze, who prepared the plans for the new Los Angeles terminal, also designed the Grand Central Station in New York City.

Reinforced concrete construction will be used for the new building, which will be 12 stories in height. Space for 600 offices will be provided. The main entrance to the building is from Hill Street, leading to an arcade 130 ft. long and 30 ft. wide, with shops on both sides. There will be eight passenger elevators, six at the Hill Street entrance and two on the Olive Street side. On this side there will also be a garage to accommodate the automobiles of the tenants. It will have a capacity for 128 automobiles on two floors. Direct entrance will be had from Oliver Street to both floors. The fact that the basement of the building is to be used as a railway terminal necessitated the location of the fire room above the street level, which presented some unusual problems in building design.

The subway terminal in the basement will have five tracks, accommodating 30 cars. Six inclined ramps will connect the boarding and alighting platforms with the first floor, where the waiting room and ticket offices will be located. The ascent will be broken, however, by a mezzanine floor with a smaller waiting room between the track and the street levels. The railway estimates that 50,000 persons a day will use the new terminal upon the completion of the subway now being built. This number will be greatly augmented when other subways are dug and connected up.

The first subway to enter the terminal will be the one now nearing completion, which will serve the northwest part of the city. This $3,500,000 project will take the Hollywood, Glendale, Santa Monica via Sawtelle and San Fernando Valley cars off the streets in the congested districts. When future traffic needs make necessary a subway specially to serve the Santa Monica Bay district the building will be enlarged to take care of this development.

Location of Interurban Terminal Will Stabilize Business District

It is thought that the decision to build the subway terminal in this location will be far reaching in its effects. It means the stabilization of the present central business district, the status of which has heretofore been somewhat uncertain because of the tremendous growth of the city. This has been unrestrained by any definite plans of development, particularly in the business section. Experience in large Eastern cities is considered to have demonstrated the fact that a constantly shifting business center is detrimental to the best interests of the city. The location of Los Angeles' first subway terminal on Hill Street and the decision to create a civic center not far away are expected to have an important influence in keeping the main business district centralized.

The construction of this new terminal means the realization of a dream which originated with the late E. H. Harriman more than 20 years ago. At that time Mr. Harriman even went so far as to have plans prepared for a large office and subway terminal building on this same site. While the present plans differ from his in many ways, the idea followed in its construction now is the same as then.

New Terminal Building of the Pacific Electric Railway in Los Angeles Means the Realization of a Dream Originating with the Late E. H. Harriman

Service Readjustments Would Increase Atlanta Earnings $700,000

Beeler Report States that Elimination of Jitneys and Rerouting of Street Cars of Georgia Railway & Power Company Would Increase Railway Revenues and Reduce Operating Expenses—Relocation of Car Stops Would Speed Up Service — Co-ordinated Railway and Bus Operation Is Recommended

BESIDES the physical improvements in transportation facilities in Atlanta recommended in the recent report prepared by the Beeler Organization, and described in ELECTRIC RAILWAY JOURNAL for Jan. 10 and 24, extensive changes in bus and car routes and service are proposed. Under the new plan the report states that there would be an increase of about $700,000 a year in net earnings and a reduction in the operating ratio from 89.7 per cent to 77 per cent.

As the first step in any program to improve transportation conditions, the present jitneys must be eliminated. Not only have they taken about 10 per cent of the business that should have gone to the railway and thereby injuriously affected the income of the company, but they have added to the already serious traffic congestion in the business district. Moreover, they afford no material addition to the transit facilities to compensate for the damage they are doing.

Jitneys have been in operation in Atlanta for a number of years and recently have become a formidable competitor to the street railway. At the time the report was made there were no fewer than 230 jitneys of all classes in daily operation, mostly 5-passenger vehicles. They operate over and along the best lines of the railway where short-haul riding makes the remuneration from operation favorable.

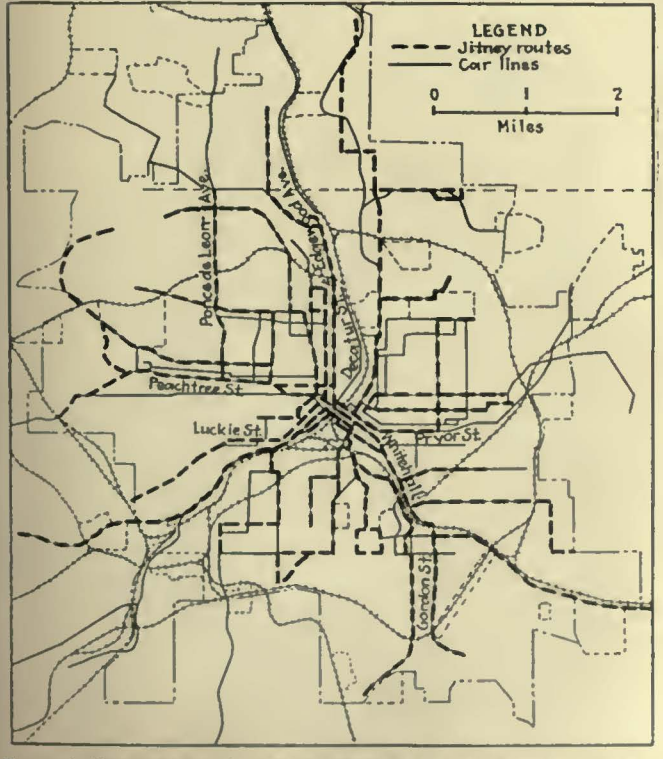
Checks made by the Beeler Organization showed a total of 23 jitney lines, all of which are being operated along the railway lines. Nineteen of the lines operate between residential sections and the business sections only, while four operate through-route city service. The routes are shown on an accompanying map. The jitney fare is 10 cents straight on 14 of the lines, and 7 cents on nine lines. Railway car fare is 7 cents, and the ticket rate is 6⅔ cents.

ANNUAL PASSENGERS CARRIED BY TRANSPORTATION AGENCIES IN ATLANTA

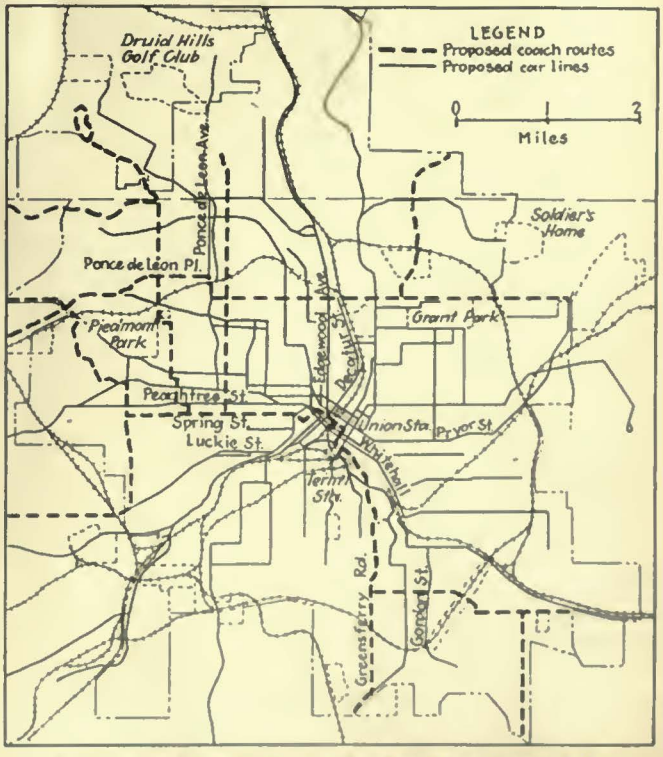
	Railway	Jitney	Total
Revenue	73,413,026	7,750,000	81,163,026
Transfer	19,967,265		19,967,265
Total	93,380,291	7,750,000	101,130,291

To determine the volume of the jitney business, a complete field survey was made. By comparing traffic counts on the jitneys with similar data for the street cars it was clearly seen that with the exception of a few lines during the rush hour the seats furnished by the railway were adequate to care for all the traffic that presented itself.

The comparative figures in the table in this column give a good idea of the annual volume of business handled under present conditions.



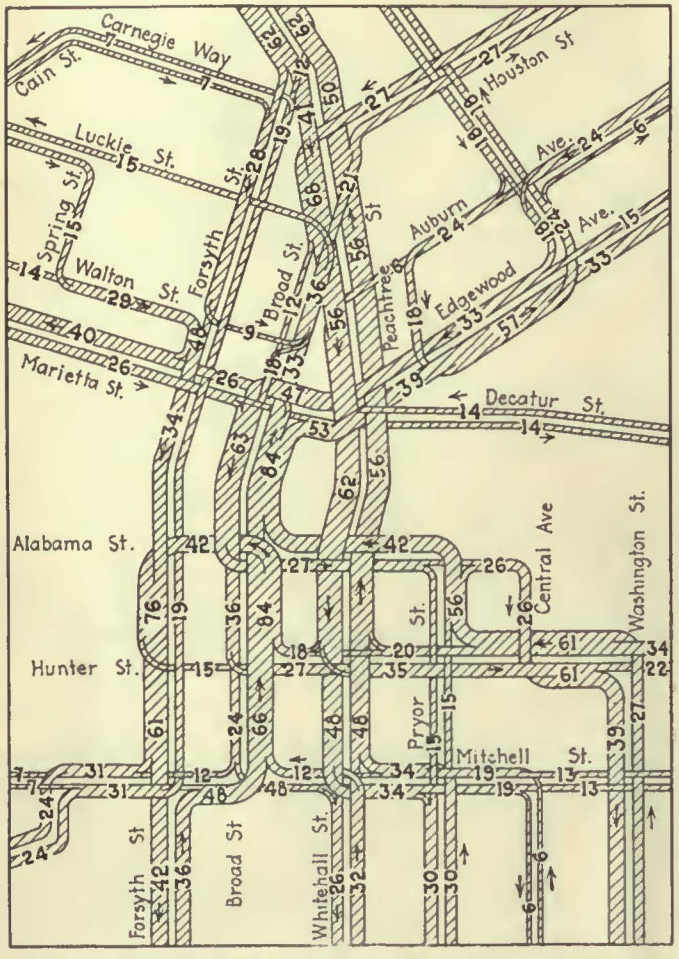
Present Jitney Routes in Atlanta Follow the Car Lines and Operate Only in the Choice, Well-Populated Sections



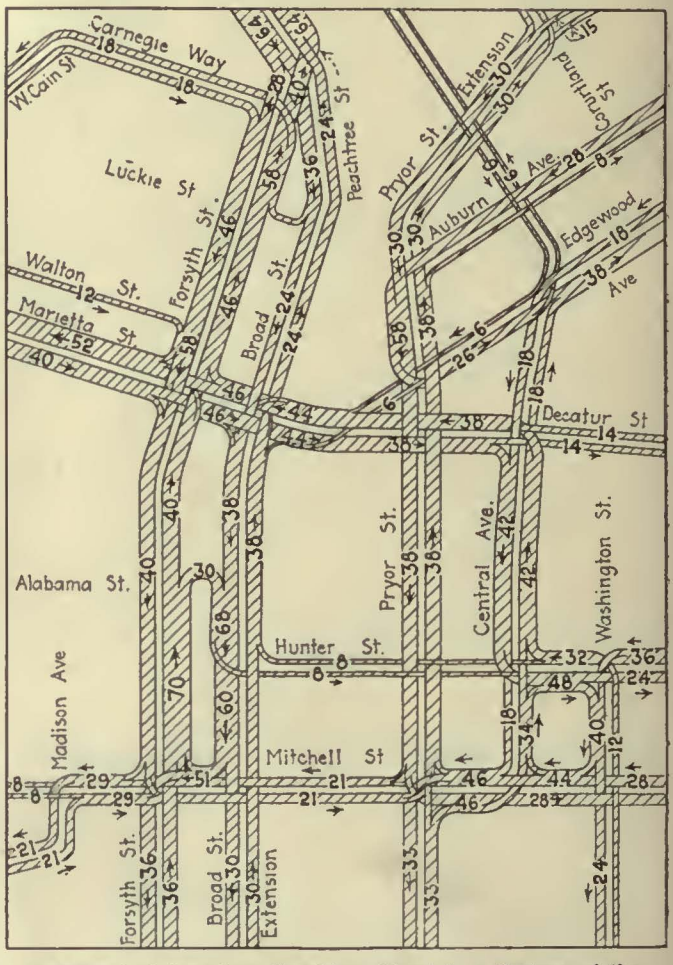
Bus Routes of Co-Ordinated Service Plan Prepared for Atlanta by the Beeler Organization

Of the total of 80,000,000-odd revenue passengers, the jitneys carry 7,750,000, or nearly 10 per cent. They are all revenue passengers and largely short riders, leaving to the railway 20,000,000 free transfers, the long-haul riders, and the problem of caring for the rush-hour maximum demand.

Increasing concentration of traffic in the business district presents another phase of this problem. Within the last 5 years the number of motor vehicles has increased practically threefold and is still climbing.



Present Car Routing Is Responsible for Many Turning Movements in the Congested District



Removal of Cars from Peachtree Street Is a Feature of the Proposed Routing Scheme

Checks showed that of the total vehicle traffic during the evening rush hour on Houston Street at Peachtree, one of the most congested corners in the city, one-fourth was jitney traffic.

The relative value of the street car for handling public transportation as compared with the jitney including the buses, as now operated, is shown in the following tabulation, which gives the approximate number of street cars and jitneys entering and leaving the central business district on a typical weekday during the peak of traffic, from 5 to 6 p.m.:

RELATIVE RUSH-HOUR TRAFFIC ON CARS AND JITNEYS

	Street Cars	Jitneys
Number of units	346	623
Passengers	16,286	2,260
Passengers per unit	47.1	3.6
Per cent of units	36	64
Per cent of total passengers	88	12

During the maximum hour there are already 80 per cent more jitneys in the central district than street cars. They carry only 12 per cent of the revenue riders, however, while the street cars carry 88 per cent. Were all these riders accommodated by street cars exclusively, the number would have to be increased by 48 per hour, bringing the total up to 394 cars per hour. Were conditions reversed and jitneys used exclusively, the report says that the number required would be 5,150 per hour, or more than eight times as many as now.

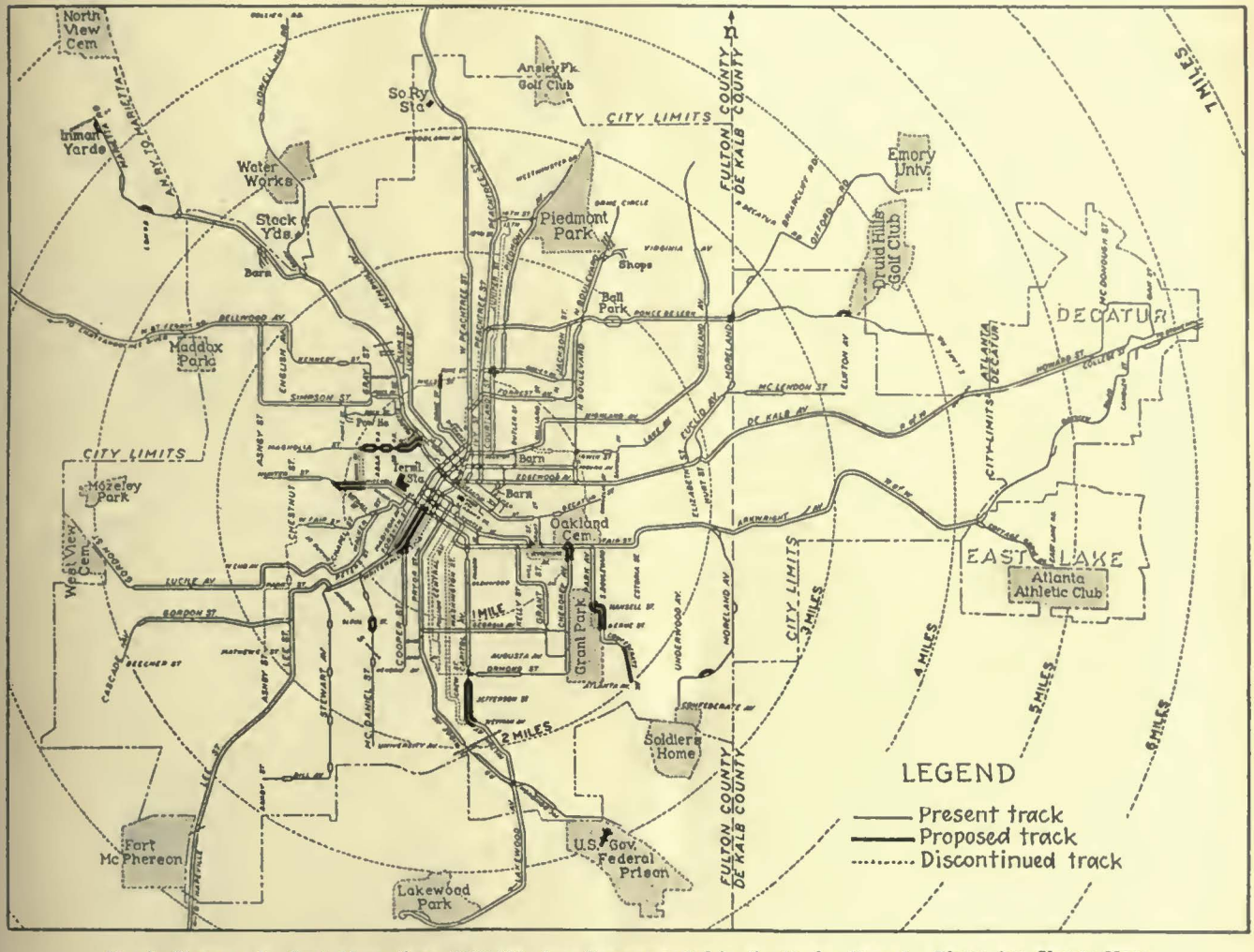
While the total mileage of the railway is but 40 per cent more than that of the jitney, it transports 10 times as many revenue passengers and is giving 529,000,000 seat-miles annually against 50,800,000 for the jitney. The speed of the jitney, viz., 12.85 m.p.h., is the greatest advantage it affords the patron; it is 37 per cent faster than the railway, and results in an average saving of about 4 minutes per ride.

Any appreciable increase in the number of jitneys operated, however, will slow the speed on account of the increased congestion. The speed of the jitneys at present is about the same as that of the street cars. On two lines the buses average respectively 9.2 and 8.9 m.p.h. With the improvement in schedules and routing of the car lines as proposed in the report it is estimated that the speed of the railway service will be raised from 9.37 to 10.32 m.p.h., which will tend to minimize the present difference.

The average length of ride of each revenue passenger is 3.40 miles on the railway and 2.11 miles on the jitney, which results in receipts at an average rate per mile of 1.99 and 4.26 cents, respectively. The jitney rate is therefore 113 per cent higher than the street

railway fare, based on the average length of ride of the patrons of the respective services. If the railway charged the same rate per mile that the jitney rider now pays, the railway would receive 14.48 cents per revenue ride. These figures are based on the average distance actually traveled by the revenue passengers and represent the actual transportation requirements of the community regardless of trip length of either car or jitney.

The report emphasizes the fact that jitney operation has no place in any real transportation plan and should be eliminated forthwith. Until this is accomplished, no improvement in or expansion of the transportation facilities of the community is practicable.



Track Changes to Cost More than $500,000 Are Recommended in the Beeler Report. These Are Shown Here

Proposed Rerouting of Cars

Another step in the direction of improving transit facilities is to reroute a number of car lines. At present the railway operates 23 city lines, of which 16 are through lines; the other seven turn back in the business district. A number of the lines extend beyond the present city limits; in fact, five of them are suburban. The number of cars passing along the various streets in the business district during the peak hours of the evening rush, given in an accompanying map, shows the multiplicity of turning movements at many of the busiest corners, and unbalanced traffic on some of the most frequently used streets.

A change in routing, as indicated on another map, will tend to bring about an equalization of car traffic on the main business streets, enlarge the delivery area in the downtown district, minimize the turning movements on the heaviest traffic thoroughfares and provide for faster and more economical operation. In the proposed plan the through-routing feature is retained and communities of mutual interest connected wherever practicable. A number of routes are rearranged in order to obtain better balancing.

A general simplification of the railway movements will be had while retaining for all routes easy access to the entire business district. Peachtree Street below Luckie will be left open to vehicular traffic only, thereby making three through streets, out of the seven from Spring to Washington, exclusively for such traffic. This should greatly facilitate the movement of all traffic and provide a purely vehicular thoroughfare in the center of the city.

In order to obtain preliminary relief, the Pryor Street viaduct, described in ELECTRIC RAILWAY JOURNAL for Jan. 24, must be constructed first. A temporary plan for relief can be instituted immediately thereafter. The final plan cannot be instituted in its entirety until both the Pryor Street and the Central Avenue viaducts are completed and the Pryor and Broad Streets openings made. All of these important improvements are included in the list of civic improvements mentioned in this paper last week.

As a result of the various routing changes, operation

will be discontinued on some 19.22 miles of track, while 7.82 miles of new track must be built. These items are summarized below:

NEW TRACKS TO BE BUILT IN ATLANTA

18,000 ft. of straight track and 5,740 ft. of special trackwork inside of business district	$305,055
14,985 ft. of straight track and 2,500 ft. of special trackwork outside of business district	200,553
Total	$505,608

Some of the track abandoned is due for replacement soon, so the expenditure does not all represent the cost of the revised plan.

Many other service readjustments are recommended for adoption along with the new routing. At present an average of 5.6 stops per mile is actually made during the middle of the day, and 7.2 stops per mile in the heaviest direction during the rush hour. Within the 7-mile zone, which includes the suburban territory, the stops average 492 ft. apart, or 10.7 per mile. In the suburban territory the stopping places average about 8.4 per mile, and in the city about 11.5. Stop locations should be rearranged, the report states, in such a way that the average spacing will be about 650 ft.

Street car stops should be marked by distinct signs. This will avoid any confusion on the part of the patron as to the exact location of the stop. At heavy loading points where traffic stanchions or raised platforms are employed other signs are not necessary. Elsewhere, however, the trolley poles can be painted with light yellow bands about 3 ft. wide and having the sign "Car Stop" indicated thereon in black letters. This inexpensive and effective marking is visible at a distance, and instantly guides the patron to the stopping place.

At present on some single-track sections stop signs are placed on only one side of the street. This is confusing as the patron is apt to infer that there is another location for the stop in the other direction. To make the location more definite, a sign should be placed at every stop in each direction. Positive stops should be marked by signs suspended from the span wires. When the same location serves as a passenger stop and a positive stop, both signs should be displayed.

The extended use of the private automobile has emphasized the desirability for higher railway speeds wherever practicable. The jitney bus, unsafe and unreliable as it may be, secures considerable business by reason of its greater speed. At present, Atlanta's street cars make on an average only 9.36 miles per car-hour. Smoother traffic movements in the business district, the elimination of superfluous stops, double tracking of single-track lines now operating with short headways, wider entrances and exists, etc., will all be beneficial factors in speeding up the service. It is estimated that with these changes in effect the average speed can be brought up to at least 10.32 car-miles per car-hour, which is an increase of 10 per cent.

Regularity of service and even headways are of prime importance. If there is travel only sufficient to warrant a 15, 20 or 30-minute headway, patrons know when the car is due and they can readily adjust their movements to take a given car, but with cars running off of schedule, or on a schedule where odd headways are employed, such as 9, 14 or 17 minutes, it is very exasperating as patrons cannot readily calculate when a car is due. Car lines that are too close to each other frequently make it necessary to dilute the service. Often the public would be much better served with one good line on a frequent headway than with two or more poor ones with infrequent headways. Discontinuance of some duplicate track is recommended to permit an improvement of headways on a number of lines.

A comparison of the total daily scheduled car-miles and car-hours present and proposed is as follows:

SUMMARY OF MOTOR AND TRAILER OPERATION

	Present	Proposed
Motor Cars:		
Car-miles	38,361	36,959
Car-hours	4,114	3,593
Car-miles per car-hour	9.33	10.29
Trailer Cars:		
Car-miles	986	1,851
Car-hours	92	166
Car-miles per car-hour	10.69	11.15
Total Cars:		
Car-miles	39,347	38,810
Car-hours	4,206	3,759
Car-miles per car-hour	9.36	10.32

Under the proposed plan practically the same number of car-miles will be operated daily, viz., 38,810 against 39,347, but with a reduction of 447 car-hours daily. Additional trailer operation to the extent of 74 car-hours daily will replace motor car operation. This assists in obtaining a large proportion of seats with a minimum cost of operation. Approximately 100 car-hours added to the schedules proposed in this plan would give ample and satisfactory service to care for the additional patronage, if jitney operation were discontinued. On several lines the report recommends the establishment of one-man operation.

As a result of the changes recommended, there should be a marked increase in the net earnings of the railway. A comparison of the annual operations under the present and proposed plan follows:

FINANCIAL RESULTS OF PROPOSED CHANGES

	Present Operations	Proposed Operations
Operating revenues	$5,057,704	$5,274,704
Operating expenses	$3,827,346	$3,330,646
Taxes	340,000	282,300
Renewals and retirements	374,000	450,000
Total operating deductions	$4,541,346	$4,062,946
Net earnings	$516,358	$1,211,758
Operating ratio, per cent	89.7	77.0

Co-ordinated Bus Service

With competitive jitney operations effectively controlled, a co-ordinated system of railway and bus operation should be inaugurated, the Beeler report says, to serve the park, parkway and boulevard sections of the newer residential districts where the extension of car lines is not practicable. Two such districts already exist in Atlanta. One is Ansley Park and the section further to the north, including Morningside. Another district that is building up practically without car service is that along Virginia Avenue. Much of this development has been during the past year.

Immediate establishment of two bus routes and the subsequent addition of others is recommended in the report. About 15 coaches with garage and shop facilities will be required to inaugurate this system, involving an initial investment of between $300,000 and $350,000, depending upon the type of coach.

The cost of service per coach-mile was estimated for both single and double-deck types. The former type is best suited to operate on roadways with the high crown encountered in some of the residential sections.

ESTIMATED COST OF BUS OPERATION
In Cents per Bus-Mile

	Single Deck	Double Deck
Operating Expenses:		
Maintenance of equipment	7.0	8.5
Conducting transportation	13.0	18.0
Injuries and damages	1.5	2.0
General and miscellaneous	2.0	2.0
Operating expenses	23.5	30.5
Taxes	1.5	1.8
Renewals and retirements	3.7	4.7
Interest	3.3	3.8
Total cost of operations	32.0	40.8

The double-deck type, similar to that in use on Fifth Avenue, New York, would of course render an extremely popular type of service especially appreciated by the public during the fair and warm days and delightful evenings, but they would involve improvements to the roadways in numerous places. This type also costs more to install and more to operate.

A comparison of the essential financial and operating features, as estimated, based on an annual total of 735,000 bus-miles, is as follows:

ANNUAL BUS OPERATING ESTIMATES

	Single Deck	Double Deck
Investment	$300,000	$350,000
Revenue passengers	2,200,000	2,600,000
Revenue at 10-cent fare	$220,000	$260,000
Operating expenses	$173,000	$225,000
Taxes	$11,000	$13,000
Renewals and retirements	$27,000	$34,500
Interest at 8 per cent	$24,000	$28,000
Deficit	$15,000	$40,500

From the foregoing it is seen that after providing for operating expenses, taxes, renewals, and a return on the investment, a deficit of $15,000 for the single and $40,500 for the double-deck type may be expected. In fact, if the organization does as well as this for the first year or so while the coach system is in the process of development, it will do better than similar enterprises have done elsewhere. Little or no additional overhead expense need be incurred in the operation. Harmonious co-ordination of the services will be readily established and an interchange of passengers by transfer will be possible.

Not a Picture of the Eclipse

THE accompanying diagram is not a series of pictures of the eclipse of Jan. 24, but a chart reproduced from the January issue of the *Journal of Land and Public Utility Economics* and from an article by Herbert E. Simpson on the taxes borne by the public service industry. This particular chart presents pictorially for a number of years the ratio of taxes of

Circles represent corporate net income as 100% ▲=Ratio of taxes to corporate net income

Diagram Showing Increase in Electric Railway Taxation

electric railway companies to their corporate net incomes. It is based on census figures which show that during the last 20 years, while the gross receipts of the electric railways have almost exactly quadrupled, the expenses and the taxes have increased almost exactly five times. In consequence, in 1922, the taxes for all of the electric railway companies in the United States had become 53 per cent of all income, after expenses and charges, or more than corporate net income.

Campaign to Reduce Accidents

Boston Elevated Begins a Course for Platform Men Under Direction of Claims Department—Weekly Talks Sent to All Transportation Employees

A NOVEL method of getting the principles of accident prevention to the 3,900 men of its transportation department is being used this winter by the Boston Elevated Railway. A series of papers, prepared by the claims department staff, are being sent weekly to the men's homes. These papers are written as reports of meetings, presided over by General Manager Edward Dana, assumed to have been held just previously. The report form is used because it is both novel and interesting. In each "report" the "speaker" presents his "talk" and then answers questions which members of the audience are supposed to have asked.

The first "report" was that for Jan. 7, and the program of "talks" as announced in a preliminary bulletin sent to the men is as follows:

"Accident Prevention," by Russell A. Sears, general claims attorney.

"What Claims and Suits Against the Railway Mean to the Public and the Railway," by Maurice P. Spillane, attorney.

"Accident Reports," by John J. Reynolds, claims attorney.

"Obtaining Names of Witnesses," by Michael F. Doyle, chief investigator of claims.

"Boarding, Alighting and Falling Cases," by E. F. Livingston, chief investigator of litigated claims.

"How Accidents Are Paid For," by David F. Lee, chief clerk claim department.

"A Few Things I Have Heard in 25 Years in the Claim Department," by Mary F. Donnelly, head stenographer claim department.

"What the Original Accident Looks Like in Court," by Rupert L. Mapplebeck, trial attorney.

A feature to stimulate interest in the "talks" is that the company has offered during May to give such employees as desire to do so the opportunity to take an examination on their contents. The two employees in each division who in the opinion of the judges pass the best examination and whose accident record since Jan. 1 has been meritorious will be suitably rewarded. The company has announced that, in the examination, handwriting will not be counted, nor will the style be considered. The criterion will be the knowledge of the subject and the common sense shown in the answers to the questions.

In the first "talk," Mr. Sears pointed out the great care required to avoid accidents in the crowded streets of the present-day city, and that under the Massachusetts law a trolley car has no superior right of way over other vehicles on the street. Hence, the ringing of a gong is simply a warning, not an order. He touched on the special care needed to avoid accidents to children and the duties of the conductors in regard to closing car doors.

In the second "talk," given by Mr. Spillane, the speaker explained why every accident presents a possibility of a claim, and he gave statistics of the accidents, claims, damages, etc., of the company during the past 2 years and what these claims meant in the way of fares paid.

In the "address" of Jan. 21, John J. Reynolds emphasized the importance of reporting all accidents "promptly, accurately and fully," getting all the witnesses possible.

These "talks" are the outcome of a meeting of several hundred transportation department men held last year.

Track Machinery Combined Into a Single Unit

By Mounting Its Cutting, Welding and Grinding Equipment on an Automobile Trailer, the Eastern Massachusetts Street Railway Has Made It Possible for Fewer Men to Complete Reconstruction Jobs in Shorter Time

THE construction by the Brockton division of the Eastern Massachusetts Street Railway of a trail truck to carry various pieces of track machinery that were formerly transported as separate units has increased to a marked extent the efficiency with which construction jobs are done. For the installation of special work or the rebuilding of short sections of track a number of different machines are required. Plate welding requires two men and one machine. Surface welding and grinding require other men and more machines. Moreover, when switches, frogs or mates are installed, it is frequently found that compromise joints, or plates, do not fit and it is then necessary either to send them to the nearest shop or to take an oxyacetylene outfit to the job.

To reduce the waste of time and avoid duplication of movement, the railway has combined cutting torches, surface welders, surface grinders and a seam-welding outfit into a single unit. This is a 3-ton trailer which is operated by one man and his helper. When not actually welding or grinding at welders' wages of 60 cents an hour, these men are working at laborers' wages of 50 cents an hour. Two men and this single unit are now able to do the work which formerly required five men and four different kinds of equipment.

The two tanks for the oxyacetylene cutting outfits are carried on the rear step of the trailer. Sufficient hose is provided to reach any rail of double track while the vehicle remains near the curb. Welding apparatus is carried on the back part of the trailer while a universal grinder is located on the forward part. A box has been provided for the welding apparatus so that it can be lifted off the trailer platform if needed for use elsewhere. The equipment is a standard General Electric welding machine with a reverse polarity switch, so that it can be used also for surface welding.

Between the welding apparatus and the oxyacetylene tanks a smaller box has been provided for tools. All

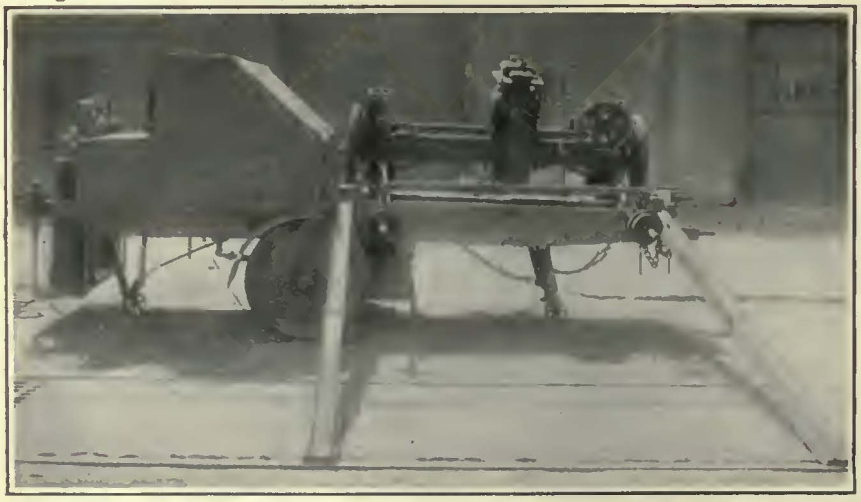
One Man Can Raise or Lower the Universal Grinder to the Street by Means of a Crank Windlass. Note the Struts to Keep the Trailer in a Horizontal Position

track tools that might be needed on a small job can be carried in this box. It is of sufficient size to hold comfortably a Jackon tie-tamping outfit. Another smaller tool box for the operator's hand tools is swung beneath the trailer.

The front platform has been lengthened to provide room for a Universal chain-driven grinding machine. Inclined skids permit the grinder to be rolled down to the ground and up onto the platform. When not in use the skids are carried lengthwise under the body of the vehicle, as shown in an accompanying illustration. A crank windlass has been installed so that this heavy machinery can be raised and lowered by one man.

A spring drawbar connects the trailer to the motor truck. Safety chains prevent any possibility of accident should the drawbar break. At each end of the platform there is a strut which keeps the trailer in a horizontal position after it has been detached from the motor truck. Wheel chocks are provided to hold the trailer when it is necessary to stop on a grade.

For small jobs the trailer can be moved easily by hand. The struts have small wheels at their lower end to facilitate these movements. When it is necessary to move the vehicle more than 200 or 300 ft., the struts are pulled up out of the way and the trailer is moved by motor truck.



This Trail Truck Has Been Designed by the Eastern Massachusetts Street Railway to Carry All the Machinery Needed for Small Track Construction Jobs

Oxyacetylene Welding Tanks Are Carried on a Rear Step. The Skids Are Carried Lengthwise Underneath the Platform

I. T. S. Builds Articulated Locomotives

Eighty-Ton Freight Units Are Designed to Operate Around Short Radius Curves—By Using Eight Axles, Wheel Loads Are Kept Low—Passenger Car Motors Used with External Blowers

TO HANDLE its increasing freight business, the Illinois Traction System has recently put into service the first of a group of six new articulated locomotives that include some very novel departures from current practice. These locomotives, which were designed by the company's engineers and built in the Illinois Traction System shop at Decatur, Ill., weigh 80 tons each, have eight driving axles and will negotiate a 35-ft. radius curve without any difficulty.

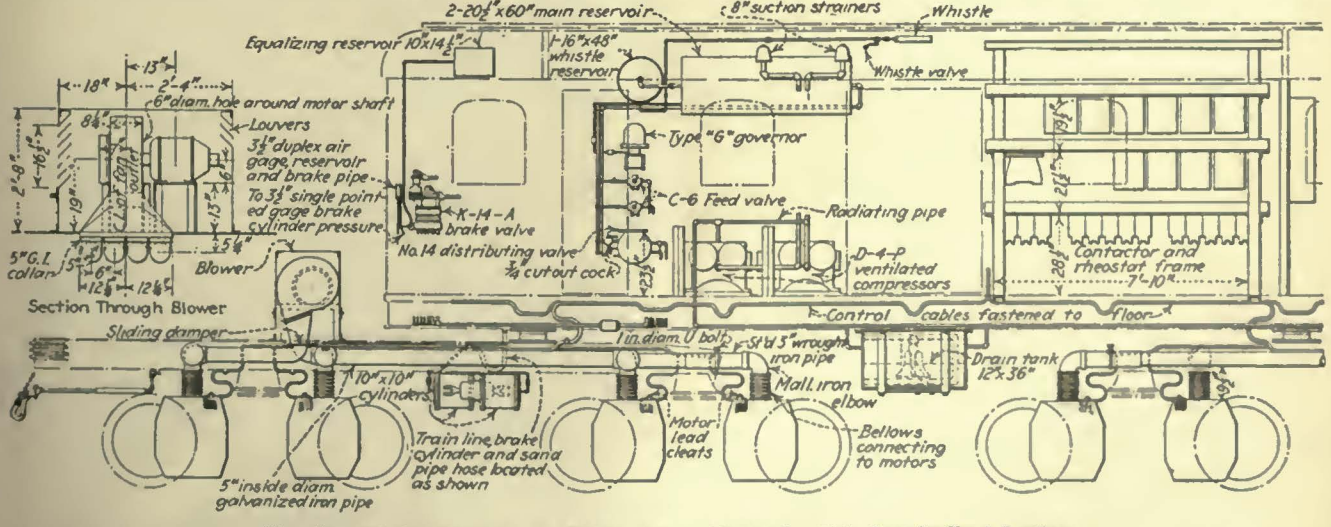
This combination of features is made possible by the articulated construction. Operation over tracks in city streets in many of the communities served by the company made it important to provide a locomotive unit that would successfully negotiate sharp curves. Increase of the weight to 80 tons was dictated by the advisability of hauling longer trains of freight. At the same time, however, there was the problem of operating a unit of this size over 70-lb. rail and the light bridges at some locations on the property. By the use of the articulated construction the weight is distributed to eight driving axles, thus making the wheel loads less than those on older locomotives of smaller capacity. The load per wheel is only 10,000 lb.

Six New Locomotives of This Type Are Being Built by the Illinois Traction System in Its Decatur Shops

The main body frame is carried on two sub-frames so as to give an articulated construction that makes it possible to operate this 80-ton unit around a 35-ft. radius curve in city streets without difficulty.

External Blowers for Motors

Another interesting feature is the use of external blowers to increase the capacity of motors that had been in service on passenger equipment, so as to make them suitable for use under the locomotives. These are GE-73-C-8 motors, having a nominal rating of 75 hp. with 17-73 gear ratio on 33-in. diameter wheels, and the locomotive design was worked out with a view to using these motors in freight service. At the same time, the comparatively small wheel loads on the locomotives made it possible to use the trucks from these cars as well as the motors. This plan was considered to have two advantages; first, by finding a method of utilizing motors and trucks that had been in service under old and heavy passenger cars, it was possible to make room for new modern passenger equipment without scrapping these motors and trucks, which although



The General Arrangement of Equipment Is Shown by This Longitudinal Section

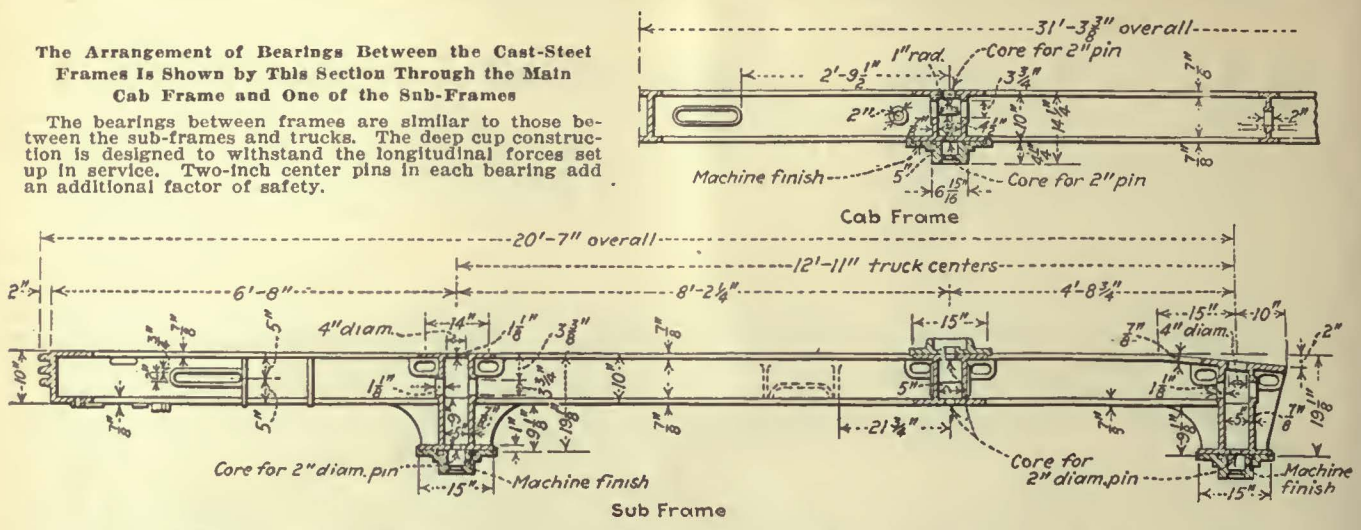
Blowers on each platform force cooling air through the rebuilt passenger car motors, increasing their capacity so as to make them suitable for freight service.

The air is transmitted from each blower through sheet metal ducts to the corresponding four motors at that end of the locomotive.

Connection from the ducts to the motors is made through flexible bellows, to permit the necessary movement on short radius curves.

The Arrangement of Bearings Between the Cast-Steel Frames Is Shown by This Section Through the Main Cab Frame and One of the Sub-Frames

The bearings between frames are similar to those between the sub-frames and trucks. The deep cup construction is designed to withstand the longitudinal forces set up in service. Two-inch center pins in each bearing add an additional factor of safety.

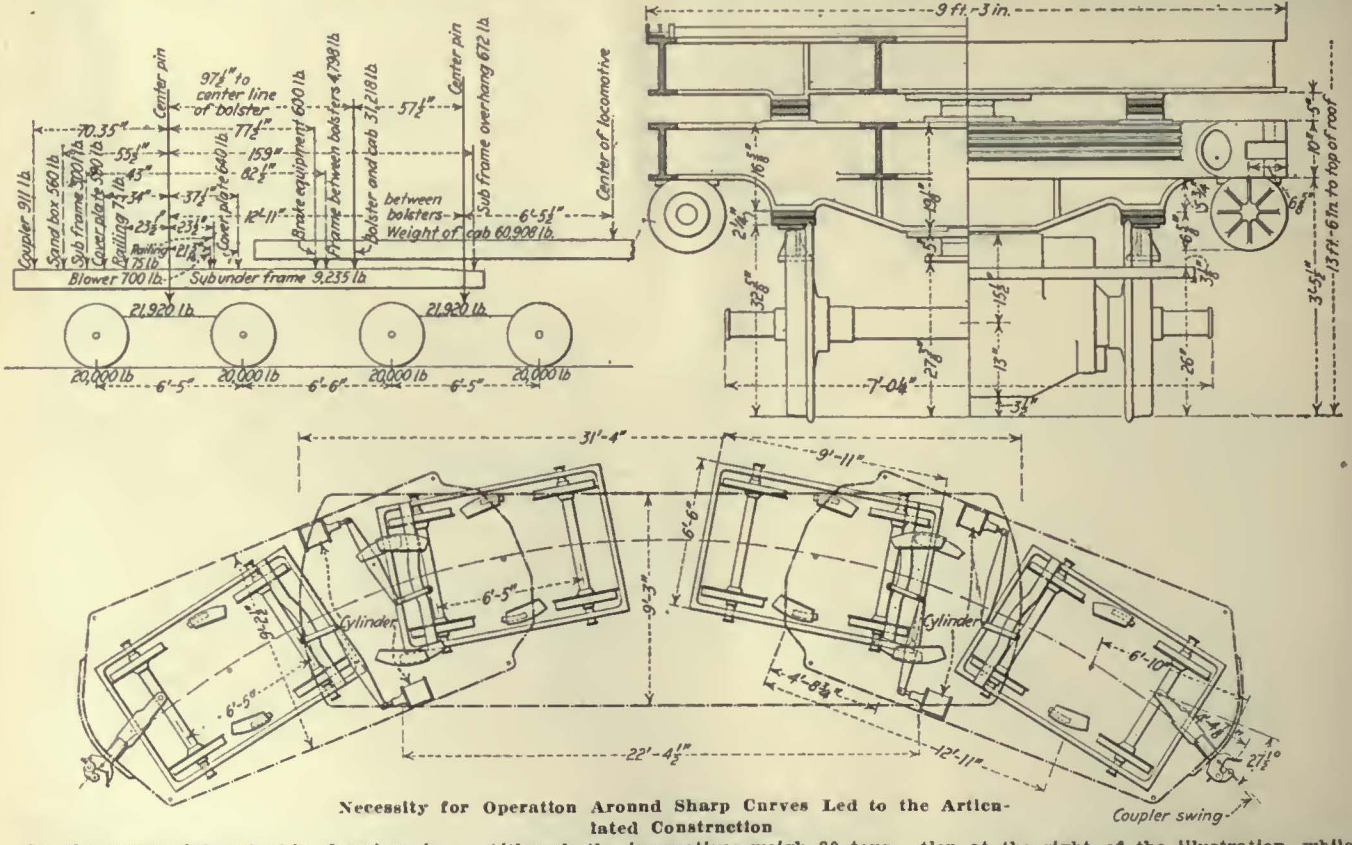


heavy for passenger service were in good condition and were completely overhauled before installation on the locomotives. In the second place it was considered a much simpler matter to apply forced ventilation by external blowers to a freight locomotive than would be the case on passenger cars.

In the articulated design as finally developed, the main cab frame is carried on two sub-frames, each of which in turn is mounted on two trucks, thus making four trucks and eight motors under the complete unit. The bearings between the main cab frame and the sub-frames are similar to those between the sub-frames and the trucks. They are of a deep cup type, as shown in the accompanying longitudinal section through the center line of the frames. These bearings are liberally designed to take the maximum end thrusts developed and are provided with 2-in. center pins.

Both the main cab frame and the two sub-frames are made of one-piece steel castings. These are excellent examples of high-grade steel foundry work, because of the large over-all dimensions and comparatively light sections. They were made by the Commonwealth Steel Company of St. Louis. The three frames forming one complete unit are shown in an accompanying illustration.

To obtain the necessary weight, the main cab frame is filled with ballast consisting of concrete and iron punchings. This is supported by ¼-in. boiler plate, put in buckle-plate fashion and resting on the lower flanges of the I-beam sections of the casting. In the completed locomotives, the top of that portion of each sub-frame which extends beyond the cab is covered with ¼-in. diamond checked floor plate. This is riveted to the cast-steel frames, and the seams are then welded together.



Necessity for Operation Around Sharp Curves Led to the Articulated Construction

In the upper left of this drawing is shown a load distribution diagram, arrows indicating center of gravity of equipment named.

Although the locomotives weigh 80 tons, the load per axle is only 20,000 lb., or 10,000 lb. per wheel. Vertical clearances above the rail are shown in the cross-section at the right of the illustration, while the position assumed on a curve by the frames and trucks is shown in the drawing below.

The bearings between the cab frame and the sub-frames are located so as to give equal distribution of weight to all wheels. The main frame weighs 11,000 lb. and each sub-frame weighs a little more than 9,000 lb. With the cab and apparatus mounted, and with ballast, the complete body weighs 60,908 lb. It will be noted from the illustrations that the bearings on the sub-frames are 1 ft. 8¾ in. inside the center line between the trucks at each end, in order to balance the overhang of the sub-frames and the apparatus mounted on them.

Four Trucks Equally Spaced

The locomotives are 52 ft. 5 in. long over the bumpers. Bearings between the main frame and the sub-frames are spaced 22 ft. 4½ in. apart, and all four trucks are equally spaced on 12-ft. 11-in. centers. The cab is 31 ft. 4 in. long, 9 ft. 3 in. wide, and 13 ft. 6 in. high from the rail to the top of the roof. With 33-in. wheels, the top of the sub-frame at each end is 4 ft. 3½ in. above the rail, and the distance from the rail to the top of the cab frame is 5 ft. 6½ in. Side bearings on the trucks and between the main and sub-frames are of the plain rub-plate type. Accompanying illustrations show the heights of the various parts above the track, and also the position assumed by the trucks and sub-frames on a curve.

Two blowers supply the ventilating air to all eight motors. Each of these is a Sturtevant single-width, single-inlet, multivane fan, delivering approximately 300 cu.ft. of air per minute to each motor. They are mounted in sheet metal housings, one on the platform at each end of the locomotive. These housings are provided with deep louvers designed to prevent rain or snow from being drawn in with the cooling air. The air is delivered through slide dampers to 5-in. round galvanized sheet-metal ducts, a separate duct being provided from the fan housing to each motor. Malleable-iron elbows connect these ducts with flexible bellows, approximately 10 in. long, at each motor. The general arrangement is shown in the accompanying drawing which is a longitudinal section through the equipment.

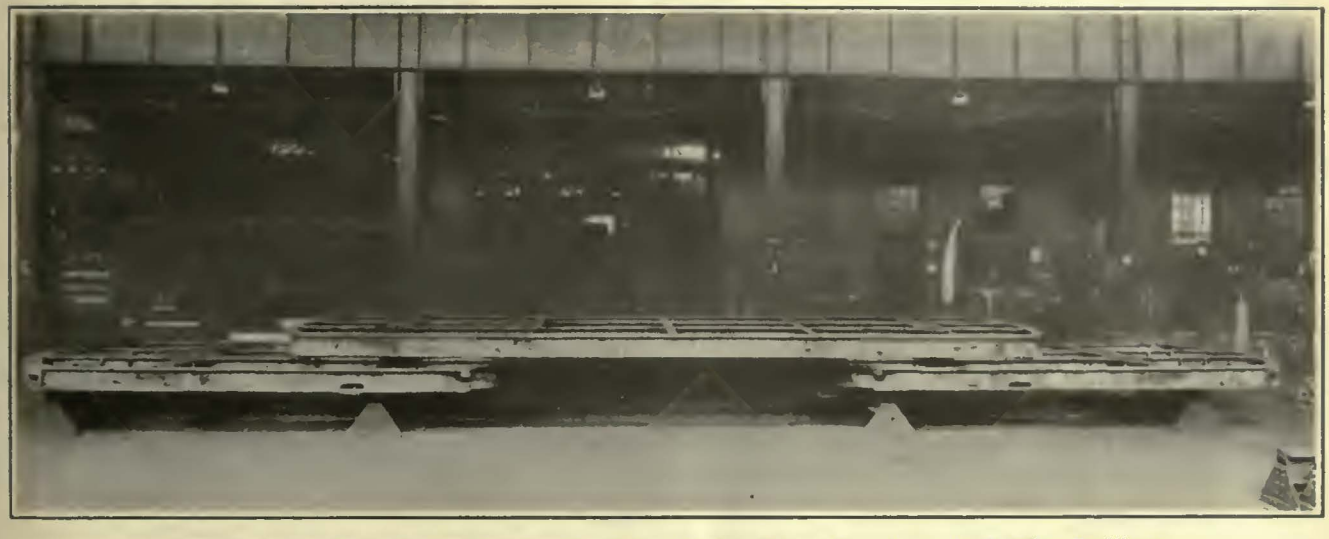
The blowers are driven by 3-hp. motors mounted inside the housings. These are designed for operation at 2,000 r.p.m. on 600 volts, and are connected directly to the line with no starting resistance. It is estimated from tests that the safe capacity of the motors is increased to 125 hp. on a 1-hour basis without excessive temperatures, as a result of the ventilation supplied by the blowers.

Multiple-Unit Control

General Electric type-M multiple-unit control is used. This includes a C-6 controller at each end of the locomotive, with type 13-DB-41 contactors and one DB-22-B reverser for each set of four motors. Through the use of multiple-unit control, the locomotives can be connected together to haul loads in excess of the capacity of a single unit. The contactors are mounted in a special frame on the interior of the cab where they are conveniently accessible, and the motor cut-out switches are placed in a special panel box built at one end of the contactor frame.

Compressed air for brakes is supplied by two D-4-P Westinghouse ventilated type 50-cu.ft. compressors. The complete air-brake equipment is Westinghouse 14-EL type. One 10-in. x 10-in. brake cylinder is provided per truck, making four cylinders in all. These are mounted on opposite sides of each sub-frame and are connected to their respective trucks by a single lever and short pull rod, arranged so as to allow the trucks to assume their proper positions on a curve. Hose connections between the air pipes on the main frame and those on the sub-frames, including the brake cylinder pipes, allow the necessary movement. Check valves are arranged so as automatically to cut off the air to any given cylinder in the event of a ruptured hose at that cylinder, thus insuring operation of the three other cylinders.

When it became apparent that increased freight business made it very desirable to handle longer trains, substation capacity was found to be a limiting factor. On the main division out of St. Louis, between Granite City and Staunton, Ill., 300-kw. stations spaced 10 miles apart were in service. Seven additional stations of 1,000-kw. capacity each were added on this division, making the spacing between stations 5 miles instead of 10.



The Three Cast-Steel Frames for One Complete Unit Are Shown Here in Their Relative Positions

Large over-all dimensions and comparatively small sections made a difficult steel foundry problem. The castings for all six locomotives were made by the Commonwealth Steel Company of St. Louis.

Track Reconstruction Speeded Up by Using Mechanical Ties

Dayton City Railway's Standard Method of Construction Includes a Longitudinal Support Under Each Rail—Concrete Foundation and Paving Is Poured in One Operation

By T. E. Howell
General Manager the City Railway, Dayton, Ohio

FOUR miles of equivalent single track was recently rebuilt on West Fifth Street, Dayton, in what is considered to be a remarkably short time. The method of construction which the City Railway used on this job is the standard which has been in use by this company for several years. The plan is extremely simple and it seems to distribute the strength of the track foundation so as to support adequately those points where the greatest strength is needed and to save construction cost where such strength is superfluous.

The rail used is Lorain 7-in. high T, and 8-hole fishplates are arc welded to the base of the rail. The base of the rail at the joint is welded to the top plate of the joint tie. The pavement is brick upon a 6-in. concrete base with a 1-in. sand cushion between the brick and the concrete. The total excavation for the pavement is 11 in., of which 4 in. is for brick, 1 in. for sand cushion and 6 in. for concrete foundation.

In the older type of construction of wood ties on 8 in. of gravel ballast which was formerly used, the excavation required was 7 in. for the rail, 6 in. for the ties, 8 in. for the ballast beneath the ties; a total of 21 in. in depth or 10 in. below the paving excavation. This required about 315 cu.yd. of excavation per 1,000 ft. of track. By digging a trench 5 in. deep and 18 in. wide under each rail and using Dayton mechanical ties with a cushion feature to protect the concrete, an efficient track foundation is secured with the use of 46 cu.yd. of excavation and concrete, as compared with the much larger quantity required by the former method. A cross-section of this roadbed and the tie spacing are shown in accompanying drawings.

The operation of placing the ties is very rapid. The rails are blocked up on sections of the old wood ties. The foreman marks the rails to guide the men in spacing the ties, and every fifth tie is then hung to the rails and the latter brought to the correct gage at these points. The intermediate ties are then hung to the rails with great rapidity. The work of pouring the concrete is done in the same operation with the pouring of the concrete for the paving foundation.

This Track Built with Dayton Mechanical Ties Has Stood Up Well Under Heavy Traffic for Seven Years

To do this work with the least possible delay to traffic, the 2 miles of double track was divided into six sections. When the steam shovel completed the excavation of one section, it moved to a section at the other end of the opposite track. Thus it was possible to continue the trackwork and the movement of cars without serious interruption while concrete was setting.

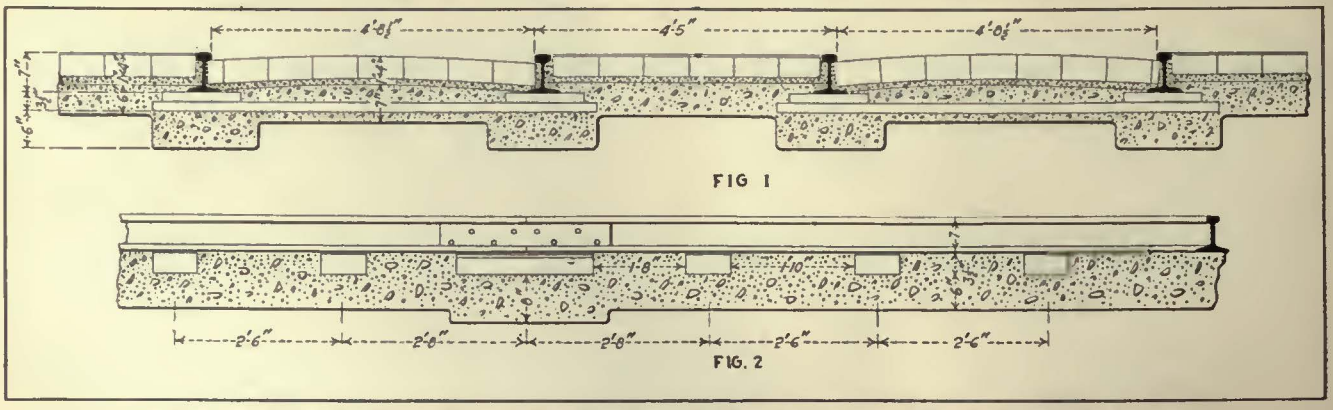
The first construction of this type has been in use by the City Railway since 1917, under the very heavy traffic. Both the Fifth Street and Kammer Avenue divisions operate 20-ton double-truck cars on a 5 to 7-minute headway. Track and pavement are still in good condition as shown above.

Weekly Bulletin from General Manager Goes to Every Beaver Valley Employee

WITH the object of instilling the idea of courtesy in the minds of all the trainmen, the general manager of the Beaver Valley Traction Company, New Brighton, Pa., sends out a weekly bulletin. This practice was begun last spring and was continued for 15 weeks. Then after an interval a second series was started on Oct. 3.

These bulletins are sent to all employees through the United States mail on Friday of each week. The names of many local people, such as the secretaries of chambers of commerce and managers of industrial plants, are included on the mailing list.

A favorable reaction from the bulletins has been noted. There is no unit by which this can be measured except that the managers of industrial plants think that the effort to inspire ideals among the employees is a good one. Neither can the absorption of an idea be measured, but at some time in the future life of the



The Standard Track Structure of the Dayton City Railway Has a Longitudinal Support Under Each Rail

individual the increased mental activity produces results. It is the intention to continue these bulletins for several weeks more and then to have a two or three-month intermission. Some other project will be under way prior to the cessation of the bulletins to take the place of and augment the previous endeavors.

Among the interesting items contained in these bulletins are the following:

When in doubt, lead a trump. This refers to business as well as to cards.

Words are like cards—and the kind words are trumps.

You might have a dispute on your car and be in doubt as to how you are going to get out of it. Lead a trump (a kind word) and, nine times out of ten, you will take the trick.

Diplomacy is a habit, but it requires thought. The only difference between the blunderer and the diplomat is that the latter thinks.

When your wife asks you, "Who is the prettiest woman on the dance floor?" be a diplomat and don't rubber around the room.

4 THOUGHT

It's easy 2 C, but hard 2 4 C.
But that is no reason why we should not try to foresee.

Increasing the Speed of Car Loading at Terminals

Studies Made by Detroit Department of Street Railways Indicate Waste of Time in Boarding and Point Way to Modification of Car Entrances

BY H. S. WILLIAMS
Assistant Superintendent of Equipment, Department of Street Railways, Detroit

IN THE handling of traffic in cities, one of the prime factors in car design is the speed with which the car may be loaded. If the loading feature is properly cared for, this automatically takes care of unloading, as unloading is rarely complicated with fare collection. There are many factors entering into this problem, such as height and width of steps, size of loading platform and system of fare collection.

In Detroit we have several types of cars in operation and varying loading practice. In standard car types, we have the prepayment car with 32 sq.ft. of loading platform available. On this loading platform is an exit door which is often utilized as an extra entrance door near the starting terminal of the line. The standard trail car is center entrance and has but 8 sq.ft. available for loading space, though on this type of car the front exit door is also made use of for entrance near terminals and heavy loading points. Then there is the Peter Witt type car with large double-entrance doors and the front half of the car available as a loading platform, and finally the one-man single-truck car with but one door for both entrance and exit.

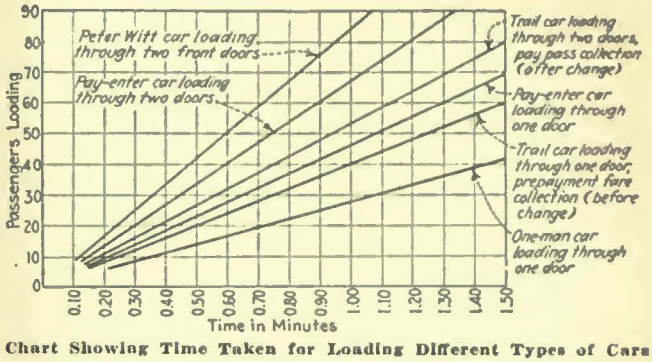


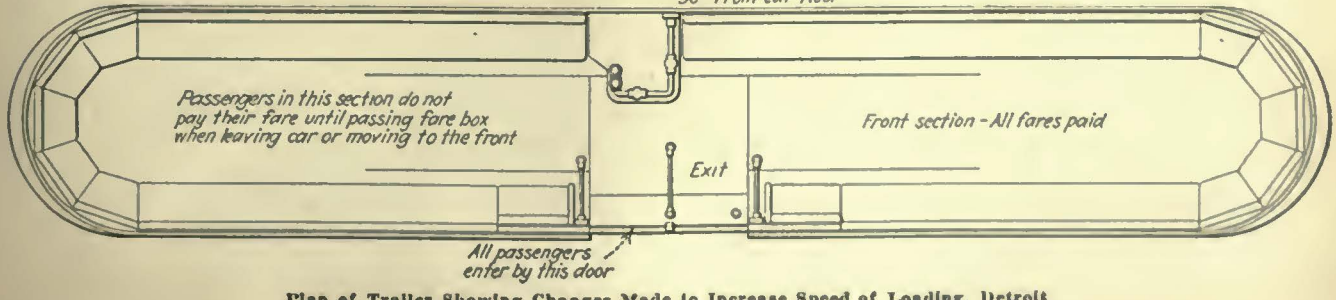
Chart Showing Time Taken for Loading Different Types of Cars

While there is an apparent difference in the loading efficiency of these various types of car the exact relation was unknown, and in order to establish this ratio a large number of time studies were made and the results plotted. From these plotted points lines were drawn, as shown in the graph presented herewith. In these studies the boarding time only was taken, as the principal factor being studied was loading speed in the congested areas with a view to improving this condition. The time consumed in opening and closing of doors was disregarded, as that element is a problem by itself. Observations were made also with small numbers of boarding passengers for the purpose of plotting a curve and establishing a ratio of the loading efficiency of the various types of car, as this factor would naturally have an effect on future car design.

Following this investigation, steps were taken to improve existing conditions on the trail cars and one-man cars. A few trail cars were changed so as to permit free entrance to the rear half of the car, as shown in the accompanying diagram. Passengers in this type of car pay their fares when they pass to the paid section of the car. This car has not been in service long enough to secure the full benefit of this arrangement, as the riders are not fully accustomed to it and there is still some confusion. However, the result has been to speed up loading. The comparative efficiencies of the old and new systems are shown above.

On the one-man cars another door was added at the front of the car, making an entrance and an exit door. This change has, of course, decreased the total time for loading and unloading by about 40 per cent, though the loading time considered by itself has not improved, as this depends upon the size of the loading space in the vestibule and the fare collection system.

There is still much to be done along this line of investigation to develop the highest degree of loading efficiency for city service. The height of step riser, which influences the angle at which the passenger climbs into the car, has an important bearing, as do also widths of doors, position of grab handles and number of doors.



Plan of Trailer Showing Changes Made to Increase Speed of Loading, Detroit

Upper Deck Inclosed for Winter

Removable Top for the Upper Deck of Milwaukee Buses Has Sliding Glass Windows—Roof Is Without Carlines Over the Aisle

BY J. H. LUCAS
Superintendent of Rolling Stock the Milwaukee Electric Railway & Light Company

A LIGHT-WEIGHT top has been designed by the Milwaukee Electric Railway & Light Company to inclose the upper deck on its Yellow Coach, model "Z" buses. This is so arranged that it can be easily put on in the fall and removed in the spring. A fully inclosed, removable top was preferred to semi-inclosed construction, because of the added protection afforded the passengers in the winter. The removable feature gives the passengers during the summer a chance to enjoy the warm air and view.

The upper-deck inclosure is tapered from the hand rails to the roof in order to minimize the danger of striking bridge braces, as well as to reduce the bulky appearance which straight sides would have produced. As these vehicles must operate under bridges having only 14 ft. 2 in. clearance, it was thought advisable to make the total height of the bus 14 ft., thus providing a clearance of 2 in. The height from the street level to the upper-deck floor is approximately 8 ft. 7 in. This limited the height from the top of the upper-deck floor to the under side of the roof to 5 ft. 4½ in. Framing of the top is of ash and the roof is ¼-in. Haskelite formed to shape and covered with canvas. No carlines are employed above the aisle, the roof being supported with cantilever carlines fastened to the letterboard at the sides, and tenoned into a §-in. wood stringer at the aisle ends. Five aluminum stanchions support the aisle stringers and roof. The carlines are so located that it is unnecessary for passengers to pass under them in getting into or out of the seats.

To Protect Passengers in Winter This Bus of T. M. E. R. & L. Co. Has Been Equipped with a Removable Top

Upper-deck side sash were necessarily made to slide horizontally. To keep the vehicle as light as possible, they were glazed with single-strength glass. Advertising racks are placed above the windows. Eight electric lamps of 21 cp. provide the necessary lighting for the upper deck. A small vestibule with a swinging door opens into the aisle at the head of the stairs.

In building and mounting the top, the original construction of the upper deck was retained. The new part was built complete and mounted directly upon the steel hand rail of the bus, to which it is secured by bolts. Screening below the upper-deck hand rail was removed and replaced by permanent aluminum sheeting. Although no effort is made to heat this upper deck, it is more comfortable in the winter than is the uninclosed upper deck and serves to take care of the overflow in rush hours.

Billboard Advertising Changed Monthly*

ON ACCOUNT of the fact that steam railroad service is available to many of the patrons of the San Francisco-Sacramento Railroad, it has been necessary for this company to go more extensively into the matter of advertising than would ordinarily be the case. A large volume of passenger traffic between the cities of San Francisco and Sacramento has been built up during the last few years. The management believes that the use of billboard advertising has been instrumental in accomplishing this result.

The billboards are 10 ft. high and 25 ft. long. Hand-painted subjects are changed every month. Two of these are shown in accompanying illustrations. One is an advertisement describing the joint service from San Francisco to Lake Tahoe. This is a trip of slightly more than 200 miles, 93 of which is accomplished by rail and the remaining 111 miles by stage. Pierce-Arrow buses are used in this service. The second calls the attention to the state fair at Sacramento. The subject matter is presented so as readily to draw attention and is a high grade example of poster work.

Joint Railway and Bus Service Is Advertised on This Billboard. The San Francisco-Sacramento Railroad Believes that Much Traffic Has Been Secured by Billboard Advertising of This Type

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

Association News & Discussions

Indiana Men Discuss Publicity

THE aanual convention of the Indiana Public Utility Association, held in Indianapolis Jan. 22, was the largest ever held by the organization and was marked by the attendance of a large number of women employees.

"Uses of Advertising" was the subject of an address by W. H. Hodge, president of the Public Utility Advertising Association and in charge of advertising for the H. M. Byllesby Company of Chicago. He urged more advertising and more efficient advertising for adequate results. "The quality of utility advertising constantly is being improved," said Mr. Hodge. "No one can defend advertising that is not efficient. While we have no accurate records for 1924, it is estimated that utilities spent between $11,000,000 and $20,000,000 last year for advertising. Our own company will spend $326,000 this year for advertising. Seventy-three per cent of our advertising budget will go to newspapers. This medium must continue to be most important with us. We cannot compare our advertising with that of department stores, where the turnover averages five times annually. We turn our capital stock only about once every 5 years. We should, however, spend about 1 per cent of our gross. We have many things to tell the public.

"One thing we can tell it is of our service, and how it is to be used. Others are our merchandise appliances, securities, relation to community development, achievements during the past year, plans for the next, our rate schedules and our side of controversies. Our advertising should produce peace between the public and the utilities. It will cut the cost of marketing our securities 50 per cent. In one instance four displays and two letters, covering a 30-day period, brought our own company more than 2,000 inquiries."

W. S. Vivian of the Midwest Utilities Company of Chicago, in a talk on "Public Relations," said that 90 per cent of the world's troubles were due to misunderstandings. "We need to educate the public and our employees. Our employees should be able to buy our securities a little easier than the general public. We should encourage our employees to take part in civic affairs and be able to make talks on utilities when given the opportunity."

A bill now before the Legislature seeking to bring under the jurisdiction of the Indiana Public Service Commission all public utility holding companies was vigorously denounced by Gen. George H. Harries, vice-president of the H. M. Byllesby Company, speaking at the annual banquet. "The proposition is so involved that its enactment into a statute would make it impossible for utilities to borrow money to continue their business," he said. "The utilities would stagnate." He declared that the day of the small utility company is passing. He asserted that it is necessary for efficient and economical operation to maintain group management and control.

C. L. Henry, president Indianapolis & Cincinnati Traction Company, was re-elected president of the association. Other officers elected were S. E. Mulholland, Fort Wayne, and F. J. Haas, Evansville, vice-presidents; Frank C. Jordan, Indianapolis, treasurer; M. V. Robb, Indianapolis, secretary.

Central Accountants' Association

THE Central Electric Railway Accountants' Association will meet at the Claypool Hotel, Indianapolis, on Feb. 27. Following the meeting of the executive committee J. R. Cavanagh, superintendent of car service "Big Four" Railroad, will deliver a talk on "Car Service and per Diem," and C. E. Baker, auditor of Lima-Toledo Railroad, will talk on "Routine of Tracing Claims for Misloaded Freight to Ascertain the Party at Fault." In the afternoon there will be two general discussions, one on "The Advisability of Including Draft Authorities on Interline Statements" and another on "Progress Made in Operation of Buses in Connection with Electric Railways, as to Costs, Service, Depreciation and Tire Renewals." Dinner will be served at the Indianapolis Athletic Club, the evening closing with a theater party. On Saturday, Feb. 29, E. F. Eicks, auditor Fort Wayne, Van Wert & Lima Traction Company, will address the meeting on "Settlement of Interline Balances by Draft." A general talk on pepping up the association will be followed by the address of President Van Bibber, auditor of the Columbus, Newark & Zanesville Electric Railway.

American Association News

A.E.R.A. Headquarters to Move Feb. 21

THE date for moving the headquarters of the American Electric Railway Association to the Johns-Manville Building, Madison Avenue and 41st Street, New York City, from its present location at 8 West 40th Street, has been advanced to Feb. 21. As announced in this paper, the new offices will occupy the entire 14th floor of the building. There will be some 40 per cent more floor space than at the present location, and this is expected to relieve the present crowded condition.

Equipment

A MEETING of the committee on equipment of the Engineering Association was held at association headquarters, New York, Jan. 15 and 16. Those present were Pierre V. C. See, chairman; A. T. Clark, vice-chairman; Daniel Durie, sponsor; C. W. Squier, secretary; Walter S. Adams, W. W. Brown, R. S. Bull, J. L. Gould, J. M. Hipple, W. H. McAloney, A. D. McWhorter, J. F. Miller, E. D. Priest, Ralston B. Smyth, W. G. Stuck, H. S. Sweet, H. S. Williams, and V. D. Bethge representing Joseph C. McCune.

Sub-committees were appointed for the seven subjects which are being studied by this year's equipment committee. The chairmen and vice-chairmen of these committees are: No. 1, review of existing standards, C. W. Squier, chairman; H. S. Sweet, vice-chairman. No. 2, study of brake design, Joseph C. McCune, chairman; J. M. Yount, vice-chairman. No. 3, methods of car painting, R. S. Bull, chairman; W. G. Stuck, vice-chairman. No. 4, motor coach design, A. T. Clark, chairman; J. H. Lucas, vice-chairman. No. 5, devices for trolley contact, W. G. Stuck, chairman; A. D. McWhorter, vice-chairman. No. 6, study of gearing, W. W. Brown, chairman; Ralston B. Smyth, vice-chairman. No. 7, methods of reducing noise, H. S. Williams, chairman; M. O'Brien, vice-chairman. Tentative dates for future meetings of the equipment committee were set. The second meeting will be held at Cleveland March 16 and 17, and the third and final meeting of the committee at association headquarters, New York, May 21 and 22.

The various subjects assigned to the equipment committee for study and report this year were discussed and a procedure was outlined for handling. It was decided that among the standards which required revision were wheel mounting and chuck gages, journal bearing and wedge gages, tolerances for the bore of gears, clearances for armature bearings and the specifications for proof testing of forgings.

Representatives of the motor coach division of the Society of Automotive Engineers were present, and it was decided that this year's work should be devoted primarily to outlining ruling dimensions and nomenclature for bus body construction. The motor coach division of the S.A.E. is to make a study of information obtained by last year's special committee and have representatives present at the next meeting of the equipment committee, so that definite recommendations can be made.

Questionnaires are to be sent out in connection with subjects Nos. 1, 3, and 6 and a definite effort will be made to get a full reply from member companies.

Maintenance of Equipment

Low-Crowned Pavement

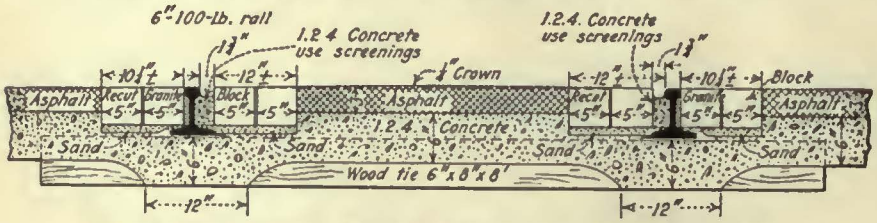
WHEREVER paving has to be laid between rails, the Connecticut Company is now laying as flat a surface as can be provided and yet shed water. The purpose of this type of construction is to make passage over the track easy for automobiles.

Most of the track of the Connecticut Company, even in large cities, is laid with plain girder or T-rail, the present standards for this rail being A.E.R.A. 5-in. 80-lb. A.S.C.E. and the 6-in. 100-lb. A.R.A. type A. This rail is laid on wooden ties with tilted tie plates and seam-welded joints, as described in the issue of this paper for April 5, 1924, page 537. When the track is laid in paved streets on a good sand or gravel soil, no ballast is used under the ties. The sub-base is simply rolled before the track is laid. When the sub-soil has poor drainage properties, 6 in. of ballast is placed under the ties, and tile drains are installed, if necessary.

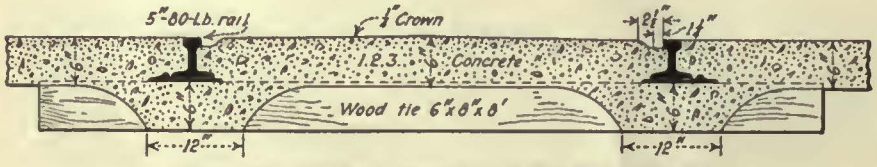
The accompanying drawings show the three standard types of track construction of the company.

The first is used extensively in the city of New Haven. The rail illustrated is a 6-in. 100-lb. section, but the construction shown can be adapted to a 5-in. 80-lb. rail, although this construction is not recommended for standard practice.

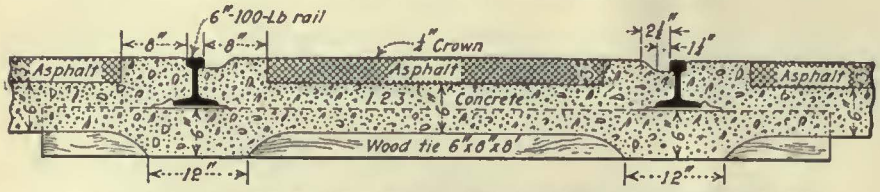
In this type of track construction with the granite blocks laid on each side of the rail, the blocks are usually recut to the size shown and rest on a sand and cement cushion. Space between the inside of the rail and the nearest block is filled with a rich mix of fine aggregate, tamped in, and a groove 1¾ in. wide is provided to take care of the wheel flange. Grouting is used with the granite blocks, and the surface between the rails up to the granite block is laid with asphalt with a ¼-in. crown.



Connecticut Company Standard with Granite Blocks Against Rail



Connecticut Company Standard in Monolithic Concrete



Connecticut Company Standard in Concrete with Part Asphalt Paving

The second section shows a monolithic concrete pavement and substructure. In this construction the groove on the inside of the rail for the wheel flange is made by a molding strip, which is pounded down flush with the head of the rail, just after the concrete has been poured. This construction is equally well adapted to 6-in. 100-lb. T-rail.

The third section is very similar to the second, except that asphalt is laid between the rails up to a distance of 8 in. on each side of the rail.

In general, the choice of these different constructions depends on the preference of the city engineer. The first has the advantage from the railway standpoint that joints can more easily be repaired. In no construction is the asphalt carried up to the rail.

The standard rail joint of the company, except in special work, is made with 20-in. machined bars, seam-welded to the rail, as described in the issue of April 5, already mentioned. Seam-welding is also used between the base of the rail and the joint base plates. The company has also recently been using thermit for some of its T-rail construction in paved streets, about 200 thermit joints having been laid during the past summer in New Haven.

In special work, bolted joints are used with rails spiked directly to ties.

Careful Grinding Prolongs Life of Drills

ONE of the important machines that permit the mechanical department of the Altoona & Logan Valley Electric Railway, Altoona, Pa., to operate efficiently is a Grand Rap-

Drill Grinder in Altoona Shop Has Proved a Good Investment

ids drill grinder. Experience has shown that the use of this machine not only prolongs the life of the drills by making them more accurate and equalizing the strain in the metal, but also enables the shop men to drill better holes.

Installing Resistors Inside Cars

DURING the winter and spring months, the Northern States Power Company, Fargo, N. D., experienced considerable trouble from short circuits caused by melting snow and water on the tracks, burning off lead wires at resistors. As the space for installation of resistors on safety cars was quite limited, the company tried removing these from beneath the floor and placing them inside the car at one end just back of the operator. A partition 3 ft. high was placed ahead of the front seat to protect the operator and passengers from draft, and this also acts as a shield to prevent passengers from coming in contact with the resistors, either while seated or standing near this point.

The resistors are insulated with ¼-in. asbestos lumber, and the tops are protected by a metal cover made in the shape of an inverted V. Twenty-four 1-in. holes are punched in the cover to allow the heat to escape freely. A fine screen is soldered to the underside of these holes, which prevents the entrance of particles which might damage the resistors. The angle-iron framework and cover were painted black. A red lettered sign reads "Danger—550 volts."

As thermostatic control is provided for the electric car heaters this method of installing the resistors inside has materially reduced the energy used. The cost for making the change was not excessive, and pull-ins from burnt-off wires have been done away with entirely.

Divided Trolley Board Gives Better Clearance

SOME time ago the Altoona & Logan Valley Electric Railway, Altoona, Pa., acquired a number of nearly new cars which had formerly belonged to another railway operated under the same management. These cars were somewhat higher than the standard cars used in Altoona, and it was found that there was considerable difficulty on account of low clearance under bridges. To increase the clearance the trolley board was divided into two strips 4 ft. apart. Flat steel bars between these strips support the trolley base. The latter is the flattest type which is now on the market. The combination of these methods of reducing the over-

Trolley Base Is Supported on Flat Steel Bars Between Wood Strips 4 Ft. Apart

all height has resulted in giving sufficient clearance and these cars are now operated without difficulty in Altoona.

Overhauling Car Cables

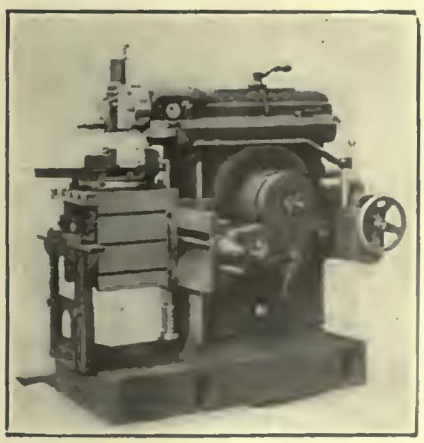
APPROXIMATELY 25 per cent of the cars overhauled at the Wolf Street shop of the New York State Railways in Syracuse have required new cables. In replacing these, No. 4 rubber-covered, double-braided seven-strand wire has been substituted for the No. 6 size previously used. Two coverings of canvas hose are also used instead of a single one. After applying, the canvas is given three coats of black insulating paint. This is allowed to dry for 24 hours, and the cable is then taped its entire length with 2-in. friction tape. After taping, another coat of insulating paint is applied.

In wiring with this cable, it is cleated to the two center sills running the length of the car. This brings it parallel with the leads as they come from the motor. Particular care is taken not to cleat the cable to the floor, as some trouble has been experienced, due to screws from the floor slats entering the sheath and causing damage. Knuckle-joint connectors are used on all motor leads. These are covered with ⅝-in. rubber tubing and are fastened to the main sill with wooden cleats.

New Equipment Available

Back-Geared Shapers

A HEAVY-DUTY 16-in. shaper, driven by a single pulley through a selective type back gear arrangement has recently been brought out by the Stockbridge Machine Company, Worcester, Mass. The geared drive with a high ratio gearing gives ample power for heavy roughing cuts. The gear arrangement is of the selective sliding-gear type, with a shift similar to that used in automobile practice. There are four changes of speed in the gear box. With back gears this gives eight speeds in all. The gears are of heat-treated steel, and can be run in oil or light grease. The teeth are pointed to permit of easy shifting.



A Heavy-Duty Back-Geared Shaper with Eight Speeds

An automobile-type driving clutch is used for starting and stopping the machine. When stopped, it locks the shaper against any possibility of starting. The clutch is operated by the horizontal lever which is extended from the front of the machine within easy reach of the operator. The ram can be positioned by moving the same lever back and forth. A handwheel is provided on the side of the machine for setting the ram by hand. It is unnecessary to stop the machine to change the speed. The feed always operates on the return of the ram and never feeds on the cut, which eliminates danger of breakage.

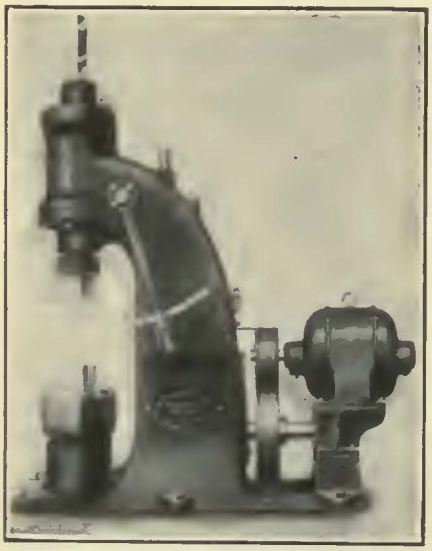
The base of the shaper has been made unusually deep in order to provide for deep ribs and give extreme rigidity. This deep base carries a table support for the knee. The vise is constructed to eliminate overhang of the front jaw. It is also designed to keep the work close to the top of the table. The body of the vise stands up but 4½ in. from the top of the table. The vise jaws are 12 in. x 2½ in., and they open 12 in. The machine can be furnished with automatic down-feed.

Improved Nickelchrome Wire for Heaters

AN improved form of nickelchrome wire is being marketed under the trade name of Kerma by the Electrical Alloy Company, Morristown, N. J. This wire is made particularly for extremely high and continuous temperatures, and is recommended especially for electric heating elements of car heaters. It is said to be free from oxides and has no weak spots in the structure which would cause breakage.

Six Small Sizes of Air Hammers

A NEW line of upright air hammers is being marketed by the Beaudry Company, Inc., Everett, Mass. These tools are furnished with rams weighing from 100 to 1,200 lb. Particular attention has been given in the design of the frame to provide for resistance to shock



Motor-Driven Air Hammer

and jar of the blow. Anvils are separate, and are supported on their own foundation. This eliminates shock to the hammer frame. The hammer is provided with both tight and loose pulleys, so that when belt drive is used no countershaft is necessary. The machines are also arranged for motor mounting with individual drive. The blow can be regulated by either treadle or hand lever.

The form of the ram is such that the greater part of the weight is concentrated in a bar of large diameter. This allows a large amount of room for handling, due to its being guided by passing through both the upper and lower cylinder heads. The head is entirely separate from the bar, and is readily removable. It is held securely to the ram by wedge clamping rings. The cushioning of the ram is done entirely by air, avoiding springs or rubber cushions.

The compressor piston is inclosed in the hammer frame and is mounted in a vertical position. The reciprocating movement of the piston is obtained by a crank on the end of the motor-driving shaft. In ascending the piston compresses air for operation which flows into the ram cylinder, sending the ram upward with great speed. When near the top air is trapped so as to form a cushion and cause the ram to rebound. The force of rebounding combined with the suction of the compressor piston gives the energy for striking a heavy blow.

Portable Arc-Welding Set

A PORTABLE motor - generator type of arc-welding machine has been added to the line of Wilson Welder & Metal Company, Inc., Hoboken, N. J. The set is particularly useful for light welding work in railway repair shops. It has a range of adjustments from 75 amp. to 250 amp. in small steps and is intended for rapid work using electrodes up to ¼ in. diameter. The generator is of the field-control type, with current regulations such that when welding at full load the current does not rise above 10 per cent of the short circuit value. As ballast resistors are not used and as the windings are of low resistance, the voltage generated is practically that of the arc plus the drop in the welding leads. The machine is mounted on a base of channels welded together, and is equipped with roller-bearing steel wheels. It is 52 in. long, 40 in. high, 30 in. wide and weighs 1,260 lb.

Roller Bearings for Line Shaft Hangers

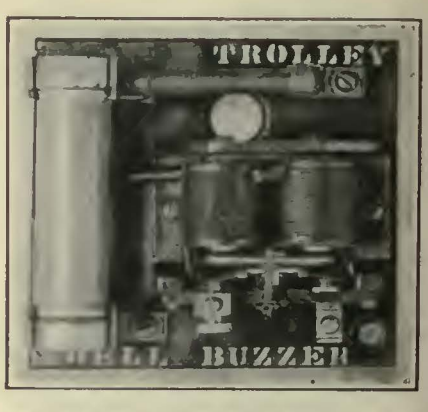
THE Dodge Manufacturing Corporation, Mishawaka, Ind., has placed on the market a line-shaft bearing embodying the Timken tapered roller bearing, as well as several new features of construction. This line-shaft bearing consists of five parts. Two tapered roller bearings are mounted on a steel tube, ground and slotted and fitted to an accurately machined housing. The ends of the steel tube are threaded to receive clamping collars. The mounting of the tapered roller bearing insures full utilization for both radial and thrust loads. The sleeve on which the bearings are mounted extends from end to end of the housing and liberal grease compartments are provided inside the housing and outside the tube. The outer ends of the bearings are protected against dust by special metallic grease seals which eliminate friction and prevent dust from working in or the lubricants from working out. The grease seals take the place of felt washers or packing.

The erection of the line-shaft bearing is accomplished by slipping the bearing over the shaft and setting up the clamping screw in each of the clamping collars. To remove it in order to make any necessary repairs the screws in the collars are loosened and the bearings can then be slipped off the shaft.

Interrupter Unit for Buzzers

AN IMPROVED design of interrupter for use on 600-volt circuits with buzzers has been brought out by the Consolidated Car Heating Company, Albany, N. Y. The two coils of the interrupter are in series and the hinged armature has a nichrome contact strip. In order to provide flexibility the contact strip is not rigidly connected to the armature, avoiding binding that might prevent proper contact. The two stationary contacts are adjustable and both have tungsten points.

A glazed type of resistance is



An Interrupter Unit for Buzzer Circuits with Flexible Contact Strip

mounted together with a fuse in the same case as the interrupter unit. This case is of sheet steel about 6 in. square. The same fuse and resistance are used for single stroke bells by taking a tap off ahead of the interrupter after passing through the resistance. Separate terminals are provided for buzzers and bells.

The News of the Industry

Wages Remain Same

Detroit Municipal Employees Will Not Press Demands for Higher Wage —Former Status Restored

The appeal to the courts in the case of the increased wage demand of the street railway employees in Detroit, made through the union, has been abandoned and conditions restored to exactly the same status that existed before the demand for more pay was made, or the same status held since the establishment of the Detroit Municipal Railway during the administration of James Couzens as Mayor. It has been announced that although the union platform employees of the D. S. R. won their demand that Judge Richter's decision last June stand in its entirety, the men will not press their wage demands at the present time. Judge Richter's ruling ordered the Street Railway Commission to arbitrate with the men through their representatives. The commission will withdraw its appeal pending before the Michigan Supreme Court, which was made following Judge Richter's decision that the commission was bound to arbitrate wages and working conditions.

The men agreed to withdraw their demands for increased wages and arbitration, acting at the request of Mayor John W. Smith. The commission believed that the men were fully and completely protected under the city charter. On the other hand, a majority of the men persisted that their relations with the city must be handled through their union officials, and the difference of opinion led to the appeal to the courts. The commission had insisted, up to the time of the conference with Mayor Smith, that as a precedent to withdrawing the appeal the men seek an order vacating Judge Richter's decision. With the withdrawal of the men's demands it was considered that there was no present case for Judge Richter's decision to operate upon.

A resolution adopted by the commission on Feb. 7, 1923, outlined wages and working conditions and provided for arbitration of disputes. This resolution, rescinded last year, is again reinstated without the amendments which constituted the new demands made by the men last April. It is cited that the resolution does not bear the signatures of the union officials and therefore is not a signed contract.

It is considered that Judge Richter's decision binds the commission to arbitrate with any association of the men, including the D. S. R. Trainmen's Association, in which non-union platform employees are members. Although these constitute a minority, according to the commission, that body has always been willing to arbitrate with the men through this association.

The section of the resolution of Feb. 7 which caused the dispute provides that in all cases of grievances or disputes the employees shall be permitted to be represented in hearings before the officer or officers or commissioners of the street railway department by the representatives of the said employees chosen by the associated employees. In case of failure of adjustment of said case, or cases, by or through said hearings, said employees may have such recourse as is provided in Section 19 of the street railway chapter of the charter, providing for arbitration of disputes.

Georgia Interurban Suspension Lifted

Marietta Line Resumes Operation Following Banning of Jitneys and Denial of Receivership Suit—Atlanta Jitney Status Acute —Anti-Jitney Ordinance Passed in East Lake

SERVICE was resumed on the 16-mile line of the Atlanta Northern Railway between Atlanta and Marietta, Ga., on Jan. 24, following a suspension of 10 days. The portion of the track which was torn up when the road ceased operating was repaired and cars began operating on the old schedules. Decision to resume the service came after the city of Marietta had passed an ordinance banning jitneys and buses from competing with the railway and after a plea by Judge Morris of Marietta to throw the road into receivership had been denied by the Fulton Superior Court.

Judge Morris insisted that the Atlanta Northern Railway, having suspended its service to Marietta on Jan. 14 by removing its cars and tearing up a section of the track, should surrender its charter. He contended that the company had violated the state law in suspending service without permission from the State Public Service Commission and asked that the court appoint a receiver to operate the line. The Atlanta Northern Railway, however, contended that it could not be compelled to operate at a financial loss. Its defense was that since the establishment of the line in 1905 its revenues had been insufficient to pay operating expenses, must less dividends. It also contended that as Judge Morris was not a stockholder in the company he had no right to bring suit to compel a receivership.

Since then a "fast" bill of exceptions, appealing to the State Supreme Court from the ruling of Judge W. D. Ellis, which denied pleas of Judge Newt A. Morris for injunction and receivership against the Atlanta Northern Railway, was signed by Judge Ellis. Such a bill gives the appeal the right of way in the Supreme Court, it is pointed out, and calls for an early hearing. Judge Morris contends that if the Supreme Court sustains his contentions it will be to grant an injunction forbidding the railway from tearing up its tracks or discontinuing service in the future without permission from the State Public Service Commission.

Hearings on the petition began Jan. 19 and as soon as the decision of the court was handed down denying the suit a committee from the Marietta Chamber of Commerce got in touch with officials of the Georgia Railway & Power Company, of which the Atlanta Northern is a subsidiary, and a conference was arranged, at which it was agreed to resume service. Under a special extension of time granted the jitney operators by the Marietta Council they were permitted to operate until Jan. 28, at which time the new anti-jitney law ordinance becomes effective. It is expected that the jitney operators will attempt to secure a permanent injunction restraining the Marietta Council from enforcing its ordinance and permitting them to operate.

The Georgia Railway & Power Company, however, has won its point, namely, the exclusion of jitney and bus transportation between Atlanta and Marietta and the elimination of what it has termed for months "unfair competition."

Not only in the city of Marietta is the jitney being banned but also in Atlanta itself. An ordinance was recently introduced before the City Council there abolishing jitneys from the city streets. The denunciation of the jitney and the demands that it be banned featured the first hearing on the question held at the City Hall on Jan. 23. The meeting was called to order by Alderman J. L. McLendon, chairman of the new traction committee of the City Council. A feature of the meeting was the reading of many resolutions from leading citizens, business, civic and other organizations asking that the ordinance banning jitneys from Atlanta streets be passed.

A counter attack upon the power company was made under the leadership of the president of the Atlanta Jitney Bus Association. Alderman McLendon decided that since public opinion was so strongly in favor of passing the anti-jitney ordinance no more hearings would be held, but that the matter would be taken up directly at the next meeting of the City Council.

The entire elimination of jitneys in Atlanta is expected to follow the banning of them from East Lake, a suburb of Atlanta, on Jan. 21 as a result of the passing of an anti-jitney ordinance by the Town Council.

New Company to Operate Rockford's Railway System

The City Council of Rockford, Ill., has instructed its legal department to draft a new ordinance which will give T. M. Ellis, Jr., head of the newly organized Rockford Public Service Company, a franchise to operate a traction system. Mr. Ellis made a plea for this action and it was supported by a letter from Mayor Herman Hallstrom. The Mayor charged that the effort to secure a new franchise for the Rockford City Traction Company, which now operates the system, was insincere. Mr. Ellis is president and general manager of the Beloit Traction Company and the Kewanee Public Service Company. He has offered to accept the terms drawn up by the City Council and rejected by the Rockford City Traction Company.

The dispute in Rockford between the city and the railway dates back to October, 1922, when the company's franchise expired. At that time a new 20-year franchise was sought. In return for this new franchise the Rockford City Council demanded certain pledges from the company, among them a guarantee for the expenditure of $750,000, to be spread over a period of 20 years, covering the construction of new lines, new equipment and replacement of considerable old trackage. At first the city insisted on a 10-year franchise, but later agreed to make the franchise continue for 20 years providing all its requirements were met by the company. Mr. Ellis has agreed to accept the franchise drawn up by the city, meet all its terms, equip the system with new rolling stock and machinery, extend the lines into new territory and rehabilitate the entire property. Immediate improvement plans call for the purchase of 25 buses to be used as feeders to the railway system. He further agreed to buy the complete equipment owned by the Rockford company at a price to be fixed by appraisers. He offered to furnish a guarantee of $750,000 demanded by the Council for improvements to be made within a certain specified time.

$105,000,000 Plan for Chicago's Traction System

Convinced that Chicago's proposed "half billion dollar transportation system" will be kept from fruition by the cries of rival politicians, Henry A. Blair, president of the Chicago Surface Lines, has made a new traction proposal workable with private capital and dependent on long-term franchises. The plan calls for $105,000,000 expenditures in 6 years, including the city's $40,000,000 traction fund for a subway.

The new feature suggested is a 4-mile system of pedestrian subways or sidewalk plazas designed by L. A. Drum, engineer, who laid out the passageway linking the Pennsylvania Station with Herald Square in New York. These would radiate from subway stations to nearly all big stores and stations and would be built at a cost of $175 to $250 a front foot to the abutting property.

Other proposals are for a four-track subway in State Street from 19th Street to Division Street and two two-track subways in east and west boulevards for use of elevated trains and two-car unit surface cars. The plan calls for $22,000,000 financing by the surface lines and $44,550,000 by the elevated, the latter's program being one for which Samuel Insull has asked the city for authority to proceed.

Twenty Passengers Hurt in New Jersey Accident

A car of the Public Service Railway bound on Jan. 22 from Passaic to Hoboken through Jersey City jumped from the elevated trestle on First Street and dropped head first to the

International News Reel

Jersey Car After Leaving Trestle

ground, carrying about 40 passengers with it to the street below. The car stood on end, as shown in the illustration, piling the passengers at the bottom. Twenty of the passengers were injured, but none of them seriously.

Increased Rates Necessary

The New York State Railways filed with the Public Service Commission on Jan. 27 a petition for permission to put into effect on short notice an increase in commutation rates on its Rochester & Eastern division and its Sodus Bay division. The present rates have been in effect since Aug. 28, 1920. The proposed rates for commutation service are as follows: On 54-trip commutation ticket books and 46-trip school ticket books the rate of 2 cents per mile for distances of 5 miles or less, to and including 12 miles; 1⅔ cents per mile for distances beyond 12 miles to and including 24 miles; 1½ cents per mile for distances beyond 24 miles to and including 43 miles, a fraction of a mile to be counted as a full mile. It is proposed to increase the minimum fare for children from 3 to 5 cents. It is stated in the petition that the commutation earnings on the two divisions for the year ending Oct. 31, 1924, aggregated $38,697, or 10.99 per cent of the total passenger revenue of the lines. The cost of the commutation service is estimated by the road at approximately $43,000.

Transportation Plan for Los Angeles Awaited

In a preliminary statement issued by traffic survey engineers of the engineering firm of Kelker, DeLeuw & Company of Chicago, Los Angeles by making provision for transit facilities can still keep up the pace of its rapid growth and arrange for the accommodation of 4,000,000 population within an area of 10 miles of Pershing Square. This firm has been engaged during the past year in making transportation surveys for the city of Los Angeles and the county of Los Angeles, the joint survey to cost the two governments $40,000, with expenses divided in half. The survey was first undertaken on May 1, 1924, and its purpose was to provide a similar transportation system as prepared for Chicago by these engineers.

The Los Angeles report contemplates rapid transit by subway and elevated systems, supplemented by surface cars and buses, to distribute the population throughout the metropolitan district outside of the central urban area.

The statement recommended in part that the suburban rapid transit railroads should be designed to provide high-speed service between the centers of the suburban cities and the central cities. On the urban rapid transit railroads over-all speeds of from 18 to 25 m.p.h. could be maintained. On the interurban rapid transit railroad over-all speeds from 25 to 40 m.p.h. could be maintained.

It is anticipated that the complete transportation report of the engineers will be filed soon.

Want Buses in Massachusetts Under City Control

Both electric railway companies in Massachusetts and their employees have taken a united stand this year in demanding of the Massachusetts Legislature that a law be enacted placing the jitneys and buses under the control of the local city and town authorities, and under the Metropolitan District Commission when the use of boulevards is involved. They have a bill which calls for the licensing of motor cars engaging in the passenger business and their regulation as common carriers.

It is the opinion of the railway interests that they can compete with the buses if the two classes of transportation are placed under the same regulations and can compete on comparable bases. The Amalgamated Association is giving wholehearted support to this proposition. It was represented at the Boston conference by 12 union presidents and by John H. Reardon, international vice-president. Among the representatives of railway managements were Fred A. Cummings of the Eastern Massachusetts Street Railway; Edward Dana of the Boston Elevated; Clark V. Wood of the Worcester Consolidated and the Springfield Street Railway; L. D. Pellissier of the Holyoke Street Railway; Clinton Q. Richmond of the Pittsfield Street Railway; Ralph D. Hood of the Massachusetts Northeastern Street Railway, and representatives from the Boston & Worcester and the Middlessex & Boston Street Railways.

Bus Operating Offer Made by Interborough, New York

Frank Hedley, president and general manager of the Interborough Rapid Transit Company, New York City, in a letter sent to members of the State Legislature, states that the company is willing to operate 3-cent feeder buses, in conjunction with its existing system, and also to provide 8-cent buses as a rush-hour expedient on streets occupied by rapid transit lines. He said the Interborough was prepared to examine the matter of free transfers from buses to elevated lines and subways.

Mr. Hedley says the establishment of a comprehensive bus system in this city in competition with Interborough subways and elevated lines in which the city of New York has a large financial interest will result in annual losses to those lines of from $1,000,000 to $2,000,000.

Mr. Hedley requests the Legislature to defer action on pending application for bus franchises for a period sufficient to permit the Interborough, after conference with the Board of Transportation and experts of the Legislature, to formulate a plan for bus operation for the consideration of the State Legislature.

Fare Increase Impends at Newburgh

The Newburgh Public Service Corporation, Newburgh, N. Y., has filed an application with the Public Service Commission for permission to increase the fares on its lines upon short notice. The corporation claims that the 7-cent fare now in force is insufficient to yield a reasonable compensation for the service rendered and asks the commission to determine reasonable and just charges. The petition includes a copy of the resolution of the Newburgh City Council consenting to an increase from 7 to 10 cents. Transportation service in Newburgh is entirely by bus except for one line operated out to Orange Lake.

Utility Regulation Bills Before Indiana Legislature

Members of the Senate committee of the Indiana Legislature having to do with utility legislation will carry to the floor of the Senate the fight being waged on measures dealing with more stringent regulation of utilities by the Indiana Public Service Commission, according to action taken on Jan. 24 by the committee. Another bill to tighten the regulation of utilities went into the House on Jan. 23. The measure provides that no utility shall place a valuation on its securities or shall assert a valuation for rate-making purposes beyond the assessed value of the property for tax purposes. The committee will recommend for passage the bill which would provide that utility depreciation funds can be used only in replacement of equipment or in new construction and another bill which would provide that utilities under regulation of the commission must agree to appeal rate case decisions to the state Supreme Court before appealing to the federal court.

Further action will be taken by the committee on the bill which would make a utility of all companies or organizations holding more than 50 per cent of the stock of a public utility and bring such holding company under the regulation of the public service commission..

Co-ordination of Service Proposed in Norfolk

The Virginia Railway & Power Company is ready to submit a plan for the operation of buses in Norfolk, Va., in co-ordination with or as an auxiliary of its railway system there. It is understood that the position of the company is:

That the company is willing to begin the operation of buses without additional legislation from the Virginia Assembly.

That the company is willing to reimburse owners of bus routes which it takes over on the appraised value of the equipment by a board of arbitration if the company and the owners were unable to agree.

That buses would be operated that would insure comfort and safety and that trollibuses be used on several routes.

Bus Legislation Proposed for St. Louis

The public utilities committee of the St. Louis Board of Aldermen has voted to file the bill for the regulation of buses prepared by C. E. Smith, consulting engineer for the city. Mr. Smith will be asked to draft another measure not quite so drastic to provide that the Aldermen and not the Board of Public Service shall issue bus permits. It will fix heavy taxes to be paid by the bus company as compensation to the city. An endeavor will also be made to have buses classed as public utilities and made subject to the regulation of the Missouri Public Service Commission.

Chicago Surface Lines Creates New Division

Organization of a new traffic division covering the downtown district has been effected by the Chicago Surface Lines to work in closer co-operation with the police for swifter movement of traffic. The new division began functioning on Jan. 5 as a contribution to several months of traffic innovations which proved notable successes for street car, pedestrian and vehicular traffic. In all particulars the new division is a crack outfit. It is headed by P. J. Duffy as superintendent, one of the oldest officials on the Surface Lines. Twelve efficient supervisors were assigned to him. The force was presented at police traffic headquarters so that it will function in a friendly spirit with traffic policemen.

Extra Appropriation Approved in Cincinnati

On recommendation of the finance committee the City Council of Cincinnati, Ohio, passed the semi-annual appropriation ordinance which includes an additional allowance of $20,000 for the solicitor's office. The major portion of the additional appropriation will be used to defray expenses of litigation to obtain forfeiture of the present franchise of the Cincinnati Traction Company, in the event such action becomes necessary. When called upon to explain this additional allotment at the time the appropriation ordinance was drawn, Mayor Carrel said the money was needed to carry out his previously announced intention of bringing suit to forfeit the existing traction franchise.

This announcement came as a climax to the fruitless negotiations over the proposed new traction franchise. It drew the fire of certain members of Council, with the result that the request for the additional funds was referred to the finance committee. Realizing that rejection of the appropriation by Council would defeat his plan to try to forfeit the existing traction franchise, Mayor Carrel and Frank Bowman, newly appointed city solicitor, together with members of the citizens' traction committee, attended the special meeting of the finance committee and urged the committee to act favorably on the appropriation. After the finance committee had acted favorably on the additional appropriation, Council went into special session and passed the ordinance in its entirety.

Utilities Measures Before California Legislature

Considerable activity has developed at Sacramento, Cal., during the recent session of the Legislature. Efforts have been exerted to present a bill to reduce the taxes of public utilities. A constitutional amendment was introduced in the Assembly on Jan. 15 proposing to tax the gross earnings of the publicly owned utilities on the same basis as privately owned utilities are now taxed by the State of California. If approved the measure would place a state tax on the earnings of the San Francisco Municipal Railway and other similar enterprises. A similar measure was passed by a previous Legislature, but was voted down by the people. There is also pending a bill to regulate the size of buses using the public state highways and roads for passenger service.

Jitneys Attached Again in Detroit

The Police Department at Detroit, Mich., has been directed by the City Council to enforce the old ordinance governing the operation of jitneys in the city. This measure requires the jitneys to carry city licenses. The jitneys were operated up to the end of 1924 without licenses. This they did under an injunction from the Circuit Court, issued when the new jitney ordinance was blocked. The Circuit Court's decision was appealed by the city, but it is reported that a decision may not be reached by the Supreme Court for another year.

The old license ordinance was never rescinded and licenses and records under its provisions have been prepared by the Corporation Counsel's office. The Comptroller's office says it has no records of the number of buses operated in the city or of their routes. It has scant information on the matter of the payment of the city tax of 1 cent a mile.

News Notes

Seeks Extension of Bus Service.—The Traction Bus Company, subsidiary of the Johnstown Traction Company, Johnstown, Pa., seeks to extend its bus service to Boswell, a distance of 4 miles. Two buses will be used. A hearing is scheduled Feb. 5.

Buses as Extensions.—The St. Louis Bus Company, subsidiary of the United Railways, St. Louis, Mo., opened its West Florissant Avenue bus lines on Jan. 13. The buses will operate as extensions of the Bellefontaine Street railway line. Transfers will be issued to and from the street cars. The bus fare will be 10 cents with no extra charge for a street car transfer. A street car rider can obtain a bus transfer for the payment of 3 cents in addition to the regular street car fare of 7 cents. The St. Louis Bus Company has been operating a line on Natural Bridge Avenue between the terminus of the Natural Bridge Street car and Pine Lawn.

Will Make Survey.—United States Judge F. E. Kennamer refused on Jan. 22 to discharge John W. Shartel, president of the Oklahoma Railway, as one of the receivers of the company as demanded by the city attorney of Oklahoma City. The court has granted the receivers permission to employ Stone & Webster, Inc., Boston, to make a survey of the conditions surrounding the operation of the railway and to make an expenditure amounting to $100,000 to improve the roadbeds and service of the company's lines. It is announced that Stone & Webster will be represented in their work for the receivers by George H. Clifford, Fort Worth, manager of the Northern Texas Traction Company, a Stone & Webster property, which last year was awarded the Coffin prize.

Good Will in "Ads."—The Des Moines City Railway, Des Moines, Iowa, is confining a great deal of its advertising space to the building of good will in the rotogravure section of the Des Moines *Register*. One of its recent "ads" was a two-column display devoted to giving directions for finding public places of interest.

Bus Route Sanctioned. — The Public Utilities Commission of the District of Columbia recently authorized the Washington Railway & Electric Company to operate a bus route from Nichols Avenue and Good Hope Road, S. E., to Blue Plains, and to Nichols and Valley Avenues. The commission at the same time ordered that the rate of fare on these buses be the same as the rate of fare on the railway lines or such other fare as may be prescribed by the commission.

More Time and Money Needed.—City Solicitor Gaffney of Philadelphia, Pa., has recommended that funds be provided for further investigation of problems involved in the Philadelphia Rapid Transit Company's fare question. He estimates the cost at $75,000. In a letter to Mayor Kendrick, which the Mayor sent to the Council, Mr. Gaffney said that about 4 months more of investigation would be needed. He also expressed the opinion that the company's financial condition this year might be such as to justify a decrease in the present 8-cent rate. Some months ago the commission adjourned hearings on the protest of the city against the increase in fares from four tickets for 25 cents to two tickets for 15 cents. At that time Mr. Gaffney sought a postponement.

Ordinances Pass Second Reading.—An ordinance calling for an agreement between the city and the Philadelphia Rapid Transit Company, Philadelphia, Pa., for the construction of the Chestnut Street subway and an ordinance granting franchises for three bus lines in the populous sections of the city passed second reading in the Council on Jan. 22.

Two Years More Allowed for Construction.—Extension for 2 years of the time within which the Frontier Electric Railway, Buffalo, N. Y., shall start and finish its proposed line between Buffalo and Niagara Falls is sought in a bill introduced into the Legislature by Senator Hickey of Buffalo. Some years ago the Frontier Electric Railway acquired the right-of-way between Buffalo and Niagara Falls. Part of the right-of-way is occupied by the Buffalo-Niagara Falls high-speed division of the International Railway, Buffalo.

Buses at Newport News Taken Over by Railway. — The Newport News & Hampton Railway, Gas & Electric Company has recently taken over passenger bus lines operating over routes in Newport News, Va., in competition with its railway lines. The plan is to replace the bus equipment with newer and more economical motor cars. At this time there are no plans for extending the bus lines to new territory. Practically all of the populous parts of Newport News which are not within a few seconds' walk from a car line already are served by the established routes.

Want Service Restored. — A resolution asking the Detroit United Railway, Detroit, Mich., to take over the defunct Detroit, Bay City & Western Railroad and operate it either as a steam or an electric line was passed at a meeting of farmers and citizens of Snover recently. The resolution states that 85,000 farmers are dependent upon the road for service.

Partial Bus Substitution Reported.—R. L. Lindsey, vice-president and general manager of the Durham Public Service Company, Durham, N. C., has told the city that plans are being made to co-ordinate railway and bus service. The present idea is to abandon a portion of the track in West Durham. The program, stated unofficially, includes the purchase of three buses.

Approves Coupon Ticket Book.—The Public Service Commission has approved a 40-commutation coupon ticket book of the Hudson Valley Railway at $6.40, good for transportation in either direction between Round Lake and Mechanicsville, N. Y. The book is limited to 30 days.

Will Supply Bus Service.—The Key System Transit Company has applied to the California Railroad Commission for a certificate to operate bus service between Santa Clara Avenue and High Street in the city of Alameda and East Fourteenth and High Streets in the city of Oakland, substituting such service over the proposed route for the present service. It is stated that operation over the present route is being maintained at a loss of $7,000 a year under present patronage, and the present route is not warranted. The present bus service was established upon authority of the commission in a proceeding involving an application by the Peerless Stages, Inc., to operate stages between Oakland and Alameda, the Key System Transit Company intervening and agreeing to supplement alleged insufficient car service by bus service.

Bus Service as Experiment.—The Key West Electric Company, Key West, Fla., is preparing to start a new bus service. According to the present plans the buses will be put in operation as an experiment for a period of three months.

Extensions of Service Sought. — Representatives of organizations in the outlying districts of Sacramento, Cal., and representatives of the Pacific Gas & Electric Company met at a special session of the City Council to discuss the possibility of obtaining either railway service or a bus line in those sections not now served with transportation. P. M. Downing, in charge of operation of the Pacific Gas & Electric Company, said that his company was ready and willing to do anything possible to give a better service, but that the receipts of the company during the past 2 years had shown a definite loss. He said further that no new car lines or buses could be installed unless the company in some way could show a profit.

Wants Payment Deferred.—Trustees of the Boston Elevated Railway, Boston, Mass., have asked the Legislature to correct the legislation of last year under which the subway extension to Ashmont is being built. That law provides that the Elevated must pay rental on the property as soon as the work of construction begins, so that the Boston Transit Commission is already prepared to send a bill to the Elevated. Col. Thomas F. Sullivan, chairman of the Boston Transit Commission, agrees with the Elevated trustees that the Elevated should not pay rental until the new line is completed and put into operation. He agrees with the counsel for the Elevated that the interest on the cost of extending the line should be reckoned as a part of the cost of construction. But the Elevated is willing to use parts of the extension before the whole is completed.

Buses Ready in April.—Samuel Cox, superintendent of the Quincy Railway, Quincy, Ill., has been notified that buses for the South Eighth and State Streets lines will be ready for service April 1. They will replace the street cars. The company is making further surveys with the idea in mind of substituting buses on other outlying branches of the system.

Financial and Corporate

Foreclosure Proceedings Requested for Boston & Worcester

Upon the recommendation of the reorganization committee of the Boston & Worcester Street Railway, the American Trust Company, as trustee under the bond mortgages of the company, filed, Jan. 27, in the Supreme Judicial Court at Cambridge, bills for the foreclosure of the mortgages and a petition requesting the court to appoint a receiver. The liabilities of the railway consist mainly of bonds which matured Aug. 1, 1923, and unpaid interest thereon. The company has outstanding in the hands of the public a total of $2,297,000 bonds, of which $1,841,000 has been deposited under the reorganization plan of July 16, 1924.

The new reorganization plan, dated July 16, 1924, provided $296,940 for improvements. This plan was explained in the ELECTRIC RAILWAY JOURNAL, issue of Dec. 20, 1924.

The reorganization committee requested foreclosure proceedings at this time as it felt it was to the advantage of the bondholders and in furtherance of the reorganization of the property.

The reorganization committee issued a letter to bondholders on Jan. 27 stating that foreclosure proceedings would be simplified and the reorganization of the company completed more promptly if holders of undeposited bonds will immediately deposit their bonds with the American Trust Company.

The Boston & Worcester Street Railway operates an interurban line between Boston and Worcester and branch lines in the towns of Natick, Framingham, Southborough and Hudson and in the city of Marlborough. The total trackage operated is about 113 miles.

Report of Impending Deal at Portland Confirmed

Holders of common stock of the Cumberland County Power & Light Company, Portland, Me., have been offered an opportunity to dispose of their stock for a sum that, plus accrued dividends to the date of settlement, amounts to $137.26 per share. The offer comes by letter to all holders of common stock through E. W. Clark & Company, Philadelphia, and J. & W. Seligman & Company, New York.

The letter states that these two concerns have been offered an opportunity to dispose of their stock for $137.50 per share plus accrued dividends to the date of settlement with the purchasers, the Albert Emanuel Company, New York City.

They offer to other holders of common stock an opportunity to dispose of their stock at the same figure minus $1 per share, which constitutes the charge to cover legal fees and other expenses, and the services of the two bond houses in disposing of the stocks.

The terms of the offer include a request that holders of common stock who are disposed to sell it at this price deposit the stock with the Seaboard National Bank, Mercantile Branch, New York City, on or before Feb. 10. The date agreed upon for the purchaser to make settlement is Feb. 16.

Danbury-Bethel Lines Purchased

Edward M. Bradley of the firm of H. C. Warren & Company, investment brokers, of New Haven, as chairman of the bondholders' protective committee, has purchased for $75,000, plus the outstanding debt against the company, the property of the Danbury-Bethel Street Railway, Danbury, Conn. The sale was under an order from the Superior Court and was conducted in Danbury on Jan. 15 by James E. Wheeler of this city.

Under the terms of the sale, the purchaser is to assume the receiver's obligations, which amount to $251,000, of which $128,328 is disputed. Receiver Judge J. Mosa Ives of Danbury will remain in charge of affairs of the road until the court passes upon the claims.

The road recently was appraised at $529,981. The bondholders, who were the plaintiffs in the foreclosure proceedings, claim that there is due on the mortgage $279,166. The taking over of the property by the bondholders was referred to previously in these pages.

A Bargain at $162,834,584

Chicago Engineers Hold This Price Reasonable as Amount to Be Paid by City for Surface Lines—Interesting Comment by Engineers on Individual Items Included in Appraisal

THREE utility engineers, waiving agreement on a specific value, have decided that the Chicago Surface Lines would be a bargain at $162,834,584. The engineers, two representing extremes in seeking a valuation figure and the third brought in by their choice as a referee, made the appraisal at the instance of the Chicago City Council committee on local transportation and a committee of bankers holding surface lines securities.

The figure of $162,834,584 used is the value fixed in the 1907 ordinances, soon to expire, which shall be the maximum price paid by the city in event of purchase. Mayor Dever and the traction owners said they would adhere to the ordinance, but a dispute arose over ownership of the company's $19,000,000 replacement fund. The owners said that if the city took it this would in effect cut the price to $19,000,000 under the ordinance figure. The engineers upheld the Mayor's contention that the money should go with the lines.

William Barclay Parsons, New York; William J. Hagenah for the traction company and R. F. Kelker, Jr., for the city, made the appraisal. Each had his own figures. They varied widely. On reproduction value, less depreciation, the figures follow:

Kelker	$176,500,000
Hagenah	204,308,669
Parsons	196,500,000*

*Kelker's estimate, plus $20,000,000 going concern value, explained below in finding No. 2.

On "original cost" two of the figures were the same but were arrived at in different manners. They are:

Kelker	$141,773,000
Hagenah	167,180,727
Parsons	167,180,727

The appraisers find that the property consists of 1,062 miles of single track, 3,540 passenger cars, of which 36 are under construction; 256 single-truck T.V.C. passenger cars held in reserve, 555 service cars, 21 carhouses, 20 substations, two storage battery stations, two main car repair shops, several hundred miscellaneous buildings and 147 parcels of real estate. All property is declared to be in fine condition.

Eight factors were given the engineers and their findings under each may be briefly summarized as follows:

1. Original cost of plant and permanent additions and improvements so far as the same is ascertainable from existing valuations, inventories and such other data available.

Major Kelker takes "original cost" to mean the cost of the existing properties to the present owners and from the facts available places this at $141,773,000.

Mr. Hagenah takes as a base the 1907 compromise figure of $55,775,000, to which he adds property additions made according to ordinances and property acquired and temporarily financed through the special renewal and equipment fund. Total $167,180,727.

Mr. Parsons uses the Hagenah figure, but bases it upon "historical cost" plus Hagenah's other figures. In the absence of definite evidence he accepts the 1907 compromise figure tentatively as the "historical cost."

2. Reproduction cost less depreciation; i.e., what it would cost the city to reproduce these properties less depreciation, taking into account the cash and property in the renewal and depreciation funds.

Major Kelker holds that the construction work best would be accomplished by the companies rather than by contractors, and, deducting depreciation, arrives at $176,500,000.

Mr. Hagenah visualizes a reproduction "using the construction methods and equipment ordinarily employed in such work, the undertaking being carried on under a continuous construction program and with sufficient funds available, but assembling a special construction organization. Value, $245,621,621 for a new plant; deducting depreciation, $204,308,669, exclusive of going concern value and cash working capital."

Mr. Parsons sustains Major Kelker's method, but holds it falls short in not assuming that the experience and organization of such a going concern are

to be used and therefore are entitled to a representation in the value. He adds to Major Kelker's figure the going concern value as determined in finding No. 5.

3. The amount and market value of stocks and bonds. Discusses average values from 1907 to date.

4. Present and probable future earning capacity. Estimated earnings for year ending Jan. 31, 1925, deducting city's 55 per cent, taxes and renewal fund contributions, $9,463,962. On the assumed purchase price at 5 per cent the city would have fixed interest charges of $8,142,179. For the past four years the company's share of net returns has averaged $1,635,383 in excess of the sum set as the city's fixed interest. The undivided net earnings, however, have averaged $14,752,713, or nearly twice these fixed charges. A moderate yearly increase is indicated, the number of revenue passengers in the years 1925-1945 increasing from 824,000,000 to 1,354,000,000.

The engineers say that assuming the properties shall be operated efficiently, the present and prospective net earnings warrant the city in making the purchase at the ordinance purchase price.

5. Going concern value. Awards ranging up to 20 per cent of the "bare bones" value were cited along with court decisions, but no percentage agreement was arrived at and the engineers compromised on the figure adopted in 1920 by the Illinois Commerce Commission for rate-making purposes, $20,000,000.

PHYSICAL CONDITION OF PROPERTIES EXCELLENT

6. Present physical condition. We find the present physical condition of these properties excellent. Viewed from the practical point of operating condition, the equipment, tracks and buildings are being well maintained. In setting up the item of deductions in the estimate for reproduction costs, the appraisers have had in mind fixing a figure which had direct relation to the purchase price of the property and not to its momentary physical condition from the operating standpoint.

The amount set aside for renewal and depreciation reserves have been so much in excess of renewal expenditures to date that an accumulation of approximately $19,000,000 against accruing wear to track, equipment, etc., is provided for.

7. Fair cash market value of real estate. Special appraisers find fair cash value of land without buildings or improvements $8,937,277. Additional real estate not used for railroad operation $76,604.95.

8. Allowances for value of unexpired franchises. None.

9. The appraisers find the present fair value of these properties for the purpose of purchase by the city, taking into consideration all the above-mentioned eight factors, to be in excess of $162,834,584, the price fixed by the ordinance, this sum to be adjudged to care for subsequent additions or deductions made between Oct. 31, 1924, and the date of the transfer.

The sections in which the engineers settled the disposition of the disputed $19,000,000 in the city's favor were taken up separately from the factors. The vital paragraphs referring to the fund follow:

> Under the provisions of the settlement ordinances the operating company is required to set aside 8 per cent of its gross receipts as a renewal fund to insure the proper upkeep of the properties. The residue receipts, after paying all operating expenses and taxes, are applied first to pay 5 per cent on the purchase price, and the remainder is divided between the city and the company in the ratio of 55 per cent and 45 per cent, respectively.
>
> The contributions to the renewal fund have been in excess of the current requirement thus far found necessary, so that on Oct. 31, 1924, this fund consisted of $14,716,506 in cash and $4,337,142 in new equipment and track purchased out of the fund but not added to the purchase price. A sale of the properties to the city under the existing ordinances would carry with it this renewal fund and its further accumulations to the date of the actual transfer as well as the equipment purchased out of this fund.
>
> The amount of the purchase price will be subject to constant increase as additions are made to the properties from time to time and in like manner the renewal fund will be increased or diminished as contributions are added from gross receipts or payments made for renewals. Both figures are, therefore, subject to correction to be fixed at the date of the transfer of the properties, should such transfer be effected. These additions or withdrawals in the near future are not likely to be of such moment as to modify to any extent the conclusions in this report.
>
> The ordinances fix the price at which the city can buy and at which the company shall sell at the option of the city. The ordinances provide that this sum shall be payable in cash, although, of course, it may be paid in other form if both parties agree.

New York Railways Reorganization a Step Nearer

Approval of the plan of reorganization of the New York Railways, New York City, has been obtained from the three protective committees representing holders of Broadway & Seventh Avenue Railroad first consolidated 5 per cent mortgage gold bonds; Broadway Surface Railroad 5 per cent first mortgage bonds, and South Ferry Railroad 5 per cent first mortgage bonds. Notices to this effect were published on Jan. 27 by the reorganization committee.

The way now seems clear to declare the reorganization plan effective. The plan has been approved by the court and the Transit Commission.

Dividend to Be Paid

Chicago City & Connecting Railways, the collateral trust holding shares representing about 40 per cent of the value of the Chicago Surface Lines, will pay $1 dividend Feb. 25 to stockholders of record Feb. 16 on 250,000 preferred participation shares. The dividend, the first since 1918, comes from accumulation for several years of income over bond interest requirements. In his annual report, Bernard E. Sunny, chairman of the board, tells of the dawn of a better transportation era for Chicago. "Any change to be made," he says, "is all to the good. Negotiations with the city have brought out much information about the properties that has been enlightening and has increased the interest and confidence in them." He said that the statement made in the last annual report that Chicago had the best railway property in the world had recently been repeated by high officials of the city, which had helped to repair the injury to the reputation of the properties caused by derogatory reports previously circulated. Income received by the trust amounts to $1,219,525 compared with $1,252,260 in 1923. Bond interest of $1,041,300 and bond redemption of $105,000 were the largest items against receipts. The balance sheet shows the trust holds $597,000, or double the sum necessary for the dividend.

Toledo Made Good Showing in December

For the first time in many months the Community Traction Company, Toledo, Ohio, had a surplus in December, 1924. After all charges this surplus was $24,630. The expenses were $224,728, including $15,000 for extraordinary maintenance, as against expenses of $240,297 for the similar month the year previous. The gross revenue for December was $340,761, compared with $344,654 for December, 1923. Bus operations on the feeder lines showed improvement with increased riding.

Sinking fund requirements for 1924 were $226,543. The showing here sustains the recent observations of board members that the company would now be breaking even and providing a profit were it not for the city-purchase plan written into the Milner ordinance. The sinking fund has already provided for the retirement of $722,000 of bonds of the company and there is added $183,483 cash in the fund. This is approximately 10 per cent of the capital value of the company. When this fund reaches 20 per cent the present set-up for the sinking fund may be done away with and in extensions of the franchise the fund may be allowed to pay its way, retiring every year 1 per cent of the amount of capital value that is outstanding.

Acting Commissioner E. L. Graumlich indicated that January would show about an even break. He announced also that the maintenance program for 1925 was set at $680,000, compared with $770,000 for 1924 and $640,000 the previous year. In 1924 the company began with about $50,000 deficit in the maintenance fund. The present year is starting with about a similar amount of cash on hand in the maintenance fund.

Committee Will Appraise Rainier Property

Negotiations for the purchase by the city of Seattle, Wash., of the Seattle & Rainier Valley Railway will probably be undertaken in the near future, following steps taken by the City Council for an appraisal of the company's property. John C. Higgins, counsel for the Rainier Valley line, declares that his company is ready to sell to the city, providing satisfactory terms can be arranged. The bonded indebtedness of the system, he reported, is between $1,500,000 and $1,600,000, the debt secured by first and second mortgages aggregating about $1,000,000 and third mortgages of $550,000. In addition, there is outstanding approximately $350,000 of the company's stock to participate in any liquidation.

Cleveland Interest Fund Up

Economy and Efficiency in Operation There Reflected in Report for Year —Need for New Financing

Ways and means of financing extensions and betterments by the Cleveland Railway, Cleveland, Ohio, will have to be found during the present year. John J. Stanley, president, so reported in his message to stockholders of the company presented at the annual meeting on Jan. 28. Mr. Stanley pointed out that not in four years has the company really added to its capital account through the sale of stock, and that minor betterments made during the past four years have come from funds derived from retirement of other property. He said:

> Our franchise provides that we may not pay more than 6 per cent for money. During the past few years money has been worth more than 6 per cent. It is now worth more than 6 per cent. This means that our property will not be enlarged until we are authorized to pay a higher rate of interest or until the general market price of money drops to or below 6 per cent. Cleveland needs extensions and betterments of its street railway system. The growth of the city in population and area means that this growth ought to be met by service adequate to take care of it and greater service calls for more tracks, rolling stock, buildings and power.

The grant under which the Cleveland Railway operates provides that no stock can be sold at less than par, and at no time during 1924 was the stock of the company at this figure. Its high was 96 and its low 85.

Mr. Stanley pointed out that since the year 1910, when the Tayler service-at-cost grant went into effect, Cleveland car riders have been saved $53,702,632, representing the difference between the average rate of fare paid in Cleveland during that time, which was 4.315 cents, and that paid in ten other large cities in the country, which was 5.814 cents. This, he said, meant an average yearly saving to car riders of $3,835,902. The average income received per ride last year amounted to 4.47 cents.

The total revenue of the Cleveland Railway in 1924 was $17,313,548, an increase of 5.94 per cent, while the actual expenses for the year were $16,905,151, divided this way:

> For maintenance, renewal and depreciation, $4,463,252; for operation and general expenses, $9,139,686; taxes $1,279,741; interest on bonds and dividends on stock $2,022,471.

As usual, wages paid conductors, motormen and trainmen took the largest slice of the operating expenses, namely, $4,543,791.

For injuries and damages, the company in 1924 spent $1,170,799, a decrease over the previous year of $411,796.

Taxes of the company, however, increased $197,546.

The number of car riders in 1924 decreased 6.46 per cent, or from 417,405,905 riders in 1923 to 390,424,469 in 1924.

The company operated 38,084,832 passenger car miles in 1924, a decrease of 4.66 per cent.

The amount paid by the company to tax-spending authorities and the cost of injuries and damages combined totaled $2,450,540. This was $428,068 more than was received by the people as interest on their investment in the bonds and stock of the company.

During 1924 the company operated at its maximum rate of fare, 6 cents cash, 9 tickets for 50 cents and 1 cent for transfer. It added 16 trailers and 25 new motor cars to replace equipment retired, and also relaid 11 miles of track.

At the end of 1923 there was a deficit of $544,221 in the interest fund, which is the fare barometer. As a result of the economy and efficiency in operation in 1924 the interest fund at the end of 1924 contained a balance of $532,254, this despite the fact that fewer riders were carried in 1924 than in 1923. When this fund reaches $700,000 the rate of fare must automatically drop one notch and when the fund goes below $300,000 the fare is increased.

The number of stockholders in the company is 6,222, of whom 5,532 live in Ohio and 4,135 in Cuyahoga County.

New Interests in Columbus Company Elect Representatives

The management destinies of the Columbus Railway, Power & Light Company, Columbus, Ohio, are now in the hands of Clarence C. Slater. He started Jan. 27, the day of the annual meeting of the company, as general manager. He finished as vice-president and general manager.

Charles L. Kurtz, president, and D. Meade Massie have resigned. Cyrus S. Eaton, Cleveland, who owns the controlling interest in the Continental Gas & Electric Company, and Frank Hulswitt, Chicago, president of the United Power & Light Company, representing interests which recently obtained control of the Columbus organization, wanted Mr. Kurtz to stay as president, but he withdrew of his own accord as president because he believed that he was entitled to a much-needed rest. He has served with distinction as president of the company since the change in control in 1919 that resulted in the election of Ohio men as executives of the company.

The directors adjourned without naming a successor to Mr. Kurtz. They are expected to meet within the next three weeks to announce their choice. Mr. Eaton was named second vice-president to succeed William A. Gill, resigned. No one was selected to fill the post of treasurer, recently vacated by Norman McD. Crawford.

P. V. Burington, secretary and auditor of the company for nearly 30 years, was retired with a pension. He was succeeded by Lyle F. Babbitt. Allen C. Beck was named assistant treasurer.

The new board of directors is composed of Messrs. Eaton, Hulswitt and Slater, Thomas Hoyt Jones, Edward W. Borer, and W. C. Williard, Walter B. Beebe, Frank L. Stein, J. B. Hanna, Ben W. Marr and Harry C. Holton.

Cincinnati stockholders, who opposed the refinancing plan, obtained amendments which conceded a 6½ per cent dividend to Series B preferred instead of 6 per cent.

The amendments were not passed upon at the stockholders' meeting. Instead action was deferred until Feb. 10, when another session will be held to take final action. In view of the fact that the forces opposing the original plan, led by H. C. Eustis, Cincinnati broker, announced their satisfaction with the concessions made, it is believed that the plan will be carried without serious opposition.

In obtaining approval of the amended refinancing plan, the Eaton-Hulswitt forces agreed to put another $1,500,000 into the company in the form of common stock purchase to strengthen the new first preferred. Mr. Eaton and his associates had agreed previously to purchase $1,000,000 of common stock.

Rochester Railway and Bus Lines Fall Short in October Quarter

The combined returns of the New York State Railways, Rochester lines, and the Rochester Railways Co-ordinated Bus Lines failed by $53,696 for the quarter ended Oct. 31, 1924, to meet the guaranteed return under the service-at-cost contract with the city, according to the report of Charles R. Barnes, Street Railway Commissioner. The railway lines fell short by $50,183 and the bus lines by $3,513.

Total revenues from railway operations were $1,184,425, or 48.86 cents for each mile of the 2,424,257 car-miles run. Operating expenses were $861,082, leaving a net revenue for railway operations of $323,342.

The street cars for the period carried 23,023,412 passengers, of whom 30.67 per cent were transfer riders. The cross-town trackless trolleys carried 333,404 riders, of whom 83.1 per cent were transfer passengers. The Dewey Avenue feeder bus line transported 58,050 passengers, of whom 82 per cent were transfer riders.

Debentures Offered.— The National City Company, New York, is offering at 93¾ and interest to yield 7.70 per cent $10,000,000 of 20-year sinking fund 7 per cent debentures of the General Electric Company, Germany. Proceeds of the debenture issue will be used to reduce current liabilities, to increase working capital and also, to some extent, to install additional machinery.

Delinquent Property to Be Sold.— The City Treasurer of Portland, Ore., has given the final notice of sale of delinquent property in Portland, which includes the King Heights Electric line, which will be sold for delinquent assessments and taxes in the sum of $11,669. The city officials may have to buy the line to protect the residents of the district served.

New Twin City Transit Directors.— At the annual meeting of stockholders of the Twin City Rapid Transit Company, Minneapolis, Minn., the following directors were elected for a term of three years: Horace Lowry, president of the Twin City Rapid Transit Company; E. W. Decker, president of the Northwestern National Bank, Minneapolis, and Frank Bergen, attorney, of Newark. A. E. Ames of A. E. Ames & Company, Toronto, was elected to fill a vacancy on the board for one year, as was Ralph Budd, president of the Great Northern Railway.

Wants Change in Stock.—The Bristol & Plainville Electric Company, Bristol, Conn., has certified to the Secretary of State an amendment to its charter which will permit a change in the par value of the company's stock by the vote of the board of directors.

Bonds Called.—Notice has been given that a portion of the American Electric Power Company's 5 per cent refunding convertible gold bonds dated Aug. 1, 1911, has been called for redemption. The company, formerly known as the American Railways, Philadelphia, Pa., will pay on Feb. 1, 1925, the face amount of such bonds drawn for redemption, with interest thereon to Feb. 1 next and a premium equal to 2 per cent of the principal thereof. Holders of the various bonds called for redemption are notified to present and surrender them with coupon due on Feb. 1, 1925, and all subsequent coupons attached.

Debentures Offered. — Pearsons-Taft Company, Chicago, is offering at 99½ and accrued interest, to yield more than 7 per cent, $2,500,000 of series D 7 per cent convertible gold debentures of the Cities Service Company, New York, N. Y. The debentures, dated Dec. 1, 1919, and due Jan. 1, 1966, will be callable as a whole or in part at 102 and interest. The Cities Service Company owns directly or indirectly a majority of the common stock of more than 60 public utilities, comprising a large and successful system of electric light and power, street railway and more than 40 subsidiaries representing an important system of oil production, distribution, refining and marketing.

Value of Fresno Property Revised.—The California Railroad Commission, in a supplemental opinion and order, has fixed the value of property of the Fresno Traction Company as follows: Property within the city of Fresno, $1,237,073; property outside of the city of Fresno, $313,247; total property of Fresno Traction Company, $1,550,320. This valuation is fixed as of June 30, 1922, to include investments added since the previous valuation was made by the commission. The value so fixed is the amount on which earnings are to be calculated in order to carry out the intent of Section 12 of the resettlement franchise which the railway was authorized to exercise by the commission on May 3, 1922.

Cities Service to Redeem Scrip.—A plan for the redemption of its scrip dividend payments, which were non-interest bearing and amounted simply to a promise at some future date to pay, has been worked out by the Cities Service Company. In accordance with the plan the company will pay out the equivalent of more than $34,000,000. Of this, $10,000,000 will be in cash and the rest in the form of stock which will pay a dividend. Culmination of the plan followed the issuance of non-interest bearing scrip since July 1, 1921, and the date set for the conversion of these paper promises into the actual cash or interest bearing securities was March 1 next. The development of the public utility business of the company was said to have warranted the expenditure.

Preferred Stocks Offered.—Stone & Webster, New York, are offering at 103, to yield 6.80 per cent, $1,500,000 of 7 per cent cumulative preferred stock of the El Paso Electric Company, El Paso, Tex. The stock, known as series A, has a par value of $100. It is redeemable at $115. The proceeds from the sale of this preferred stock will be used to retire floating debt and for other corporate purposes.

Removal of Tracks Allowed. — The Pacific Electric Railway, Los Angeles, has been authorized by the California Railroad Commission to abandon and remove its tracks on the West Colorado Street and Orange Grove Avenue line, the Los Robles Avenue and Washington Street line and the California Street line in the city of Pasadena. Bus service has been substituted for the railway service.

Tramway to Abandon Line.—The Colorado Springs & Interurban Railway, Colorado Springs, Col., on Jan 3 was authorized by the State Public Utilities Commission to abandon its line known as the Roswell loop. Roswell is a suburb of the Springs. The railway is permitted to remove its tracks and pole line.

Authorized to Abandon Appurtenances.—The Nevada County Traction Company has been authorized by the California Railroad Commission to abandon and remove its railroad, tracks and appurtenances in the city of Grass Valley, Nevada County. It was shown at the hearing of the application that operations were carried on during 1923 at a net corporate loss of $5,377. Regular operation was suspended on Dec. 7, 1923, by reason of snow conditions, and has never been resumed due to inability of the company to obtain funds to finance operations.

Suit Over Railway Control Dismissed.—The bill in equity filed by Mary Walker Boggs, wife of the late R. H. Boggs, department store owner and traction magnate, in an effort to obtain the return of control of the Pittsburgh, Butler, Harmony & New Castle Railway, New Brighton, Pa., from David I. McCahill and his associates has been dismissed in an opinion handed down by Judge James R. Macfarlane. It was alleged by Mrs. Boggs that control of the railway was procured from her late husband without his receiving any compensation in return. The bill in equity sought an accounting and suggested the court order the stock of the company, which was apportioned to McCahill and his associates, returned to the Boggs estate. The court held, in short, that no duty devolved upon it to revise a disposition or "exchange of property made by an unusually capable business man" who took no steps toward that end in his own lifetime.

Sale of Niagara Gorge Road Approved.—The New York Public Service Commission has approved the sale of the entire outstanding capital stock of the Niagara Gorge Railroad to the Niagara Falls Power Company. E. E. Nicklis, who has been superintendent of the railway, will continue in this capacity. Other officers elected at the organization meeting are: A. H. Schoellkopf, president; Bert L. Jones, vice-president and general manager; Mrs. Joseph T. Jones and Ross R. Coddington, second and third vice-presidents, respectively; G. L. Corliss, secretary and assistant treasurer, and W. Paxton Little, treasurer. A. H. Schoellkopf, J. F. Schoellkopf, Jr., R. J. Hutton, Morris Cohn, Jr., and Ross R. Coddington were added to the directorate.

Book Reviews

Stinnes and His Enterprises (Stinnes und Seine Konzerne)

By Paul Ufermann and Carl Hüglin; Berlin, Verlag für Sozialwissenschaft. 206 pages.

Through the Siemens-Halske and Schuckert companies, which he controlled, Stinnes was for many years a very active figure in electrical development in Europe, Asia and South America. His promotion work was aggressive, and the combination of steel, chemical, banking, shipping and electrical manufacturing interests under his direction gave him great power. This book describes the corporate relations of his various companies, some of which were electric railway, and it contains nearly 100 corporation charts.

The Journal of Land and Public Utility Economics

Vol. I, No. 1. Quarterly. Published by A. W. Shaw Company, Chicago.

The Institute for Research in Land Economics and Public Utilities, of which Richard T. Ely, of Madison, Wis., is director, has assumed editorial responsibility for the new quarterly mentioned above. Dr. Ely is its editor in chief. The first number contains several articles of special interest to electric railway operators. Ralph Heilman, dean of Northwestern University School of Commerce, contributes an article on "Customer Ownership of Public Utilities," in which he speaks of its advantages and also of its dangers. Herbert E. Simpson, a research associate of the Institute, contributes an extended discussion on taxation of public service industry, with many statistics and charts, in which some interesting facts are given on electric railway taxation. Other articles of interest to electric railways concern the prevention of waste by city planning and the water power situation and the United States.

The Automobile: Its Province and Problems

The *Annals* of the American Academy of Political and Social Science for November, 1924, is devoted entirely to the automobile, its province and its problems. Altogether there are 50 contributed articles. The topics included: The services of the automobile; the manufacture and sale of automobiles, the home, the school and the church; the place of the motor in our transportation system; the building and financing of motor highways; the safety of the highways through traffic regulation. The contributors include men prominent in automobile manufacture, highway engineers, and others familiar with the topics on which they treat.

Personal Items

Harry Brown Joins Ohio Brass Company

Executive Editor of the "Journal" Resigns to Accept Executive Position with Manufacturer—Mr. Buck to Be Acting Head of Staff

Harry L. Brown, editor ELECTRIC RAILWAY JOURNAL, has resigned, effective February 1, to become an executive of the Ohio Brass Company, Mansfield, Ohio. Mr. Brown has been connected with the McGraw-Hill Company for the past 10 years. He started with the company as an assistant editor of *Electrical World* early in 1915. The following year he transferred to the position of Western editorial representative of the ELECTRIC RAILWAY JOURNAL in Chicago and subsequently was promoted to Western editor. In April, 1922, he moved to New York to become managing editor of the JOURNAL and then on January 1, 1923, was made co-editor with Henry W. Blake and placed in executive charge.

The earlier experience of Mr. Brown began with the degree of bachelor of electrical engineering from the University of Michigan. For two years before taking up editorial duties he was engaged in engineering work with the Aurora, Elgin & Chicago Railroad and the Chicago Telephone Company. During the war he was first lieutenant and captain in the Signal Corps. In this work he had a great deal to do with radio and after the war was co-author of Lauer and Brown's "Radio Engineering Principles," a successful college text book.

Mr. Brown's editorial work and broad contact in the power and electric railway fields have given him a very wide acquaintance and an intimate knowledge of the problems and progress of these industries. His studies of electric railway and bus transportation were extended to foreign countries during the summer of 1924 in the trip made to Europe by a committee of the American Electric Railway Association, of which he was a member. The report of this committee was presented at the annual convention of the American Association last October and published in the ELECTRIC RAILWAY JOURNAL for Sept. 20, 1924. It seems to have made a profound impression both in this country and abroad, as the committee continues to receive congratulatory letters on the value and usefulness of the matter presented.

As executive editor of the JOURNAL, much of Mr. Brown's work has been concerned with making the paper's policies more aggressive and its articles more practical. The staff has been strengthened by adding several new men drawn from active railway work. It is generally conceded that the paper is more valuable to the industry today than ever before. Its leadership is unquestioned. Its campaigns for the newer developments have been of far reaching effect in helping to restore the industry to a sound condition.

For several years past Mr. Brown has consistently emphasized in the paper an optimistic view of the outlook for the industry, because of his firm belief in its fundamental soundness. He has been an ardent advocate of measures to improve public relations and to merchandise the service, particularly those having to do with modernization of the railway plant and operating methods. He was one of those who first urged adoption of the bus by railway companies where suitable as an adjunct to their service,

H. L. Brown

for he sensed the value of the bus as a new transportation tool.

The success which has attended Mr. Brown's efforts is perhaps best attested by the enhanced position of the JOURNAL among the leading men of the industry. His associates deeply regret his retirement from the paper. But a strong editorial staff has been built up which will carry on aggressively the policies established under Mr. Brown's direction. To this end, Morris Buck, managing editor, is made acting head of the staff.

Charles Currie Heads South Bend Road

Another honor has been bestowed upon Charles Currie, who has been actively identified with the electric railway industry for more than 30 years. He has just been elected to the presidency of the Chicago, Lake Shore & South Bend Railroad, which he has served as acting vice-president.

In addition to holding this position, Mr. Currie also is president of the London Street Railway, London, Canada, and a director of the Northern Ohio Traction & Light Company, the Lake Shore Electric Railway and the Cleveland, Painesville & Eastern Railway. He was vice-president and general manager of the Northern Ohio Traction & Light Company up to 1916.

Mr. Currie has made Michigan City his headquarters for the past year, having assumed the duties of the late C. N. Wilcoxon, who headed the Chicago, Lake Shore & South Bend Railway. Mr. Currie is about 55 years of age.

N. McD. Crawford Retires

Executive of Columbus, Ohio, Property Withdraws from Utility Field After Forty Years of Service

Norman McD. Crawford has resigned as vice-president and treasurer of the Columbus Railway, Power & Light Company, Columbus, Ohio. Mr. Crawford is leaving the organization because of a wish to retire from active business. He has no plans for the future other than taking a much-needed rest. He has been at work more than 40 years nnd believes that the time has come for him to retire from active participation in the management of public utilities. Mr. Crawford's resignation is to become effective at the convenience of the board of directors of the company, but not later than March 1.

Mr. Crawford has been connected with the company at Columbus since 1916. He went to Columbus early that year as the representative of the E. W. Clark & Company Management Corporation. The following March he was elected vice-president of the company to assist S. G. McMeen of the Management Corporation, then president of the Columbus Railway, Power & Light Company. At the time of the change in control of the property at Columbus several years ago the wide experience of Mr. Crawford was quickly appreciated by the new interests in the company, and he continued with it undisturbed as to the scope of his activities.

Mr. Crawford is particularly well known in the East. As he himself has said, he has been in business more than 40 years. As a matter of fact, as a contractor, he built the Glastonbury line of the Hartford Street Railway, Hartford, Conn., as long ago as 1892, and was afterward retained by the company as engineer. In 1894 he was made general manager of the company, which position he held until the Hartford Street Railway was taken over by the Connecticut Company. In December, 1908, Mr. Crawford was elected president of the Mahoning & Shenango Railway & Light Company. Later he became connected with the Reading Transit & Light Company, Reading, Pa., which property he served as president and general manager. He was also for several years vice-president of the Ohio Electric Railway, Cincinnati.

The scope of Mr. Crawford's activities is well illustrated by the posts he filled at Youngstown and at Reading. The Mahoning & Shenango Railway & Light Company owns and controls electric railways at Youngstown, Warren, Niles and other cities in Ohio and in Newcastle, Sharon, Wheatland and Sharpsville in Pennsylvania, and the lighting properties in Youngstown, Newcastle, Sharon and Sharpsville. In

all, that company operates 145 miles of electric railway.

The Reading company controls the lines in and around Reading, Pa. In addition to being president and general manager of the Reading Transit Company, Mr. Crawford was also vice-president and general manager of the Neversink Mountain Railway and vice-president and general manager of the Oley Valley Railway, Reading, also vice-president and general manager of the Metropolitan Electric Company.

In 1906 Mr. Crawford spent 6 months in Europe investigating electric railway conditions there for the committee on public ownership and operation of the National Civic Federation. His conclusions, with those of his associates in the investigation, were embodied later in several volumes on the subject, published by the federation.

Personnel of Bus Division Announced

Under a new plan of organization of the West Chester Street Railway, West Chester, Pa., made necessary by the taking over of the West Chester Transportation Company, operating buses in Chester and Montgomery Counties in southeastern Pennsylvania, C. W. Christensen will be general superintendent of motor coach operation and also will head the personnel and public relations departments. Mr. Christensen was formerly with the Bell telephone system. Three divisions of the bus system will be established as follows:

Wilmington Division, Lewis Souder, division superintendent, to include the routes between Wilmington and Chester; Wilmington, Avondale, West Grove and Oxford; Wilmington and Kennett Square, via Hamorton; Wilmington and Kennett Square, via Hockessin.

West Chester Division, Henry Corcoran, division superintendent, routes between West Chester and Pottstown; West Chester and Norristown; West Chester and Wilmington; West Chester and Chester; Media and Kennett Square; Downingtown, Strafford and other Lincoln Highway points.

Phoenixville Division, Eli Stoltzfuss, division superinendent, routes between Phoenixville and West Chester; Phoenixville and Norristown; Phoenixville and Valley Forge; Phoenixville and Spring City, Royersford, Phoenixville and Collegeville.

P. J. Duffy Heads New Transportation Department in Chicago

P. J. Duffy was appointed, effective Jan. 1, superintendent of the central division of the Chicago Surface Lines transportation department. Mr. Duffy, one of the oldest employees in point of service of that organization, started work in 1876, during the horse car days, with the Chicago West Division Street Railway. In 1898 he was appointed assistant station superintendent. Two years later he became station superintendent. With the formation of the Chicago Surface Lines in 1914 he was appointed assistant division superintendent and continued in that position until 1923, when he was transferred to the headquarters of the transportation department with a special assignment in contact with the downtown traffic police. Out of this arrangement grew the plans for the formation of the new central division, through which it is hoped to get more effective co-operation with the police department in directing traffic through the loop district. Twelve supervisors have been assigned to Superintendent Duffy to help direct this work. Reference to the creation of this new department is made elsewhere in this issue.

W. B. Wheeler Advanced with Third Avenue Railway

William B. Wheeler has been appointed assistant superintendent of transportation of the Third Avenue Railway, New York, under William E. Thompson, vice-president and superintendent of transportation. Mr. Wheeler started as a conductor with the Atlantic Avenue Railroad, Brooklyn, in 1894. He left that company in 1897 to become connected with the Metropolitan Street Railway, operating the Broadway line in New York City. At that time the line was operated by cable. In 1898 Mr. Wheeler was transferred to the Lenox Avenue Railway, 146th Street and Lenox Avenue, then operating the first underground conduit system in New York City. Here he was made starter. The Lexington Avenue line was changed over from cable to underground conduit in 1901, and Mr. Wheeler was sent to that line as depot starter. On Dec. 2, 1903, he began to serve the Dry Dock, East Broadway & Battery Railway, the Central Crosstown Street Railway and the Metropolitan Street Railway, all operating out of the Avenue B depot. In July, 1908, Mr. Wheeler was made superintendent of the Westchester Electric Railroad, which operates in Mount Vernon, New Rochelle and other towns in Westchester County. He was general superintendent under the receiver in entire charge of the property. In December, 1919, he went to the Third Avenue Railway as superintendent of schedules. He has continued in that capacity since that time.

W. B. Wheeler

Alfred H. Schoellkopf, vice-president of the Niagara Falls Power Company, Niagara Falls, N. Y., has been elected president of the Niagara Gorge Railroad, taken over recently by the power company principally because of the strategic position of the railway with respect to future power development plans at the falls.

Archie Andrews, a veteran employee of the Rockford & Interurban Railway, Rockford, Ill., has been advanced to the position of general superintendent, to succeed J. A. Phelan, who resigned recently to become connected with the Chicago Motor Coach Company.

George A. Henshaw, recently appointed co-receiver of the Oklahoma Railway, Oklahoma City, Okla., was at one time a member of the Oklahoma constitutional convention, Assistant Attorney-General under Charles West from 1907 to 1911 and a member of the State Corporation Commission from 1911 to 1917. He has been a prominent practicing attorney in Oklahoma City since his retirement from the commission and has specialized in public utility cases before the commission and courts. He has, however, never represented the Oklahoma Railway in any capacity.

Clark G. Anderson, general manager and assistant to the president of the Arkansas Valley Interurban Railway, Wichita, Kan., resigned on Jan. 1 to accept a position of cashier with the Fifth Avenue Trust & Savings Bank, Moline. Mr. Anderson was head of the Wichita property only since last July, when he resigned as manager of the Clinton, Davenport & Muscatine Railway, Moline, Ill. He started upon a public career in Moline as city engineer. In this capacity he served 6 years. His ability gained for him a place on the first city commission when the form of government was changed. He began service with the interurban railway at Moline in 1914.

Robert Ridgway, chief engineer of the New York City Board of Transportation, has been elected president of the American Society of Civil Engineers. Mr. Ridgway has been identified with rapid transit construction in New York City 25 years. Just now he is engaged in the task of designing and planning New York City's new subway system intended for municipal operation. Mr. Ridgway joined the Public Service Commission in 1912 in charge of the supervision of subways and elevated lines, including five tunnels under the East and Harlem Rivers, embracing 620 miles of single track at a construction cost of more than $200,000,000.

Obituary

W. A. House

William Alexander House, formerly president of the United Railways & Electric Company, Baltimore, Md., died in that city on Jan. 27, aged 64 years. He had been ill only a few days. The malady to which he succumbed was diagnosed as pneumonia.

Mr. House retired from the United Railways & Electric Company in 1917. He saw many years of active service

with the railways in that city and was an inexhaustible source of information with respect to all of their operations. He was chivalry itself and all his letters, no matter how prosaic their subject, reflected this attitude of the man. His bold flowing hand and the personal touch that he gave to his letters marked him as a man of unusual characteristics.

In fact, it often seemed that all the letters that went out from the company during the time he was president were signed by him. For the last seven years Mr. House had not been actively engaged in business. He had earned for himself the right to take things easy after 37 years of active service with the local lines in his native city, and this he did.

It was in 1879 that he entered the employ of the old People's Passenger Railway as an assistant in the accounting department. He served in this and other departments until 1883, when the People's company was reorganized with T. E. Hambleton as president. At that time Mr. House was made secretary and general superintendent of the new company. In 1889 the People's Railway was succeeded by the Baltimore Traction Company, and soon thereafter Mr. House was made general manager of the combined properties. In this capacity in the year 1892 the work was carried on by him of electrifying the lines in Baltimore. In recognition of his faithful service there came in 1895 his election to the vice-presidency of the company, in addition to his duties as general manager. The following year Mr. House was elected president of the combined properties to succeed ex-Governor Frank Brown.

In 1897 another consolidation of Baltimore properties was effected, the City & Suburban and Baltimore Traction Companies being merged into the new Baltimore Consolidated Railway, with Nelson Perin as president. Mr. House was made vice-president and general manager of this company. Two years later there was effected the consolidation which brought into one company all the traction properties in Baltimore. The company that succeeded to the different independent lines was the United Railways & Electric Company, with which Mr. House became connected as second vice-president and general manager. In 1907, shortly after the death of John M. Hood, he succeeded to the presidency.

Mr. House in the various offices that he held with the railway passed through some very trying experiences, but probably the most difficult problems he was called upon to solve followed the terrible fire in Baltimore in 1904. In this conflagration the central power station of the company and many miles of track and line were destroyed. In the work of reconstruction everybody did his part, but the job of directing the work of reconstruction fell to Mr. House and made unusual demands upon him.

It is 20 years since those trying experiences, but in the electric railway world the memory still lingers of the celerity with which the reconstruction of the system was carried out and of the part that Mr. House played in restoring order so far as the properties under his direction were concerned.

Earl J. Payden, manager of the Rock Island Southern Railway, Rock Island, Ill., several years ago, a member of the Chicago Traffic Club and in recent years associated with T. M. Cox in the central freight bureau in Galesburg, died Jan. 22 after an operation. Mr. Payden was 43 years old.

John Baillie Hamilton, commercial manager and tramway manager to the City Council of Leeds, England, died on Jan. 9 at the age of 69. He was at one time traffic superintendent and afterward assistant general manager of the Glasgow Corporation Tramways. He showed so much energy and ability that he was appointed general manager of the Leeds City Tramways more than 20 years ago. Under his sway the Leeds tramways developed into a great organization, with an annual revenue of about £1,000,000. Mr. Hamilton's organizing ability got further scope when he was appointed commercial manager to the corporation, a newly created post and one which has few if any analogies in Britain. As commercial manager he controlled more than 8,000 workpeople engaged in the tramway, cleansing and highways departments. He was one of the founders of the Municipal Tramways Association and was connected also with the Tramways & Light Railways Association, Institute of Transport and Tramways National Joint Industrial Council.

Glenn G. Howe, for many years senior vice-president of the Link-Belt Company, Chicago, Ill., died in Muskegon, Mich., on Christmas Day, 1924. He joined the Link-Belt organization in 1877 as an office boy. When the three related interests, the Ewart Manufacturing Company, the Link-Belt Machinery Company and the Link-Belt Engineering Company, were merged as the Link-Belt Company, in 1906, Mr. Howe became vice-president in charge of the company's Indianapolis operations. Later he organized the Howe Chain Company at Muskegon.

Charles R. Guthrie, inspector for the Westinghouse Traction Brake Company in New York City, died on Dec. 28, 1924. Mr. Guthrie was graduated from the department of science and technology at Pratt Institute in 1923. He entered the employ of the Westinghouse Traction Brake Company as special apprentice at the Wilmerding shops on July 10, 1923, and on Aug. 1, 1924, was assigned to the New York office. His duties have been assumed by V. D. Bethge, already a member of the New York office staff.

Manufactures and the Markets

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

Swiss Maker in American Market

Plans Large Manufacturing and Sales Activity—Investment of Upward of $50,000,000 Contemplated

Laurence Wilder, American representative of Brown, Boveri & Company of Switzerland, makers of electric locomotives and equipment for power houses, announced on Jan. 26 that his company has decided to enter the American field. An initial investment of between $35,000,000 and $40,000,000 will be made. Negotiations are in progress for the purchase of a number of plants and the American Brown-Boveri & Company will probably be actively engaged in the electrical manufacturing business in this country within 90 days.

The plans call for the manufacture of all kinds of heavy electrical equipment. According to Mr. Wilder, the Brown-Boveri interests anticipate a good business in heavy traction and are prepared to furnish any type of system or locomotive desired. In Switzerland, Chile, France and Russia both direct-current and alternating-current electrifications have been made by this company, and a recent contribution has been the manufacture of several large Diesel-electric locomotives for the soviet government. Oil breakers and power mercury rectifiers are among other lines of activity. The company expects to add a complete electrical line of American manufacture and Brown-Boveri design in a short time.

The company controls a wide range of patents covering electrical apparatus in use in Europe, but not yet in the American market. As examples, Mr. Wilder has mentioned the Buchli drive for locomotives and the mercury arc power rectifier. It is said that the company will so direct its efforts as to be prepared to participate in the electrification of American railroads and extension of the use of superpower.

Brown, Boveri & Company, with main offices and plant in Switzerland, hold a position in Europe similar to that of the leading electrical manufacturers in the United States. The company employs many thousands of operators, has subsidiary plants in Germany, France and Italy, and it is not so many years ago that it took over and absorbed the European plant of the Westinghouse Electric & Manufacturing Company. For the last two years Brown-Boveri has had an agency in the United States, the chief purpose of which has been to test out the American market for Brown-Boveri products. It is said to be generally recognized all over the world that in some of its fields of operation there is no counterpart for the products of the Swiss company.

Metal, Coal and Material Prices

Metals—New York	Jan. 27, 1925
Copper, electrolytic, cents per lb	14.875
Copper wire base, cents per lb	17.25
Lead, cents per lb	9.95
Zinc, cents per lb	7.97
Tin, Straits, cents per lb	57.875
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.45
Somerset mine run, Boston, net tons	2.125
Pittsburgh mine run, Pittsburgh, net tons	1.95
Franklin, Ill., screenings, Chicago, net tons	1.875
Central, Ill., screenings, Chicago, net tons	1.45
Kansas screenings, Kansas City, net tons	2.50
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$7.25
Weatherproof wire base, N.Y., cents per lb.	20.00
Cement, Chicago net prices, without bags	2.10
Linseed oil (5-lb. lots), N. Y., per gal	$1.15
White lead in oil (100-lb. keg), N. Y., cents per lb., carload lots	0.1347
Turpentine (bbl. lots), N.Y., per gal	0.94

Yellow Coach to Expand

Lehman Brothers and Goldman, Sachs & Company, New York investment brokers, have acquired a substantial interest in the Yellow Coach Manufacturing Company, and Robert Lehman and John M. Hancock have been elected directors. Additional large factory development is indicated by the formation of a $1,000,000 subsidiary to Yellow Cab of Chicago by John Hertz to operate "Drivurself" systems throughout the country. The passenger cars to be rented by the company, shown for the first time at the recent New York automobile show, will be made by the Yellow Coach Manufacturing Company.

Rolling Stock

United Railways, St. Louis, Mo., has ordered 15 White buses and has placed an order with the St. Louis Car Company for 15 steel bodies for these vehicles.

Houston Electric Company, Houston, Texas, it is reported, has purchased three new Reo buses from the R. W. Price Company, distributors for the Reo in Houston.

Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., is said to be in the market for buses to replace automotive equipment which has been in use on bus lines in Newport News recently taken over by the railway.

Youngstown Municipal Railway, Youngstown, Ohio, has arranged to replace the first seven buses used in Youngstown. The vehicles were authorized by the city of Youngstown under the provisions of its service-at-cost ordinance. The buses in question were Republic Knight chassis under bodies by Bender. The seven original bodies are being rebuilt for use upon the same number of White chassis. They were purchased and will be operated by the Youngstown Municipal Railway under the provisions of the service-at-cost ordinance.

Track and Line

Connecticut Company, New Haven, Conn., plans to relocate its tracks at Morse's Station, Woodmont, Conn., in connection with proposed new highway improvements. The tracks will be straightened out, which will eliminate a dangerous curve.

Detroit Street Railways, Detroit, Mich., will construct considerable new trackage during the present year which it is estimated will save the department $1,000 a day. The Jefferson-Grand River line will be split up, the Jefferson line being looped somewhere in the vicinity of City Hall and the Grand River around Capital Park. About $75,000 will be expended for new tracks at the Woodward Avenue carhouse. It is planned to combine the Clairmount and St. Jean lines into a crosstown belt line. Other connecting links are to be built, including one hooking the Fenkell line with the Northwestern Belt line leading directly to the Highland Park Ford plant. The proposed double-track extension of the Trumbull line to Fort Street is announced. A new carhouse for the northeast section is also proposed to save dead mileage on the Davison line. In summing up these major parts of the 1925 construction program Ross Schram, general manager, stated they would mean more and better service to the car riders of Detroit and a considerable saving in the department's expenses.

Trade Notes

Col. Eugene C. Peck, after a service of almost 25 years as general superintendent and later as works manager of the Cleveland Twist Drill Company, Cleveland, Ohio, has retired from active management. He will continue as a stockholder in the company and as a member of the board of directors. Serving as a member of the American engineering standards committee, as chairman of the standardization committee of the A. S. M. E. and as vice-chairman of the National Screw Thread Commission, he has been largely responsible for many of the much-needed reforms that have taken place in standards of practice.

Eisemann Magneto Corporation, New York, N. Y., announces that arrangements have been completed for the acquisition of the automotive business of the Duplex Engine Governor Company. The entire stock of raw and finished materials, special machinery and facilities for manufacture have been transferred to the Eisemann plant, and it is expected that but a slight interruption in production will occur. Both the well-known Simplex and Duplex models will be continued. Production is being organized and plans made for marketing a new developed mercury turbine governor very soon.

Okonite Company, Passaic, N. J., will open an office at 310 South Michigan Avenue, Chicago, on Feb. 1 and will take over the sale of Okonite products in the Western territory. Charles E. Brown, formerly vice-president of the Central Electric Co., has been appointed vice-president in charge of the territory west of Pittsburgh and east of the Rocky Mountains of the Okonite Company, with headquarters in Chicago. A. L. McNeill has been appointed manager of the railroad department. E. H. McNeill and Ray N. Baker have been appointed sales engineers. L. R. Mann has been appointed manager of the St. Louis office.

Premier Equipment Corporation, Houston, Tex., is the successor company to the Houston Railway Car Company. The business of the new company will consist of locomotive and car repairing, buying and selling cars, locomotives, rails and industrial equipment. The general offices will be at Calhoun Avenue and Interurban Viaduct. P. R. Plumb is retiring from the Houston Railway Car Company. The new company is composed of L. A. Wiltshire, formerly of the Birmingham Rail & Locomotive Company, Birmingham, Ala.; O. D. Cleveland of the Equitable Equipment Company, New Orleans, La., and M. R. Ducey, Houston Railway Car Company, Houston, Tex.

Pure Carbon Company, Wellsville, N. Y., announces the appointment of H. H. Miller as its Pittsburgh representative, with office located at 7719 Lyman Street.

The Okonite-Callender Cable Company, Inc., has purchased a plant in Paterson, N. J., where it will manufacture lead-covered paper-insulated cables.

American Wood Preservers' Association will hold its twenty-first annual meeting at the Congress Hotel, Chicago, on Feb. 3, 4 and 5.

New Advertising Literature

Rail Welding & Bonding Company, Cleveland, Ohio, has issued bulletin No. 112, describing Una rod 300, a recent development of its laboratory for building up cupped rails.

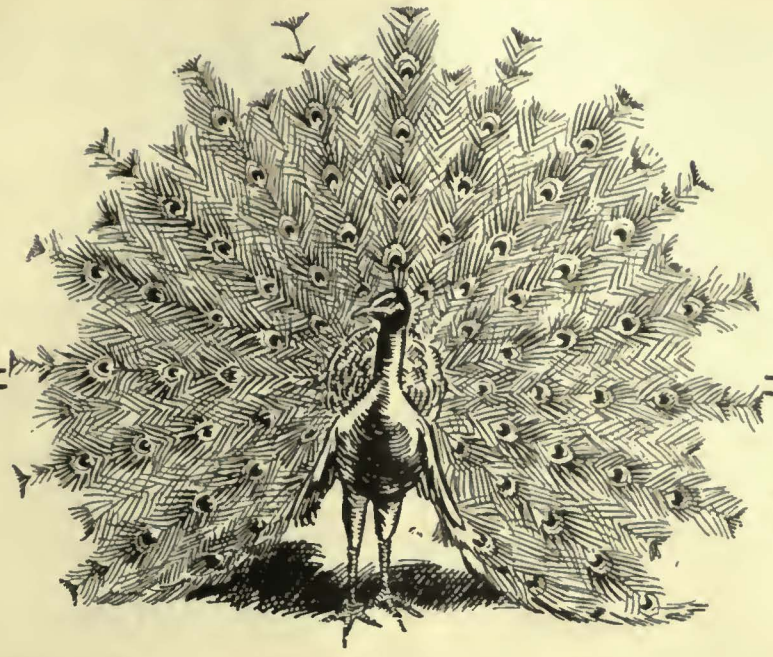
General Electric Company, Schenectady, N. Y., has issued a new 32-page bulletin, describing four improved types of oil circuit breakers. The bulletin contains illustrations and tables and covers details of construction, operation and characteristics.

Ohmer Fare Register Company, Dayton, Ohio, has issued a pamphlet entitled "The Human Factor," which describes the company's attitude on the human element as a factor in business.

Beaudry Company, Inc., Everett, Mass., has issued a descriptive circular of a new upright air hammer. This is furnished with rams weighing from 100 to 1,200 lb. All sizes are equipped with treadles and hand levers so that the hammers may be operated either by hand or foot.

Electric Machinery Manufacturing Company, Minneapolis, Minn., has issued bulletin No. 861 on electric power apparatus.

More-Jones Brass & Metal Company St. Louis, Mo., has issued an attractively illustrated and handsomely bound souvenir volume in commemoration of the 50th anniversary of the founding of its business in 1874. In this book, containing some 70-odd pages, are outlined the features of its organization and products which have been developed over a period of half a century. Photographs of the many personalities who have been a part of the romance of the brass industry are reproduced within these pages.



ON GUARD!

for the emergency stop

PEACOCK BRAKES

A few swift turns of the hand-wheel and the sure grip of the Peacock Brake takes hold with maximum braking power—a retarding grip which is more effective than spinning wheels backward with reversed motors.

That's what a hand-brake is for,—i.e. to stop the car as quickly as any other means, if some emergency renders the air brakes inoperative. But not every hand-brake will do it. Peacock Brakes are made to stop the car under emergency conditions—they are always "ON GUARD."

The Peacock Staffless

Peacock Staffless Brakes are especially adapted for the modern, light-weight safety car, both single and double-truck. Minimum platform space, light weight, high braking power.

NATIONAL BRAKE COMPANY, Inc.
890 Ellicott Square, BUFFALO, N. Y.

Bankers and Engineers

St. Louis Built-
Ever-Wear STEEL BODIES
for Street Railways-

PIONEER experience in the building of every type of street railway car has enabled us to incorporate the practical advantages of spacious layout and quick passenger interchange with the luxury of the best automobile practice.

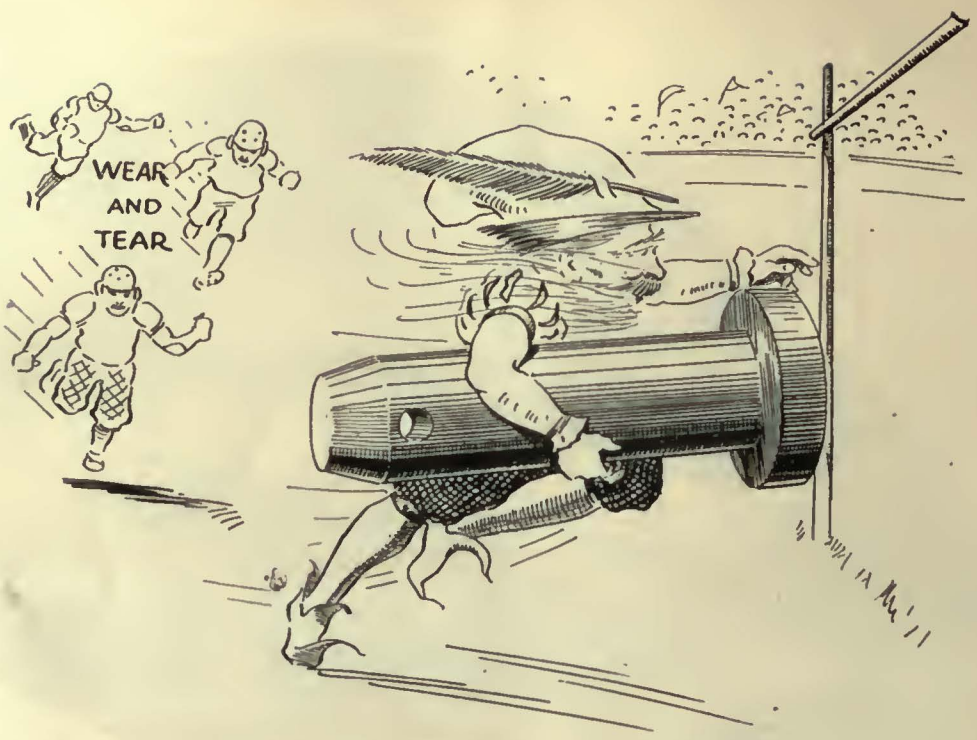
The illustrations show interior and exterior views of 29-passenger steel body recently built for the Houston Electric Company.

This "Ever-Wear" Steel body built in our quality shops will survive the chassis in normal service and it can be remounted when the original chassis is discarded.

In consulting us you are consulting manufacturers who are familiar with the best railway practice—exclusive builders for street railway companies.

Write today for further particulars and prices.

St. Louis Car Company
St. Louis, Mo.



They can't tackle this player before his long run is done!

Wear and tear, abuse and corrosion, these are the "tackle" on your opponent's team! Let Boyerized Parts play on your side. They are trained by our special process to outwit the ravages of the gruelling service on electric railways, and reach the goal of longer life and lower cost.

BOYERIZED PARTS

Here's the list to choose from

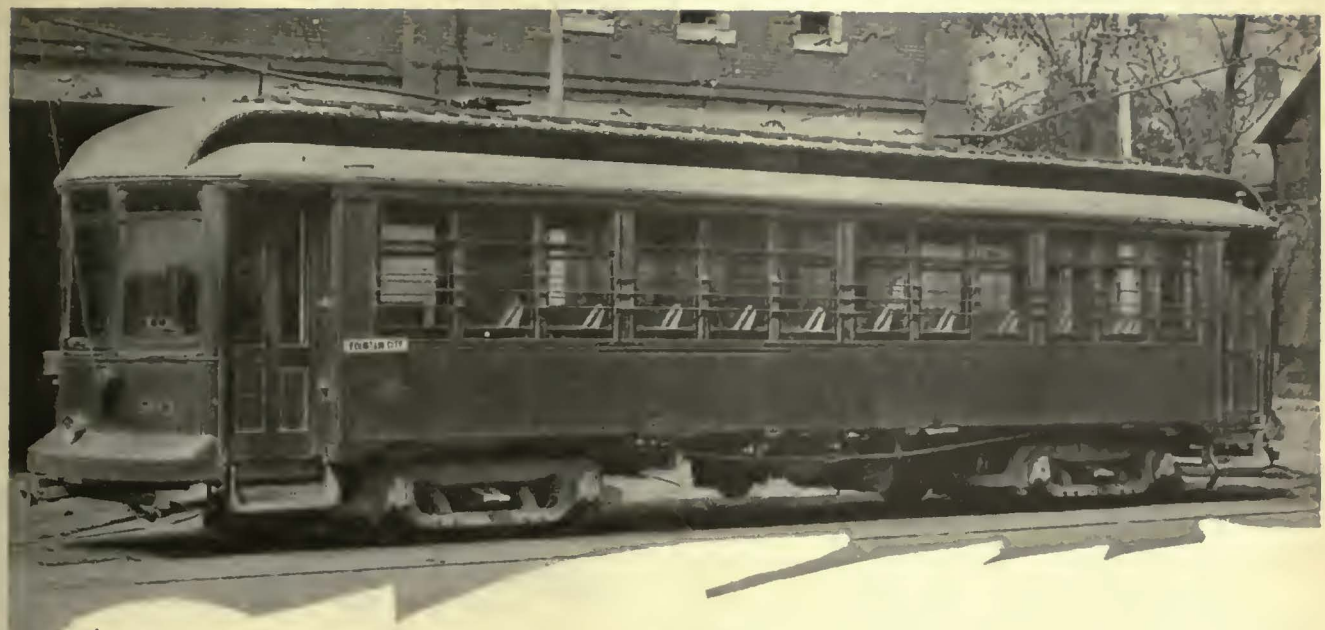
- Brake Pins
- Brake Hangers
- Brake Levers
- Pedestal Gibs
- Brake Fulcrums
- Center Bearings
- Side Bearings
- Spring Post Bushings
- Spring Posts
- Bolster and Transom Chaffing Plates
- Manganese Brake Heads
- Manganese Truck Parts
- Bushings
- Bronze Bearings

Bemis Car Truck Company

Electric Railway Supplies

Springfield, Mass.

Representatives:
Economy Electric Devices Co., Old Colony Bldg., Chicago, Ill.
F. F. Bodler, 903 Monadnock Bldg., San Francisco, Cal.
W. F. McKenney, 54 First Street, Portland, Oregon
J. H. Denton, 1328 Broadway, New York City, N. Y.
A. W. Arlin, 772 Pacific Electric Bldg., Los Angeles, Cal.



Modernize—Miller-ize *city cars too!*

Nearly all the important interurban lines have found an end to trolley troubles in the smooth-running wire-hugging, big capacity, 3-inch contact surface of Miller Trolley Shoes.

And if fast interurbans need the security of a trolley shoe that hugs the wire as no wheel ever could, that gives more mileage, that wears the wire less, and that delivers all the current the motors can demand, city cars need it equally as much. For city service involves constant stopping and starting, sharp curves, switches, intersections, ... and wire breaks mean costly traffic tie-ups.

Remember too, Miller Trolley Shoes present no backing up problem. The design and construction of the shoe itself ensures equally smooth running in either direction.

Make the Miller Shoe test yourself.

Remember—

1. **Less wire wear.**
2. **More mileage.**
3. **No dewirements.**
4. **Silent operation.**
5. **Steady current delivery.**

Miller Trolley Shoe Co.
Boston-21, Mass.

MILLER TROLLEY SHOES

Tune in on a wave length of 100% satisfaction!

This is station CCH, the Consolidated Car Heating Company, broadcasting our regular weekly program direct from our factory at Albany.

Tilting Heat Deflectors for Car Comfort

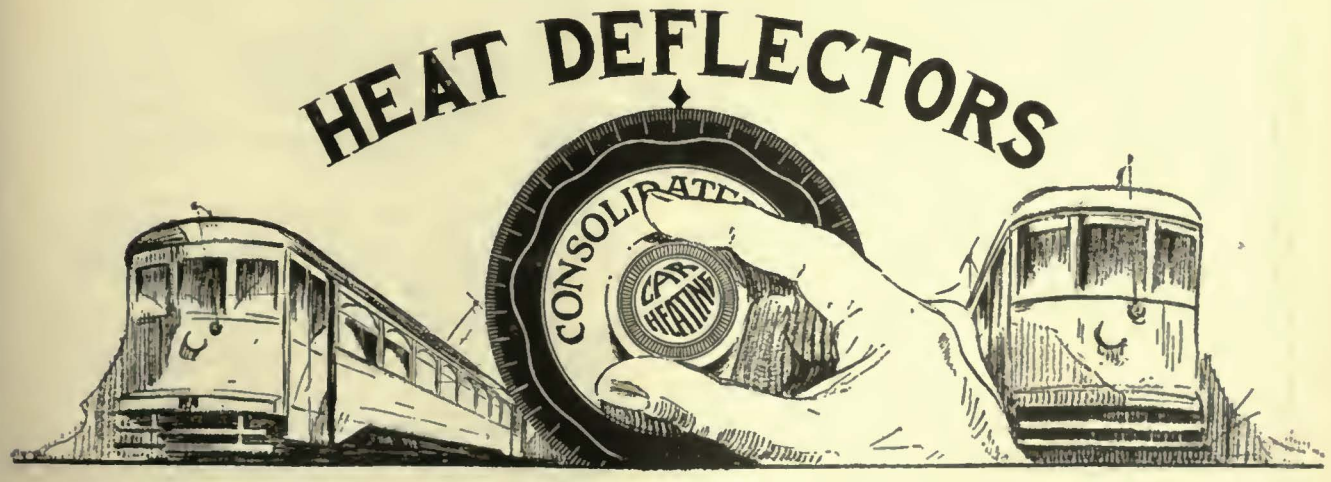
USED in combination with Consolidated Cross Seat Heaters, the Consolidated Tilting Heat Deflector assures a unit of maximum heating comfort, appreciated by passengers.

The heated air follows the angle of the deflector to the back of the seat where it has a free escape. Heat cannot pocket and seat cannot become overheated.

Consolidated engineers have provided for automatically reversing the inclination of the deflector by the movement of the seat. Light and rust-proof, Consolidated Deflectors are made for either single or double coil heaters in varying lengths. This tilting deflector is merely another example of the advanced thinking of the engineers who have linked with electric car heating the success of the open coil principle and thermostat control.

Station CCH now signing off until this time next week.

Good day!



CONSOLIDATED CAR HEATING COMPANY

New York ALBANY, N. Y. Chicago

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, 5 cents a word, minimum charge $3.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH

1 to 3 inches..... $4.50 an inch
4 to 7 inches..... 4.20 an inch
8 to 14 inches..... 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

Advertising inch is measured vertically on one column, 3 columns 30 inches to a page.

E.F.J

POSITIONS VACANT

SPECIAL track work draftsmen wanted preference given men having had experience with special track work manufacturer, but will consider one or two junior draftsmen familiar with trigonometry. State age, experience and salary in first letter. P-774, Electric Railway Journal, Old Colony Bldg., Chicago, Ill.

EXPERIENCED traffic superintendent wanted, to maintain schedules and take supervision of inspectors. P-775, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

POSITIONS WANTED

GOOD track man wants job. All experience has been with electric railways. Newt Smith, Little River, Texas.

MASTER mechanic, with broad experience and successful record backed by prominent executives in railway field, desires change. PW-769, Elec. Ry. Journal, 10th Ave. at 36th St., New York.

SUPERINTENDENT of equipment thoroughly experienced and successful in the efficient maintenance of auto buses, city and interurban cars, desires to change. Confidential interview solicited. PW-771, Electric Railway Journal, 10th Ave. at 36th St., New York.

FOR SALE: The following gears can be disposed of for immediate delivery:

Type	Teeth	Bore	Solid or Split	No. Gears
GE-70 and 80	71	5.485"	solid	124
GE-70 and 80	71	5.500"	split	20
GE-1000	67	4.870"	solid	9
GE-1000	67	4.500"	split	2
GE-1000	67	4.000"	split	2
GE- 800	69	4.000"	split	1
GE- 74	67	6.000"	split	9

If interested, please communicate with

The Milwaukee Electric Railway & Light Company
Purchasing Agent
Public Service Building, Milwaukee, Wisconsin

FOR SALE
Used Seat Cushions, Seat Backs and Frames
If interested detailed information will be furnished.
Purchasing Agent
KANSAS CITY RAILWAYS CO.
Kansas City, Mo.

FOR SALE
12 G. E. 264A MOTORS
TRANSIT EQUIPMENT COMPANY
Cars—Motors
501 Fifth Avenue, New York

WANTED
USED PORTABLE SUB-STATION

Will buy or rent one used portable substation, 500 to 1000 kw.-600-v.D.C. output, complete with control equipment, car and accessories. Rotary converter preferred. Also transformers for use with above, to be used with 4000 or 23000-60-cy. primaries.

Bidders to submit proposal to

L. R. WAGNER, E.E.
Department of Street Railways, St. Jean and Shoemaker Aves., Detroit, Michigan

WANTED TO BUY
Scrap and Relaying Rails, Trolley and Feed Wire
We are Interested in Buying: Entire Trolley Roads and Power Plants for Dismantling Purposes.
THE S. SNYDER CORPORATION
14 to 21 Mart Place, Rochester, N. Y.
N. Y. Office—721 Knickerbocker Bldg.

WE WANT TO BUY
30—West. 306-C.V.-4
MOTORS
Have you any to offer?
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

1200 Tons 70 lb. ASCE
Relaying Rails
Strictly First Class
With Angle Bars
ZELNICKER IN ST. LOUIS
Cars—Locomotives—Hoists—Etc.

SOME ONE WANTS TO BUY

the equipment or machinery that you are not using.

This may be occupying valuable space, collecting dust, rust and hard knocks, in your shops and yards.

SELL IT BEFORE DEPRECIATION SCRAPS IT

THE SEARCHLIGHT SECTION
IS HELPING OTHERS

—LET IT HELP YOU ALSO

0128

WHAT AND WHERE TO BUY

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

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

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Johnson & Co., J. R.
St. Louis Car Co.
Westinghouse E. & M. Co.

Axles, Car Wheels
Bethlehem Steel Co.

Axles, Front & Rear Motor Truck & Passenger Car
Timken Detroit Axle Co.

Axles, Trailer & Motor Bus
Timken Detroit Axle Co.

Babbitt Metal
Ajax Metal Co.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co., The

Batteries, Dry
National Carbon Co.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Brill Co., J. G., The
General Electric Co.
More-Jones Brass & Metal Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Baldwin Locomotive Wks.
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Consolidated Car Heat. Co.
Elec. Service Supplies Co.

Bearings, Roller
Norma-Hoffman Bearings Corp.

Boilers
Babcock & Wilcox Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Trackwork Co.

Bonds, Rail
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Westinghouse E. & M. Co.

Book Publishers
McGraw-Hill Book Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Br. Shoe & Fdy. Co.
Bemis Car Truck Co.
Brill Co., The J. G.

Brakes, Brake Systems and Brake Parts
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Westinghouse Tr. Br. Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
National Carbon Co.
Westinghouse E. & M. Co.

Brushes, Graphite
National Carbon Co.

Buses, Motor
Brill Co., The J. G.
International Motor Co.
N. Y. Transportation Co.
St. Louis Car Co.

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Long Co., E. G.

Cables. (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Cars, Dump
Brill Co., J. G., The
Differential Steel Car Co.
St. Louis Car Co.

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Cars, Passenger, Freight, Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co
National Ry. Appliance Co.
St. Louis Car Co.
Wason Mfg. Co.

Cars, Gas, Rail
Brill Co., J. G., The
St. Louis Car Co.

Cars, Second Hand
Electric Equipment Co.
Transit Equipment Co.

Cars, Self-Propelled
Brill Co., J. G., The
General Electric Co.

Car Wheels, Rolled Steel
Bethlehem Steel Co.

Castings, Brass, Composition or Copper
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
Bemis Car Truck Co.
Fort Pitt Steel Castings Co.

Castings, Malleable and Brass
Amer. Br. Shoe & Fdy. Co.
Bemis Car Truck Co.
Fort Pitt Steel Castings Co.
Horne & Ebling Corp.

Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceilings, Plywood, Panels
Haskelite Mfg. Co.

Change Carriers
Cleveland Fare Box Co.

Circuit-Breakers
Anderson, A. & J. M. Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Elec. Service Supplies Co.

Coils Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
Intern'l Register Co.
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Tr. Br. Co.

Condensor Papers
Irvington Varnish & Ins. Co

Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Connectors, Balderless
Frankel Connector Co.
Westinghouse E. & M. Co.

Connectors, Trailer Car
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Controllers or Parts
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Copper Wire
Anaconda Copper Mining Co.

Cord, Bell, Trolley, Register
Brill Co., The J. G.
Elec. Service Supplies Co.
Internat'l Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works
Silver Lake Co.

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing, Frog & Switch
Ramapo Ajax Corp.
Wm. Wharton, Jr., & Co., Inc.

Crossing, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.

Crossings
Ramapo Ajax Corp.

Crossings, Track (See Track, Special Work)

Crossings, Trolley
Ohio Brass Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Elec. Service Supplies Co.
Morton Mfg. Co.

Dealer's Machinery
Elec. Equipment Co.
Hyman-Michaels Co.
Transit Equipment Co.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heat. Co.
General Electric Co.
Nat'l Pneumatic Co., Inc.
St. Louis Car Co.

Doors & Door Fixtures
Brill Co., The J. G.
Consolidated Car Heat. Co.
General Electric Co.
Morton Mfg. Co.
St. Louis Car Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

Drills, Track
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.

Ears
Ohio Brass Co.

Economizers
Power Specialty Co.

Electrical Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.
Roebling's Sons & Co., J. A.

Electric Grinders
Railway Trackwork Co.
Western Electric Co.

Electrodes, Carbon
Railway Trackwork Co.

Electrodes, Steel
Railway Trackwork Co.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. S.
Archbold-Brady Co.
Beeler, John A.
Bibbins, J. Rowland
Buchanan & Layng Corp.
Bureau of Commercial Economics, Inc.
Day & Zimmerman, Inc.
Drum & Co., A. L.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelly Cooke & Co.
Ong, Joe R.
Railway Audit & Inspection Co.
Richey, Albert S.
Robinson & Co., Dwight P.
Sanderson & Porter
Stevens & Wood
Stone & Webster
White Eng. Corp., The J. G.

Engineering Equipment Engineering Co.

Engines, Gas, Oil or Steam
Allis-Chalmers Mfg. Co.
Westinghouse E. & M. Co.

Fare Boxes
Cleveland Fare Box Co.
Johnson Fare Box Co.
Nat'l Ry. Appliance Co.

Fare Registers
Ohmer Fare Register Co.

Fences, Woven Wire and Fence Posts
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Consolidated Car Fender Co.
Elec. Service Supplies Co.

Fibre and Fibre Tubing
Westinghouse E. & M. Co

Field Coils (See Coils)

Flangeway Guards, Steel
W. S. Godwin Co., Inc.

Floodlights
Elec. Service Supplies Co.

Forgings
Brill Co., J. G., The

Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.

Frogs, Track (See Track Work)

Frogs, Trolley
Ohio Brass Co.

Fnnnel Castings
Wm. Wharton, Jr. & Co., Inc.

Fuses and Fuse Boxes
Consolidated Car Heat. Co
General Electric Co.
Westinghouse E. & M. Co

Fuses, Refillable
General Electric Co.
Johns-Manville, Inc.

Gaskets
Westinghouse Tr. Br. Co.

Gas Producers
Westinghouse E. & M. Co.

Gas-Electric Cars
General Elec. Co.
Westinghouse E. & M. Co.

Gates, Car
Brill Co., The J. G.

Gear Blanks
Bethlehem Steel Co.
Brill Co., J. G., The

Gear Cases
Chillingworth Mfg. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Bethlehem Steel Co.
Elec. Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.

Gong (See Bells and Gongs)

Greases (See Lubricants)

Grinders and Grind Supplies
Railway Trackwork Co.

Grinders, Portable
Railway Trackwork Co.

Grinders, Portable Electric
Railway Trackwork Co.

Grinding Bricks & Wheels
Railway Trackwork Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Elec. Service Supplies Co.
More-Jones Brass Metal Co.
Nuttall Co., R. D.
Star Brass Works

Headlights
Elec. Service Supplies Co.
General Eelctric Co.
Ohio Brass Co.

Headlining
Haskellte Mfg. Co.
Panelyte Co.

Heaters for Special Purposes
Power Specialty Co.

Heaters, Car (Electric)
Consolidated Car Heat. Co
Gold Car Heat. & Ltg. Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Elec. Service Supplies Co.
Smith Heater Co., Peter

Helmets, Welding
Railway Trackwork Co.

Hydraulic Machinery
Allis-Chalmers Mfg. Co.

Instruments Measuring, Testing and Recording
Elec. Service Supplies Co.
General Electric Co.
Johns-Pratt Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Stand. Underground Cable Co.
Westinghouse E. & M. Co.

Insulating, Silk & Varnish
Irvington Varnish & Ins. Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Westinghouse E. & M. Co.

Insulation Slots
Irvington Varnish & Ins. Co.

Insulators (See also Line Materials)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse E. & M. Co

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

Jacks (See also Cranes, Hoists and Lifts)
Buda Company
Elec. Service Supplies Co.

Joints, Rail
(See Rail Joints)

Journal Boxes
Bemis Car Truck Co.
Brill Co., J. G.
Fort Pitt Steel Castings Co.

Junction Boxes
Horne & Ebling Corp.
Std. Underground Cable Co.

Lamps, Guards and Fixtures
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Arc & Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Nichols-Lintern Co.
Ohio Brass Co.

Lanterns, Classification
Nichols-Lintern Co.

Lightning Protection
Elec. Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Shaw, Henry M.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Archbold-Brady Co.
Electric Ry. Equipment Co.
Elec. Service Sup. Co.
General Electric Co.
Hubbard & Co.
More-Jones Brass & Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm. Wharton, Jr., & Co., Inc.

Locomotives, Electric
Baldwin Locomotive Wks.
General Electric Co.
McGuire-Cummings Mfg. Co
St. Louis Car Co.
Westinghouse E. & M. Co.

Lubricating Engineers
Galena Signal Oil Co.
Texas Co.
Universal Lubricating Co.

Lubricants, Oil and Grease
Galena Signal Oil Co.
Texas Co.
Universal Lubricating Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Castings
Wm. Wharton, Jr. & Co.

Manganese Steel Guards Rails
Ramapo Ajax Corp.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr., & Co., Inc.

Manganese Steel Switches Frogs & Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.

Meters (See Instruments)

Molding, Metal
Allis-Chalmers Mfg. Co.

Motor Buses (See Buses, Motor)

Motors, Electric
Allis-Chalmers Mfg. Co.
Westinghouse E. & M. Co.

Motors and Generators, Sets
Allis-Chalmers Mfg. Co.
General Electric Co.

Motormen's Seats
Brill Co., J. G.
Elec. Service Sup. Co.
Heywood-Wakefield Co.
St. Louis Car Co.
Wood Co., Chas. N.

Nuts and Bolts
Bemis Car Truck Co.
Bethlehem Steel Co.
Hubbard & Co.

Oil Heaters
Power Specialty Co.

Oils (See Lubricants),

Omnibuses (See Buses, Motor)

Oxy-Acetylene (See Cutting Apparatus, Oxy-Acetylene)

Packing
Elec. Service Supplies Co.
Westinghouse E. & M. Co.

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

Paints and Varnishes for Woodwork
National Ry. Appliance Co

Pavement Breakers
Ingersoll Rand Co.

Paving Guards, Steel
W. S. Godwin Co., Inc.

Paving Material
Amer. Br. Shoe & Fdy. 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
Bemis Car Truck Co.
Elec. Service Sup. Co.
Ohio Brass Co.
Westinghouse Tr. Brake Co.

Pipe Fittings
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Sup. Co.

Pole Line Hardware
Bethlehem Steel Co.
Ohio Brass Co.

Poles, Metal Street
Elec. Ry. Equipment Co.
Hubbard & Co.

Pole Reinforcing
Hubbard & Co.

Poles & Ties Treated
Bell Lumber Co.
International Creosoting & Construction Co.

Poles, Ties, Posts, Piling & Lumber
Bell Lumber Co.
International Creosoting & Construction Co.

Poles, Trolley
Bell Lumber Co.
Elec. Service Supplies Co.
Nuttall Co., R. D.

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

Portable Grinders
Buda Company

Potheads
Okonite Co.

Power Saving Devices
National Ry. Appliance Co
Railway Improvement Co.

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Pumps
Allis-Chalmers Mfg. Co.

Pumps Vacuum
Ingersoll Rand Co.

Punches, Ticket
Intern'l Register Co., The
Wood Co., Chas. N.

Rail Braces & Fastenings
Ramapo Ajax Corp

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.
Rail Joint Co.

Rail Joints—Welded
Lorain Steel Co.

Rails, Relaying
Foster Co., L. B.
Hyman-Michaels Co.

Rails, Steel
Bethlehem Steel Co.
Carnegie Steel Co.
Foster Co., L. B.

Railway Paving Guards, Steel
Godwin Co., Inc., W. S.

Railway Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Rail Welding
Railway Trackwork Co.

Rattan
Brill Co., The J. G.
Elec. Service Supplies Co.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.

Reclaimers, Waste & Oil
Oil & Waste Saving Machine Co.

Registers and Fittings
Brill Co., The J. G.
Elec. Service Supplies Co.
Intern'l Register Co., The
Rooke Automatic Register Co.

Reinforcement, Concrete
Amer. Steel & Wire Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.

Repair Work (See also Coils)
General Electric Co.
Westinghouse E. & M. Co.

Replacers, Car
Elec. Service Sup. Co.

Resistances
Consolidated Car Heat. Co.

Resistance, Wire and Tube
General Electric Co.
Westinghouse E. & M. Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

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

Roofing Car
Pantasote Co., Inc.

Roofs
Haskelite Mfg. Co.

Sanders, Track
Brill Co., The J. G.
Elec. Service Sup. Co.
Nichols-Lintern Co.
Ohio Brass Co.

Sash Fixtures, Car
Brill Co., The J. G.
Horne & Ebling Corp.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Elec. Service Sup. Co.

Seats, Bus
Brill Co., J. G., The
Heywood-Wakefield Co.
St. Louis Car Co.

Seats, Car (See also Rattan)
Brill Co. The J. G.
Heywood-Wakefield Co.
St. Louis Car Co.

Seating Materials
Brill Co., J. G.
Heywood-Wakefield Co.

Second Hand Equipment
Electric Equipment Co.
Hyman-Michaels Co.
Transit Equipment Co.

Shades, Vestibule
Brill Co., The J. G.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Side Bearings (See Bearings, Center and Side)

Signals, Car Starting
Consolidated Car. Heat Co.
Elec. Service Sup. Co.
Nat'l Pneumatic Co., Inc.

Signals, Indicating
Nichols-Lintern Co.

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Block
Elec. Service Sup. Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

Slack Adjusters (See Brake Adjusters)

Sleet Wheels and Cutters
Anderson Mfg. Co., A. & J. M.
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

Smokestacks, Car
Nichols-Lintern Co.

Sockets & Receptacles
National Metal Molding Co.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Consolidated Car Fender Co
McGuire-Cummings Mfg. Co.

Soldering and Brazing Apparatus (See Welding Processes and Apparatus)
Irvington Varnish & Ins. Co.

Solderless, Connector
Frankel Connector Co.

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co.

Spikes
Amer. Steel & Wire Co.

Splicing Compounds
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs, Car and Truck
Amer. Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Fort Pitt Spring & Mfg. Co.
St. Louis Car Co.

Sprinklers, Track and Road
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.

Steel Castings
Wm. Wharton, Jr., & Co., Inc.

Steel and Steel Products
Carnegie Steel Co.

Steps, Car
Brill Co., J. G., The
Morton Mfg. Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.

Stop Signals
Nichols-Lintern Co.

Storage Batteries (See Batteries, Storage)

Strain, Insulators
Anderson, A. & J. M. Mfg. Co.
Ohio Brass Co.

Strand
Roebling's Sons Co., J. A.

Superheaters
Babcock & Wilcox Co.
Power Specialty Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switches, Safety
Johns-Pratt Co.

Switches, Selector
Nichols-Lintern Co.

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track Special Work)

Switches and Switchboards
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Tampers, Tie
Railway Trackwork Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Bethlehem Steel Co.
Ramapo Ajax Corp.

Telephones and Parts
Elec. Service Supplies Co.

Terminals, Cable
Std. Underground Cable Co.

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heat. Co.
Gold Car Heat. & Ltg. Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers & Destroyers
Elec. Service Supplies Co.

Ties, Mechanical
Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel
Carnegie Steel Co.
W. S. Godwin Co., Inc.
International Steel Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tongue Switches
Wm. Wharton, Jr., & Co., Inc.

Tool Steel
Bethlehem Steel Co.

Tools, Track & Miscellaneous
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Hubbard & Co.
Railway Trackwork Co.

Torches, Acetylene (See Cutting Apparatus)

Towers and Transmission Structures
Archbold-Brady Co.
Westinghouse E. & M. Co.

Trackless Trolley Cars
Brill Co., J. G., The
St. Louis Car Co.

Track Expansion Joints
Wm. Wharton, Jr., & Co., Inc.

Track Grinders
Railway Trackwork Co.

Track, Special Work
Bethlehem Steel Co.
Buda Company
N. Y. Switch & Crossing Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr., & Co., Inc.

Transfer (See Tickets)

Transfer Tables
American Bridge Co.

Transformers
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Treads, Safety, Stair, Car Step
Morton Mfg. Co.

Trolley Bases
Elec. Service Supplies Co.
General Electric Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Bases, Retrieving
Elec. Service Supplies Co.
Nuttall Co., R. D.
Ohio Brass Co.

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

Trolley Material, Overhead
Anderson, A. & J. M. Mfg. Co.
Elec. Service Supplies Co.
More-Jones Brass & Metal Co.
Ohio Brass Co.

Trolley Shoe
Miller Trolley Shoe Co.

Trolley Wheel Bushings
More-Jones Brass & Metal Co.

Trolley Wheels & Harps
More-Jones Brass & Metal Co.
Thornton Trolley Wheel Co.

Trolley Wheels (See Wheels, Trolley)

Trolley Wire
Amer. Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
Roebling's Sons Co., J. A.

Trucks, Car
Baldwin Locomotive Wks.
Bemis Car Truck Co.
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Taylor Elec. Truck Co.

Tubing, Yellow & Black Flexible Varnish
Irvington Varnish & Ins. Co.

Turbines, Steam
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Turbines, Water
Allis-Chalmers Mfg. Co.

Turnstiles
Elec. Service Supplies Co.
Perey Mfg. Co., Inc.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Varnished Papers & Silks
Acme Wire Co.
Irvington Varnish & Ins. Co.

Ventilators, Car
Brill Co., The J. G.
Nat'l Ry. Appliance Co.
Nichols-Lintern Co.
Railway Utility Co.
St. Louis Car Co.

Welded Rail Joints
Alumino-Thermic Corp.
Ohio Brass Co.
Railway Trackwork Co.

Welders, Portable Electric
Ohio Brass Co.
Railway Trackwork Co.

Welding Processes and Apparatus
Alumino-Thermic Corp.
General Electric Co.
International Oxygen Co.
Ohio Brass Co.
Railway Trackwork Co.
Westinghouse E. & M. Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Cast Iron
Bemis Car Truck Co.
Carnegie Steel Co.

Wheels, Wrought Steel
Carnegie Steel Co.

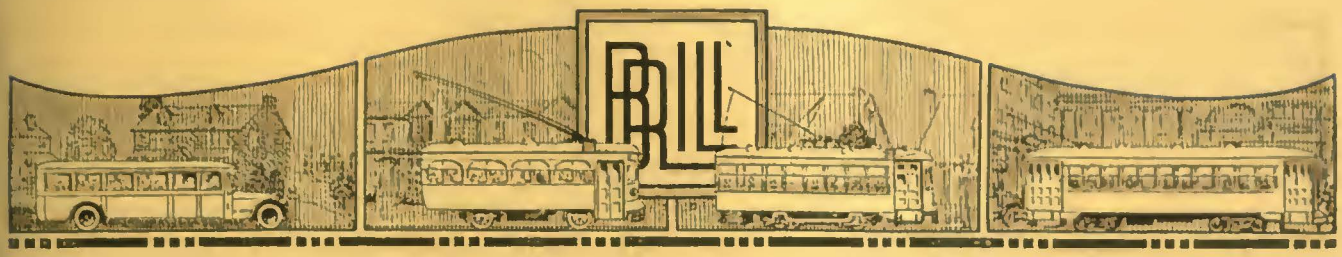
Wheels, Trolley
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works.

Whistles, Air
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

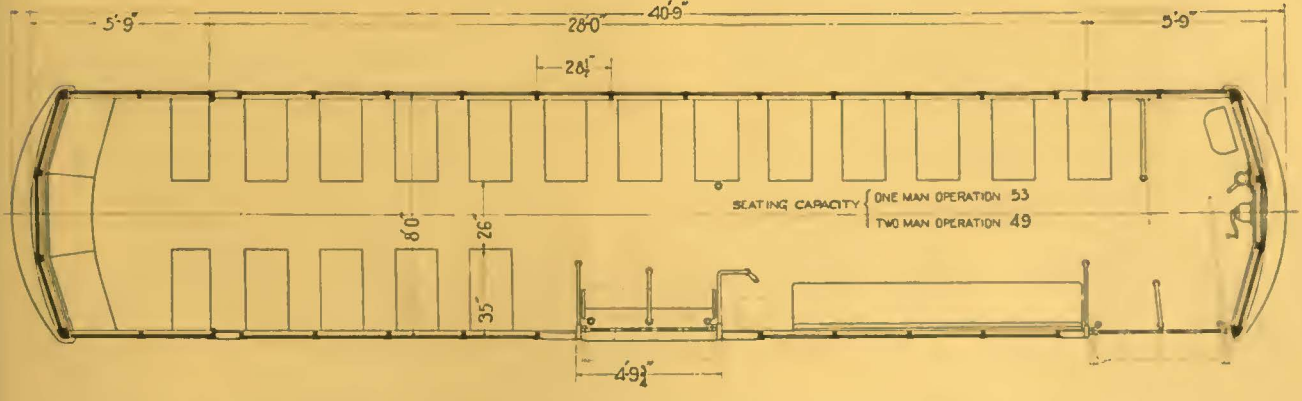
Wire Rope
Roebling's Sons Co., J. A.

Wires and Cables
Acme Wire Co.
Amer. Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
General Electric Co.
Okonite Co.
Roebling's Sons Co., J. A.
Westinghouse E. & M. Co.
Std. Underground Cable Co.

ALPHABETICAL INDEX TO ADVERTISEMENTS



Shreveport's All-Service Cars



This type car, recently furnished the Shreveport Railways Company by the American Car Company, has distinctive features which particularly adapt it to all kinds of service.

While light in weight and arranged for one-man operation, it is also equipped with double front-entrance and center-exit doors to facilitate quick passenger interchange in heavy traffic.

Equipped with quadruple 25 hp. motors and mounted on Brill 77-E Low-level trucks, it weighs 30,090 lb. complete.

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO ST LOUIS MO — G.C. KUHLMAN CAR CO. CLEVELAND OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

KEEPING your equipment physically fit—*maintenance*—means keeping it most fit for profits.

You should *maintain* your equipment with duplicate parts—built by the equipment manufacturer—and thereby insure against the high cost of repeated pull-ins.

You should *modernize* existing equipment by installing wherever possible new devices that are designed to give better service at a lower maintenance cost.

GENERAL ELECTRIC

Schenectady, N. Y.

54C-23